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5TH INTERNATIONAL CONFERENCE OF DEVELOPMENT & ECONOMY Kalamata Greece

21-23
October 2022

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ISBN 978-618-86130-1-0

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Digital platforms in the creative industries: Evidence from the Greek artists and young creators

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ABSTRACT

This research investigates the adoption and impact of digital platforms among participants in the Greek Creative Industries. Digital platforms are considered as IT-based infrastructures that enable two or more user groups such as customers, advertisers, service providers, producers, suppliers, etc. to interact and allow them to perform various tasks (Srnicsek, 2017[21]; Cusumano et.al., 2019 [2]; de Reuver et et.al., 2018 [4]; Gawer, 2009 [8]). In recent years, a lot of research has emerged around the rationale, benefits and characteristics of digital platforms, from identifying their key constituents and how they generate value (de Reuver et al., 2018 [4]), to understanding the implications of platforms for development in the field of information systems (Cusumano et.al., 2019 [2]). Through the lenses of an Innovation-Technology Adoption framework this paper provides an overview of the results of primary empirical research among Greek creatives active in different areas of the creative industries. The results of the research in online platforms and their use open the black box of the drivers and barriers for Greek creators in their decision to make use of online platforms. They are also revealing regarding the effects of the covid-19 crisis on individuals' creative activity. Based on the questionnaire results, we also get to know the basic parameters that contribute to the adoption of online platforms by Greek creators. This paper presents the preliminary results of an on-going research endeavor and identifies key factors that shape the decision of creatives in using certain platforms and the benefits they derive from them. The results also point to avenues for future research.

KEYWORDS

Creative industry, creative entrepreneurship, digital platforms

1. INTRODUCTION

The creative and cultural industries have undergone tremendous changes with the development and popularization of the Internet and the establishment of digital platforms. Digital Platforms provide creative micro-entrepreneurs with intermediaries that offer them more than just new sales opportunities. Creators have found new ways to showcase their art, find suppliers and sell to new, established audiences worldwide. (Stavrianidi & Constantelou, 2022 [22]). This paper explores the extent of Digital Platforms' adoption by Creative Entrepreneurs in Greece. In particular, this paper examines the factors that influence the adoption of digital platforms by Greek creators from various creative and cultural sectors, and the benefits they consider to derive from their use.

The present research is driven by the following questions:

- Have Greek creators adopted digital platforms to improve their creative activity?
- Which factors mainly contribute to the adoption of digital platforms by Greek creators?
- Which digital platforms do Greek creators choose to use and what is their intensity of use?
- How has the pandemic crisis affected Greek creators' creative activity?
- What type of skills, other than artistic, do creators and creative people need to possess in the age of digitalization?

The paper is based on primary empirical research among Greek creators active in many different areas of the creative industries.

The paper is organized as follows: the next Section 2 presents the theory of Innovation-Technology Adoption as a broader framework that guided the empirical part of digital platforms adoption by Greek creatives. Section 3 presents the methodology followed and Section 4 presents the preliminary descriptive results of the research among a sample of creators from the Cultural and Creative Industries (CCI) in Greece. The last Section summarizes the key findings and limitations of the study and discusses areas for further research.

2. THEORETICAL BACKGROUND

2.1 INNOVATION ADOPTION

Much research has been conducted on the factors influencing the adoption of Information Technology (IT) and Information Systems (IS) artifacts. For example, Jeyaraj et al. (2006) [11] present a meta-analysis of factors influencing the adoption and dissemination of Information Technology (IT) innovations and the factors that can be used to predict IT-related adoption. As stated in their article, a significant number of theories have been proposed to examine the adoption behavior of individuals, the most prevalent of which are:

- The Innovation Diffusion Theory, Rogers (1983, 1995),
- The Technology Acceptance Model, Davis (1989)

- The Technology Acceptance Model II, Venkatesh et al. (2003),
- The Theory of Planned Behavior, Ajzen (1991),
- The Theory of Reasoned Action Fishbein and Ajzen (1975),
- The Unified Theory of Acceptance and Use of Technology, Venkatesh et al. (2003),
- The Diffusion/Implementation Model, Kwon, and Zmud (1987),
- The Tri-Core Model Swanson (1994)

Various IT innovations have been explored through the lenses of these theories, including email systems, the World Wide Web, microcomputers, spreadsheets, and Microsoft Windows (Jeyaraj et al., 2006) [11]. These theories typically refer to individuals' behavioral intentions to adopt certain innovations or to actually adoption behaviors. For example, the theory of rational action explains individuals' behavioral intentions to adopt, while the diffusion of innovation theory predicts the behavior of individuals who will adopt. Sometimes, behavioral intention and actual behavior are used interchangeably. Despite differences in application, these theories generally hold that beliefs influence attitudes, which in turn influence intentions, which in turn influence behavior (Jeyaraj et al. (2006) [11].

There are differences among the characteristics of these theoretical frameworks that examine innovation adoption. For example, the Technology Acceptance Model (TAM) introduces perceived ease of use and perceived usefulness as driving factors, whereas innovation diffusion theory (IDT) suggests the relative advantage, complexity, compatibility, observability, and trialability of the technologies or the technological artifacts (Jeyaraj et al. (2006) [11].

Most of these proposed theories are appropriate to investigate technology adoption only at the individual level whereas others, such as the Innovation Diffusion Theory (IDT) (Rogers, 1983) are more powerful in explaining technology adoption in terms of how a firm or an organization uses technology. In a similar vein, Leung et al. (2015) [14] discussed a series of factors that influence actors' initial adoption decisions and the subsequent decisions for continuous adoption of IT-based innovations and developed a framework for the classification of these factors into three main categories: Technological, Organisational, and Environmental (TOE).

The TOE is a theoretical framework that describes the process through which an individual enterprise adopts and implements a technological innovation and understands it as being influenced by three independent contexts, the technological, the organizational, and the environmental.

- The Technological Context.

The technological context describes a company's internal techniques and technologies and the set of external technologies available in the market. The initial approach to the technology framework concerns the extent to which the availability of certain technologies can influence the adoption process.

- Organizational Context.

The organizational context refers to the characteristics and resources available to a company to adopt and operate a new technology successfully. For an organization to receive the benefits of technology, it must also have the appropriate resources to support this adoption.

- Environmental Context.

The external factors of an organization that present opportunities and constraints for technological innovations and how an organization relates to a business represent the Environmental Context. That is, a company, irrespective of its size, may be forced to accept a technology due to the pressures it receives from different external forces.

Based on the original study of Leung et al. (2015) [14] that was selected as the most suitable basis to guide the empirical part of the research, we developed a framework of factors affecting the extent of platform adoption by Creative Entrepreneurs that was used to guide the empirical part of the study. This is shown in Figure 3.

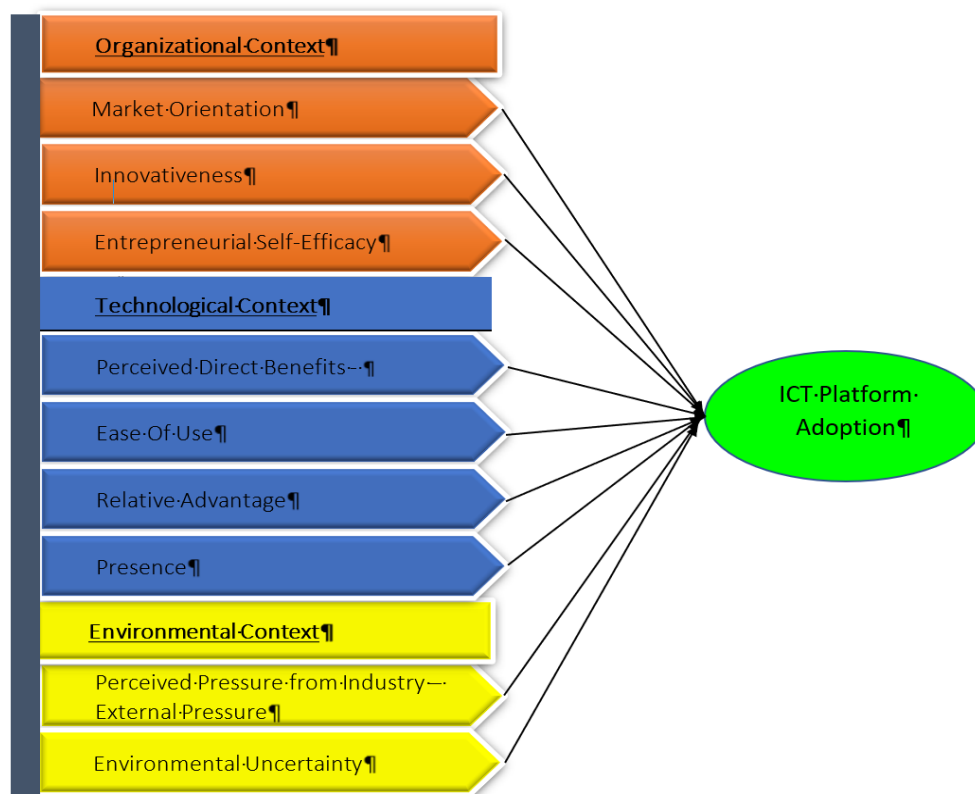


Figure 3: A framework of factors affecting the extent of Platform Adoption by Creative Entrepreneurs based on Leung et. a. (2015)

As shown in Figure 3, we followed the TOE Framework and identified three main pillars that may affect the creators' adoption of digital platforms:

- The creators' Organizational Context.
- The platforms' Technological Context.
- The overall Environmental Context.

Based on the relevant literature, we identified specific factors that we consider to contribute the most to creators' decision to adopt and/or invest in specific digital platforms. Several studies were reviewed to identify these relevant factors including those by Davis (1989) [3], Jaworski & Kohli (1993) [10], Kuan and Chau (2001) [13], McGee et al. (2009) [15], and Pateli et al. (2020) [17]).

Starting from **the creators' organizational context**, we chose "**market orientation**" to determine the creators' tendency to orient themselves towards the market for disseminating or extracting information related to their field. Jaworski & Kohli (1993) [10] refer to the generation of information from the market, the dissemination of this information to departments, and the responsiveness of departments throughout the organization (see Kohli and Jaworski 1990) [12] as market orientation. Theoretical approaches to market orientation can be divided into two broad categories: behavioral and cultural (Gaur, Vasudevan & Gaur, 2011) [7].

"**Innovativeness**" refers to the degree to which an individual, or other units of adoption, take over new ideas earlier than other members of a social system. In other words, a willingness to change should be observed. In the case of creators, innovation is a crucial ingredient for both the adoption of digital platforms and the diffusion of new technology. Because innovative businesses or individuals are considered more risk-averse, innovation plays a critical role for creators in adopting digital platforms, even in cases where resources are scarce and business environments are uncertain. (Pateli et.al 2020) [17]

"**Entrepreneurial self-efficacy**," measures the creators' belief in their ability to launch a business venture successfully. It incorporates each person's personality and is an indicator of their entrepreneurial intentions (McGee et al. 2009) [15]. Also, "Entrepreneurial self-efficacy" can be improved by improving the rate of entrepreneurial activities and education and training (Florin, Karri, & Rossiter, 2007 [6]; Mueller & Goic, 2003 [16]; Zhao et al., 2005 [24]).

Continuing with **the Platforms' Technological Context** the "**perceived direct benefits**" refer to the benefits an individual creator or a small business can gain from adopting digital platforms compared to non-users. Some of the advantages of Digital Platforms are that they can help improve the operational performance of a business, make transaction processes faster, and help it stay competitive in its industry. (Kuan & Chau 2001)[13].

"**Ease of use**" refers to the perceived effort required to use a particular system, in our case, digital platforms. From the definition of "easiness" it follows that it is: "freedom from difficulty or great effort" (Davis, 1989, p. 3)[3]. An effort is a resource that an individual can allocate to the various activities he/she is responsible for (Radner & Rothschild, 1975)[18].

"**Relative advantage**" is attained when an innovation, in our case Digital Platforms, is considered to provide more benefits than its predecessor, including the return on investment before adopting this innovation (Pateli et.al 2020)[17]. In this vein, when an innovation is expected to be more beneficial compared to other innovative technologies/tools, then it is having a "relative advantage" (Grover, 1993)[9], (Ramdani et al., 2013)[19].

"**Presence**" in the market for a creative enterprise applies when the results of its innovative activity are visible to third parties. By leveraging digital platforms, a creative industry can increase creators' visibility in the market along with their competitors and partners while providing the possibility to share knowledge and develop effective communication and marketing channels. (Pateli et.al 2020)[17].

Regarding the third pillar of the overall **Environmental Context**, "**Perceived Pressure from Industry**" along with "External Pressure" consists an important factor as creative businesses in order to remain competitive may feel under pressure to adopt digital platforms by their business partners who may have already adopted similar technologies. We sought to examine the degree to which external pressure from competitors, customers, peers, and governments exist and guide the creators' adopting behavior in order not to lose their competitive advantage. (Kuan & Chau 2001)[13] (Pateli et.al 2020)[17].

"**Environmental Uncertainty**" refers to the tendency of entrepreneurs to act proactively in the strategic path they will take to maintain their advantage. In our case, we considered Digital Platforms to function as an important way of increasing reach, performance, and competitiveness due to the need to deal with the dynamism of the specific industry environment (Pateli et.al 2020)[17]. We also sought to investigate whether the advent of COVID-19 had an impact on creatives' use of platforms assuming that such periods of uncertainty and crises may enhance their creative potential.

2.2 DIGITAL PLATFORMS

Much research has been done on digital platforms (DPs) from identifying their main characteristics and how they generate value (de Reuver et al., 2018)[4] to understanding the implications of platforms for development in the field of information systems (Cusumano et al., 2019)[2]. There are various definitions of digital platforms according to the field in which they are studied. Gawer et al., (2019) suggested that digital platforms are a distinct type of information technology (IT) artifact with distinct properties, which lend particular affordances for development. In the context of this research, digital platforms are considered as IT-based innovations. In information systems, DPs are digital infrastructures that enable two or more user groups to interact, such as customers, advertisers, service providers, producers, and suppliers, and allow

them to perform various tasks (Srnicek, 2017; Cusumano et al., 2019; de Reuver et al., 2018; Gawer, 2009)[21][2][4][8].

Cusumano et al. (2019)[2] identified two broad categories of digital platforms: the transaction platforms and the innovation platforms. Transaction platforms or exchange platforms' purpose is to facilitate transactions between different organisations, entities, and individuals. Transactional platforms are divided into subcategories according to their principal purpose. From previous research we know that creators use several subcategories of the transaction platforms such as: social media platforms, learning platforms, freelancing and portfolio platforms, e-commerce platforms, tool offering platforms all-inclusive platforms, etc.

2.1 CREATIVE AND CULTURAL INDUSTRIES (CCI)

There are various definitions for the “Creative and Cultural” Industries in the literature, some of which are presented below:

- “Cultural and creative industries” or “culture and creativity industries” (CCIs) usually encompass any enterprise producing marketable goods of high aesthetic or symbolic nature, the use of which aims at stimulating consumers' reactions stemming from this experience. The end good or service comprises an intellectual property and a product subject to the legislation on the protection of intellectual property rights”. (Avdikos et al., 2017)[1]
- “Creative” industries” are those industries which use culture as an input and have a cultural dimension, although their outputs are mainly functional” (European Commission, 2010)[5]

For the needs of our research we relied on the study of David Throsby (2008)[23], who proposed the Concentric Circles Model to define CCIs. His model is based on the proposition that cultural goods and services create two distinct types of value: economic and cultural. The model's claim is that the cultural value, or cultural content, of the goods and services produced is the most important distinguishing characteristic of cultural industries. The model consists of four concentric circles to classify the industries that produce cultural goods and services. In the model's central circle are the core creative arts and the rest industries are in the next circles, the circles/categories and the main industries they contain are:

- Core creative arts (literature, music, performing arts, visual arts)
- Other core cultural industries (film, museums, galleries, libraries, photography),
- Wider cultural industries (heritage services, publishing, print media, sound recording, television and radio, video and computer games)
- Relate industries (advertising, architecture, design, fashion).

There are already many digital platforms chosen by creators from all creative industries. Some of the most popular DPs among them and their key features are presented in the Table 2 below.

Table 2. List of Digital Platforms for the Creatives

Facebook	https://www.facebook.com/	Social media Platform that can be used also for advertisement, portfolio browsing or website promotion
Instagram	https://www.instagram.com/	Social media Platform that can be used also for advertisement, portfolio browsing or website promotion
Twitter	https://twitter.com/	Social media Platform can benefit same as Facebook & Instagram
Etsy	https://www.etsy.com/	e-commerce Platform that offers an online marketplace where creatives can sell their goods or buy supplies for their art .
Shopify	https://www.shopify.com/	e-commerce Platform that offers an online marketplace where creatives can sell their goods or buy supplies for their art .
Flickr	https://www.flickr.com/	<i>Photo sharing Platform that offers to photographers a big community where they can edit and share photos, gain inspiration and advises from others</i>
Pinterest	https://www.pinterest.com/	<i>Photo and video sharing Platform that offers inspiration, advertisement, portfolio browsing or website promotion</i>
YouTube	https://www.youtube.com/	Video Sharing and Social media platform, be used for advertisement, portfolio browsing or website promotion
TikTok	https://www.tiktok.com/	Video Sharing and Social media platform, be used for advertisement, portfolio browsing or website promotion
Domestica	https://www.domestika.org/	Course Platform where creators can learn new techniques through online courses or they can teach others and gain profit
Coursera	https://www.coursera.org/	Course Platform where creators can learn new techniques through

		online courses or they can teach others and gain profit
Upwork	https://www.upwork.com/	Freelancing Platform that offers a place where creators can connect with businesses and gain new clients

2.1.1 CREATIVE AND CULTURAL INDUSTRIES IN GREECE

Greece is a country with a great cultural heritage and a large part of the state's revenue is due to its exploitation through the tourism sector. Regarding the share of creative industries, Greece ranks 10th (in the EU-28) in cultural goods exports within the EU and 16th in exports to countries outside the EU, with the goods being exported being mainly books, knitwear, textiles, embroidery, and recorded media. (Avdikos et al., 2017)[1]. During the country's economic recession, the creative industries have seen a bigger drop compared to other industries. In recent years, we are seeing a new boom in the creative sector, which is due, among other things, to the introduction of innovation through digitization. The majority of creative businesses in Greece (71%) employ very few workers or are sole proprietors (Avdikos et al., 2017)[1]. Digital platforms have an important contribution to the country's creative sector, because they offer small businesses highly cost-effective solutions for goods distribution, payment security, data access, competition monitoring and global market penetration.

3 METHODOLOGY

To measure the creatives' opinions and attitudes and adoption behavior towards DPs we constructed a Likert-type questionnaire where responders had to specify their level of agreement to statements selecting one of the options: (1) not at all (2) slightly (3) Neutral (4) somewhat (5) very much. We conducted eight pilot interviews that gave us important feedback regarding the phrasing of the questions. We adapted the questionnaire according to the artists' comments from the reports written during the interviews. We then modified the questionnaire for the creators to make it as understandable as possible. For the needs of our research, we based on primary empirical research among Greek creators active in creative industries adopting Throsby's classification of CCI and ensured that we distributed the questionnaire to creators from all four layers/circles of the Concentric Circles Model (CCM). Thus we end up with are the following creative sectors:

Art Gallery
Architecture

Media and Communication
Theatre

Graphic and Industrial Design	Film Production
Decoration	Music Games and Video Games
Sculpture	TV and Radio Production
Publishing	Fashion, Photography
Literature	Crafts and Antiques, Dancing
Poetry	Spectacle
Painting	Event Organization.

The sample artists/creators were found and distributed in the following 3 ways:

1. By drawing a sample data from the Hellenic Statistical Authority and the Statistical Register of Enterprises. Artists and creators were selected from the Professional Chambers of Greece according to the Activity Code Number related to the primary or secondary professional activity. The online questionnaire was distributed to each artist or creator via e-mail.
2. By desk-based research. We started a search for Greek artists/creators from on the internet, through online platforms (google, instagram, etsy, linked_in, facebook, deviantart, etc) using key phrases and such as:

"made in Greece"	"Greek fashion designer"
"top Greek artists"	"based in Greece artist"
"top Greek sellers on Etsy"	"Greek handmade"
"Greek photographer"	"all Greek art"

The result of this search was a long list of contacts of Greek creators from each sector to whom the questionnaire was sent by e-mail or through the platform where they were located.

3. By the snowball method. The members of our research team distribute the questionnaire via mail, sms, messenger or in person, to personal acquaintances and ask them to forward it to other Greek artists/creators they may know.

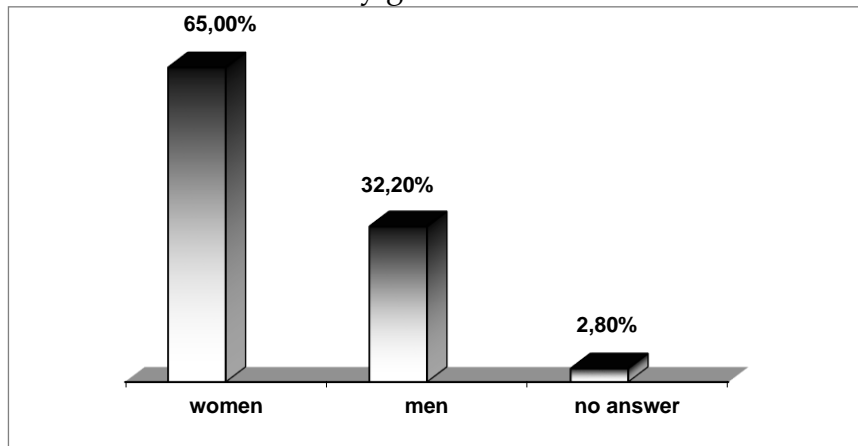
We also contacted:

- agencies and organizations such as: AnimaSyros, Hellenic Animation Association, Association of Photographers and Videographers of Central Macedonia, Photographic Association of Chios, Association of Visual Artists of Larissa, Benaki Museum and METS Arts Center
- theaters and performing arts labs such as: Aristotle Theater of Thessaloniki and Artiria Athens
- libraries and galleries such as: Epsilon Gallery and Myro Gallery
- Greek online art magazines such as Journal of Culture and Athens Insider Magazine
- publishing houses such as Ekdoseis Erma, etc,

Data collection lasted four (4) months and resulted in the collection of 180 completed questionnaires.

Our sample consisted of men (32,2%) and women (65%), while 2,8% did not answer for its gender.

Chart 1: Distribution of creators by gender



Regarding the distribution of creators by age, the majority (40.60%) are aged between 30 to 40 years old, while a significant percentage of them (26,1%) are between 41 to 50.

Chart 2: Distribution of creators by age

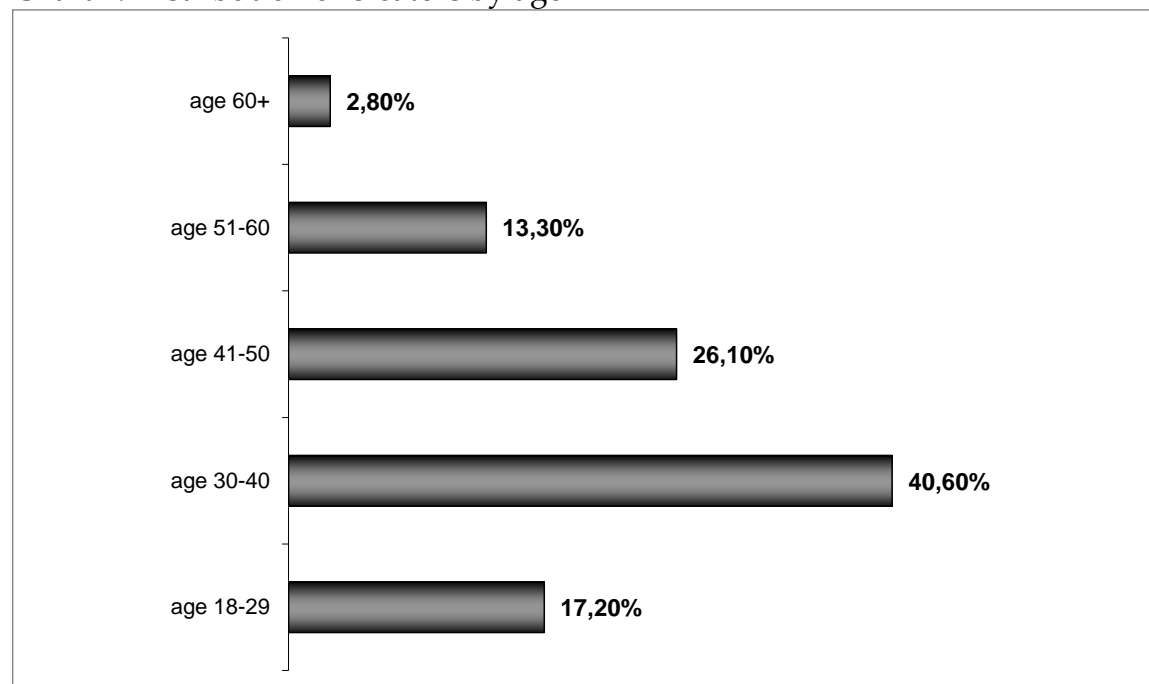
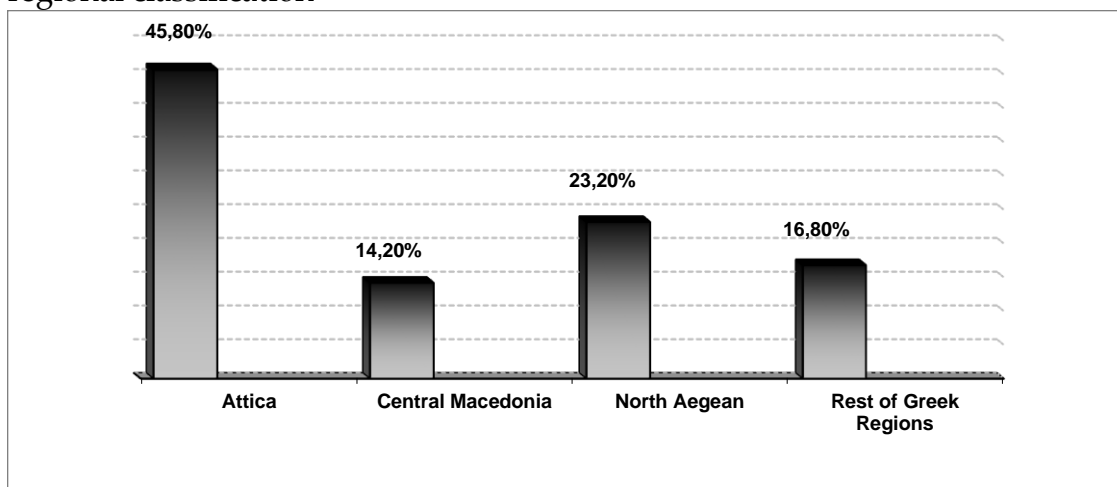


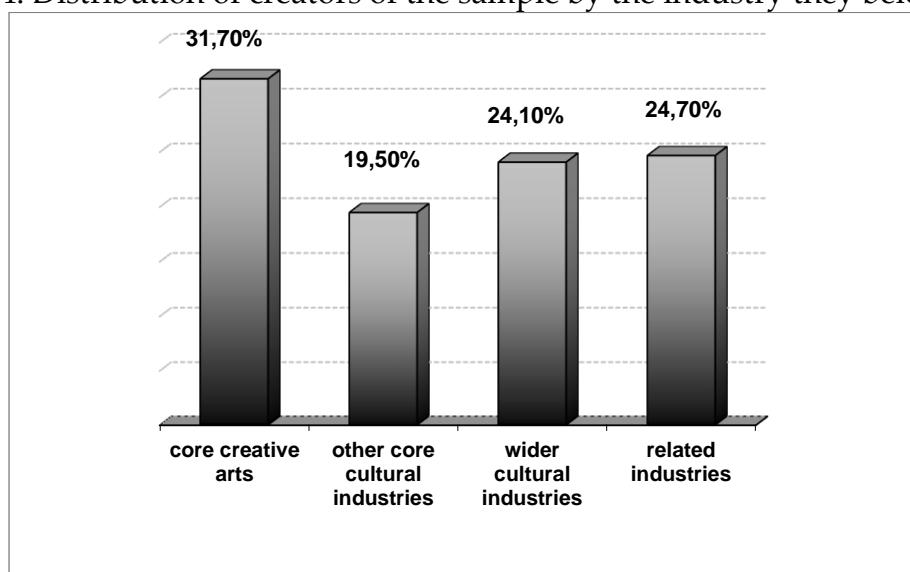
Diagram 3 below, lists the distribution of Greek creators by geographical region. The evidence shows that most of them (45,8%) are based in Attica, 14.2% are based in the region of Central Macedonia and 16.8% in the rest of the Greek regions, while a significant number in our sample creators are based in the region of the North Aegean (23.2%).

Chart 3: Distribution of creators of the sample by major geographical areas - regional classification



The creator's distribution by the industry appears in the chart below.

Chart 4: Distribution of creators of the sample by the industry they belong in

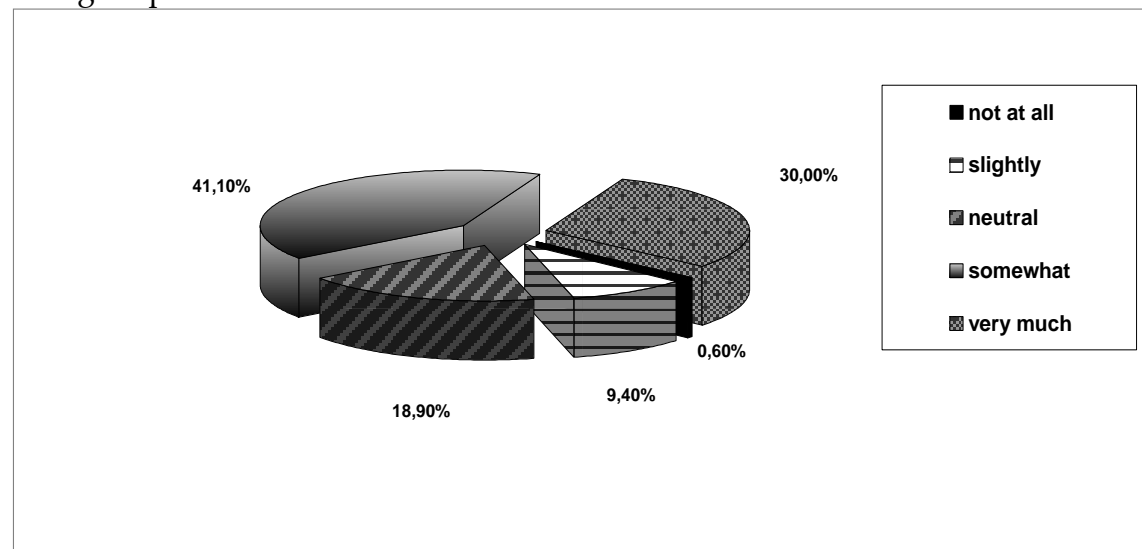


4 PRELIMINARY DESCRIPTIVE RESULTS

This section presents the preliminary descriptive results, derived from the field survey regarding the main dimensions that contribute most to creators' decision to adopt and/or invest in specific digital platforms. The charts below reveal the creators opinion about the use of digital platforms and the benefits they believe they gain regarding the improvement of their creative activity, the effects of the covid-19 crisis on their creative activity, the search for competitive advantage, and the potential of presence in the global market.

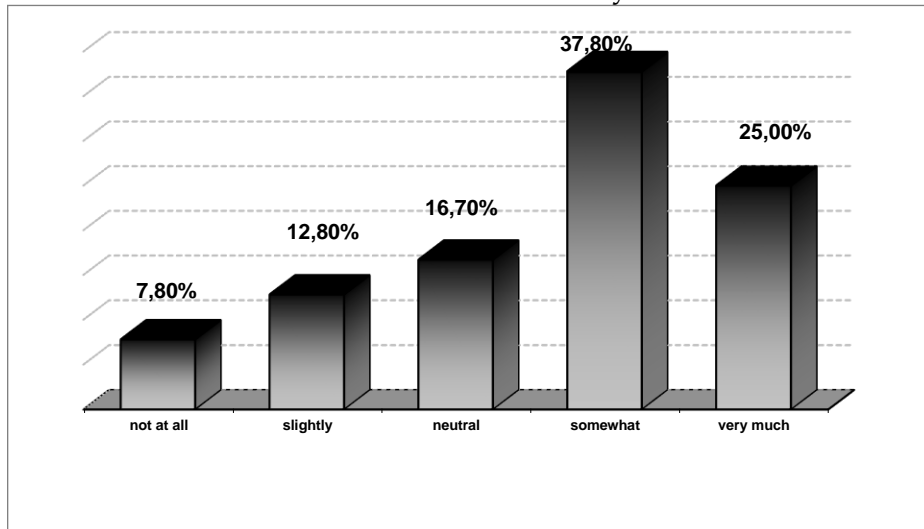
Regarding the intensity of digital platforms' use by Greek creators, the majority of creators (71.10%) declared that they use them intensively (somewhat to very much), while 18.9% answered neutral and 9.4% declare that they use digital platforms slightly. Only 0.6% of creators do not use digital platforms at all.

Chart 5: Distribution of creators of the sample by the intensiveness of the use of digital platforms



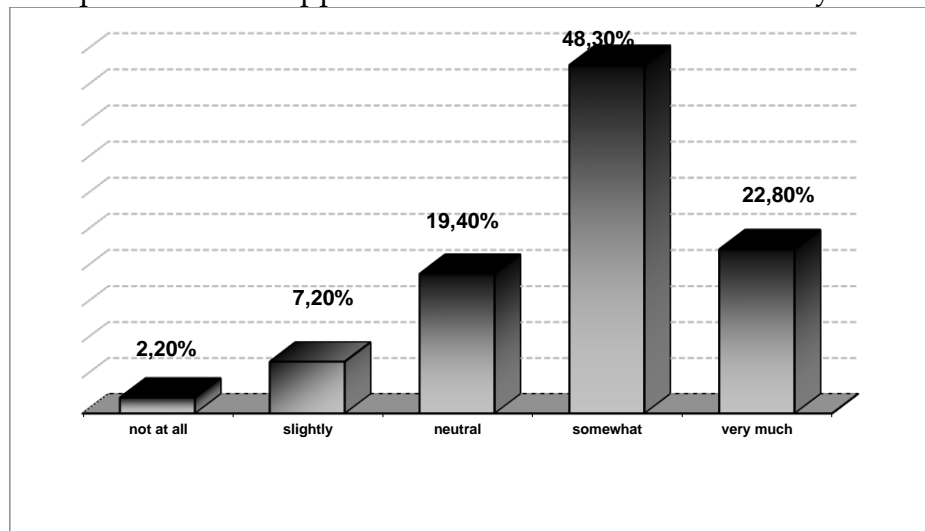
The preliminary results regarding the role of Organizational context revealed that most of the creators do a lot of market research to support their creative activity (37,8% somewhat and 25% very much) while 16,7% gave neutral answer. Only 7,8% of the creators declared they do not do market research at all.

Chart 6: Distribution of the sample creators based on how much market research they do.



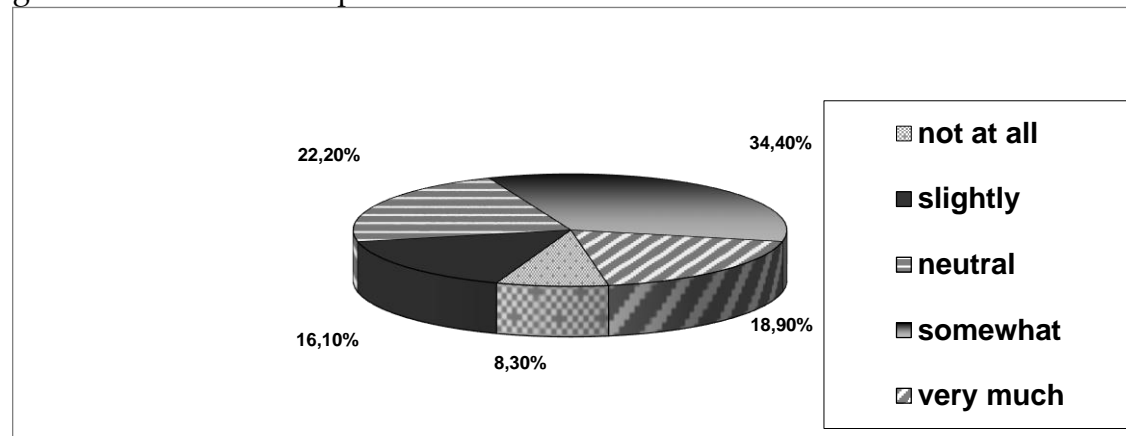
Regarding their perceived level of innovativeness, the majority of creators declared that they adopt new innovative processes and applications (48,3% somewhat and 22,8% very much), 19,4% gave neutral answer, and only 2,2% of the creators reported that they do not adopt any innovative processes and/or applications to enhance their creativity.

Chart 7: Distribution of the sample creators based on whether they adopt new innovative processes and applications to enhance their creativity



Regarding their approach to Entrepreneurial Self-Efficacy, the majority of creators declared that they somewhat formulate clear business goals for their creative pursuits (34,4%) only 18,9% declared very much, 22,2% gave neutral answer, while 16,1% slightly believe that they formulate clear business goals and 8,2% of the creators declared they do not.

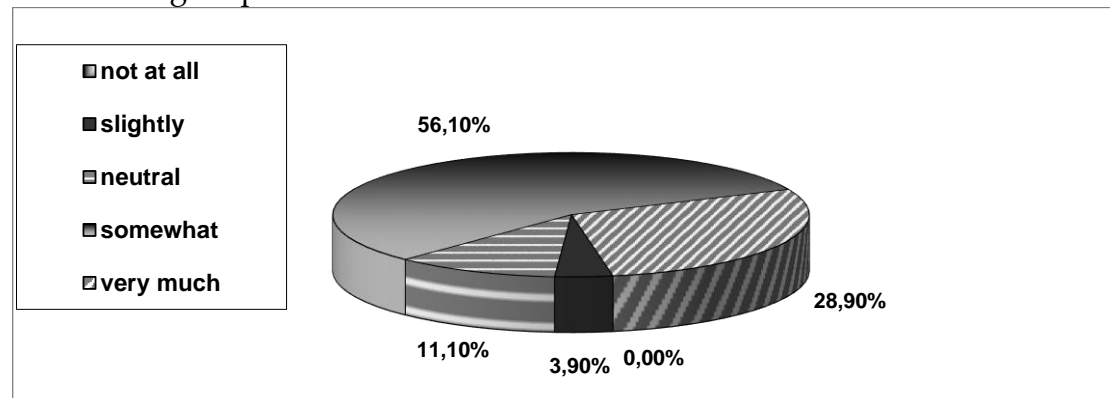
Chart 8: Distribution of creators based on the formulation of clear business goals for their creative pursuits.



Preliminary results regarding the role of Technological Context are presented below:

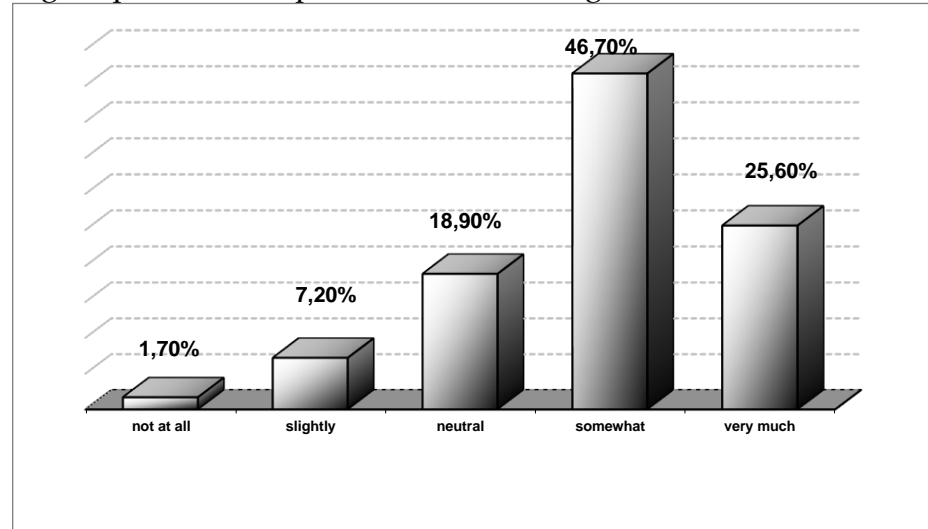
Regarding the ease of use of digital platforms, most of the creators (56,10%) declared that DPs are somewhat easy to use, DPs also are very easy to use for the 28.9% of the creators, while 11.1% are feeling neutral about it and only 3.9% find them slightly ease of use with no negative answers.

Chart 9: Distribution of creators of the sample by their opinion about the ease of use of digital platforms



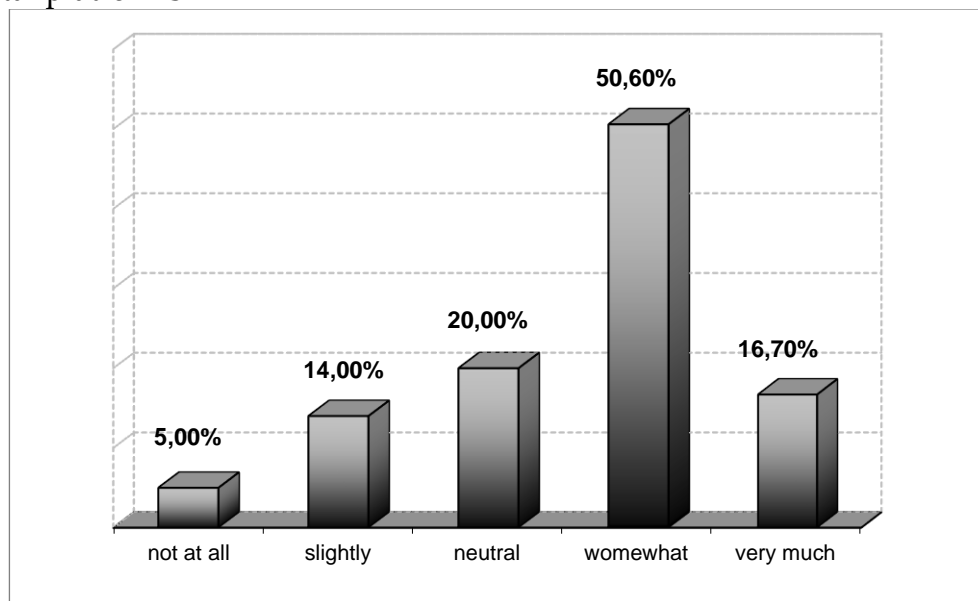
The statistical results also show that 72.3% of the sample believe that digital platforms improve the functioning of their creative activity somewhat or very much. (This refers to the Perceived Direct Benefits)

Chart 10: Distribution of creators of the sample based on their belief that digital platforms improve the functioning of their creative activity



Moreover, a majority of 67,3% of the sample believe that the basic expectations of their creative activity are more easily achieved through digital platforms, i.e. DPs offer them a relative advantage) and only 5% deny it.

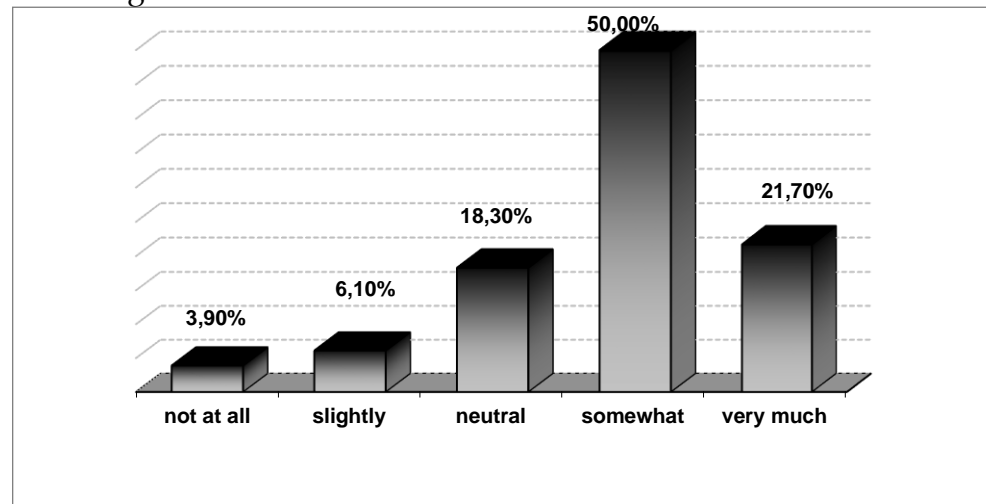
Chart 11: Distribution of creators of the sample based on their belief that the basic expectations of their creative activity are more easily achieved using digital platforms



Regarding their belief on whether the exploitation of digital platforms gives their creative business a competitive advantage – another attribute of relative advantage - a majority of 71,7% believe so somewhat to very much, 3,9% deny it, with the rest either being neutral or believe it slightly.

Chart 12: Distribution of creators of the sample based on their belief that exploitation of digital platforms gives their creative business a competitive

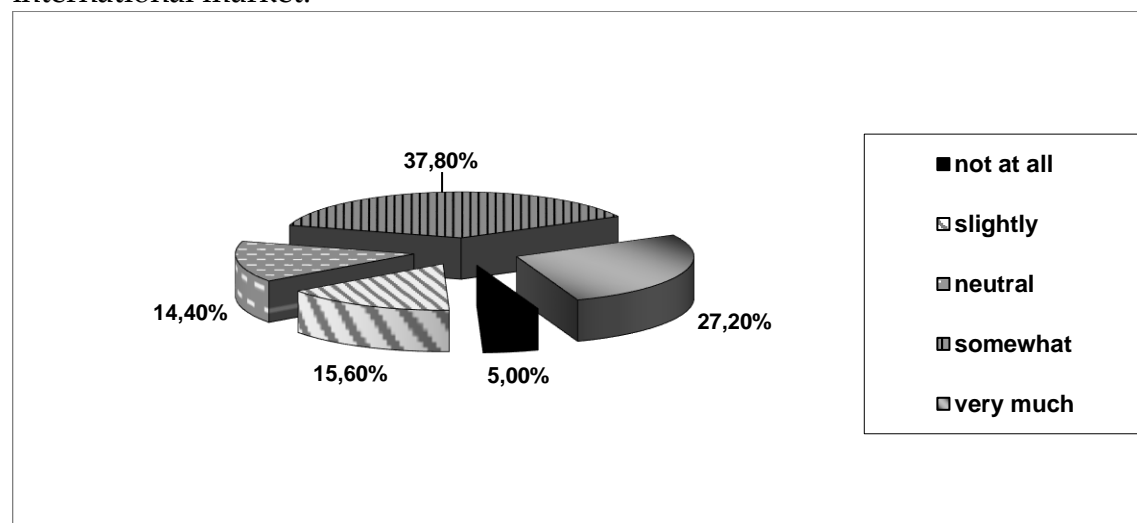
advantage



20

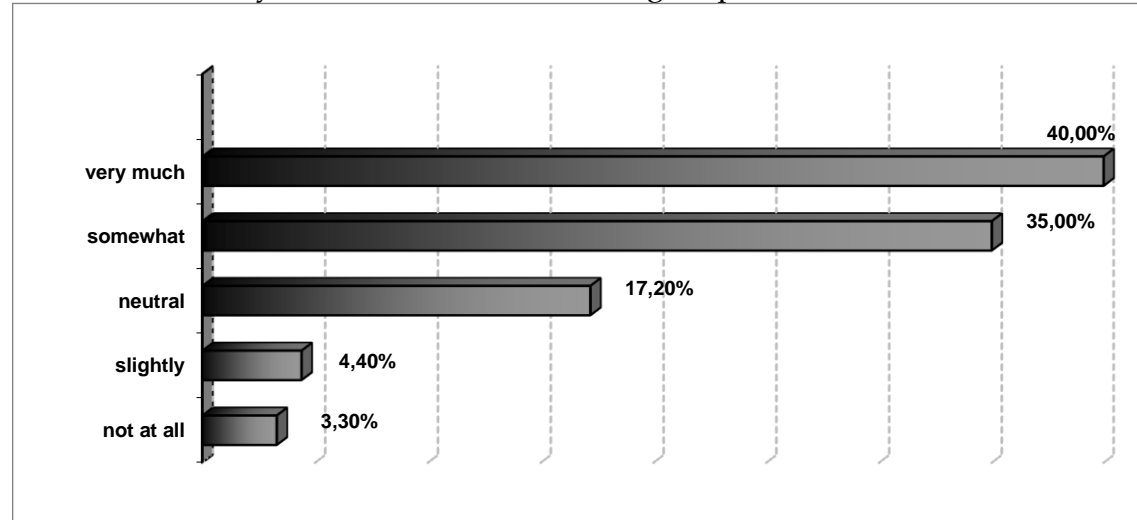
As appears in the chart below, 37.8% of the creators somewhat believe that through digital platforms their creative activity has a presence in the global market, whereas 27,2% believe it strongly. Only 5% of the sample does not believe that DPs allow for their presence in the international market.

Chart 13: Distribution of creators of the sample based on their belief that through digital platforms their creative activity has a presence in the international market.



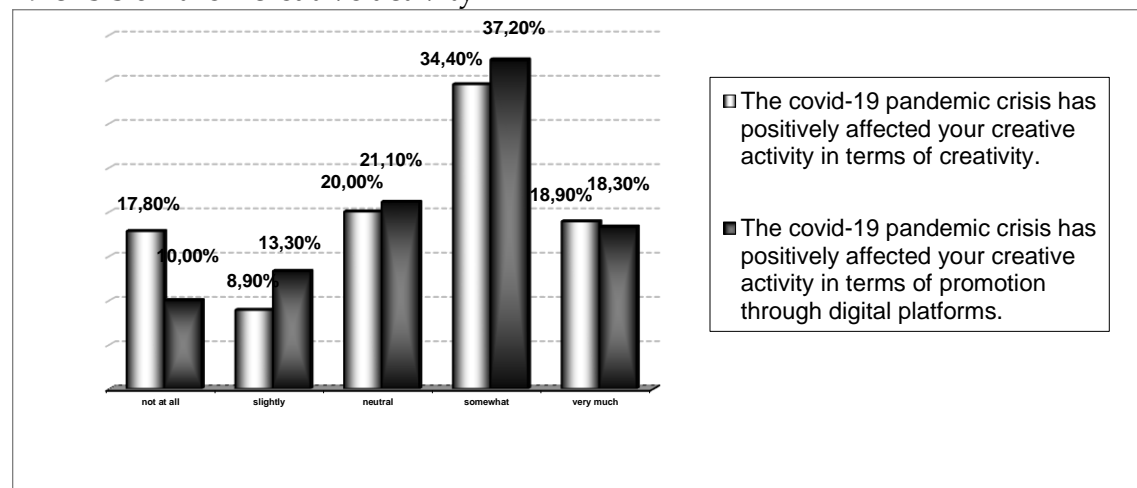
Preliminary results regarding the Environmental Context are presented below: Regarding their Perceived Pressure from Industry - External Pressure, most of the creators in our sample (75%) reported that their specific sector of creative activity strongly recommends the use of digital platforms whereas only 3,3% reported that they feel no pressure from the goings-on of the sector to use DPs.

Chart 14: Distribution of creators of the sample based on whether their sector of creative activity recommends the use of digital platforms.



Regarding the effects of the covid-19 crisis on their creative activity, a topic related to Environmental Uncertainty, 34,4% of the creators reported that Covid-19 pandemic positively affected their creative activity in terms of creativity, while a significant 17,8% reported no positive impact. Moreover, 37,2% of the creators found that the covid-19 pandemic crisis positively influenced the promotion of their creative activity through DPs, while 10% found that it did not affected it at all.

Chart 15: Distribution of creators' opinions regarding the effects of the covid-19 crisis on their creative activity



5 CONCLUSION- FURTHER RESEARCH

Creative industries are quite different from the rest of the industries. During our research, we recognized the different characteristics of the creative industries. We formulated a framework to identify the factors that influenced the adoption of digital platforms by the creators in Greece.

The Preliminary Descriptive Results Indicate that:

- 1 Most of creators (71.10%) use Digital platforms intensively
- 2 Most of the creators do a lot of market research to support their creative activities
- 3 The majority of creators adopt new innovative processes and applications in practicing their creative activities
- 4 The vast majority of creators consider that DPs are somewhat to very easy to use
- 5 The vast majority of creators (72,3%) believe that digital platforms improve the functioning of their creative activity somewhat to very much
- 6 Most of the creators (67,3%) believe that the basic expectations of their creative activity are more easily achieved through the use of digital platforms
- 7 The vast majority of creators (71,7%) believe that exploiting digital platforms gives them a competitive advantage
- 8 The vast majority of creators (75%) feel pressure to use digital platforms by the conditions that prevail in their sector
- 9 One in three creators in our sample (34,4%) reported that the covid-19 pandemic crisis positively affected their creativity, while 17,8% reported no impact at all.

In this research we faced several limitations:

- It is a stylised fact in the creative industries, that the vast majority of creators either perform undeclared work or work occasionally and in their vast majority fall under the country's grey economy. Therefore, it has been very difficult to spot them and persuade them to participate in our survey. It is also true that artists and creators are among the least willing to answer fixed questionnaires with economic and/or technical content.
- The distribution of the questionnaire took place mainly during the summer months, and, as is well known, summer is a very busy period for Greek creators during which most of them do not have much free time.

In the next phase of the research the empirical results will be further tested statistically and several hypotheses will be formulated and tested in an econometric way.

The main contributions of this study are, firstly that the current effort is the first research regarding the effects of the development of digital platforms in the Greek creative industry. Secondly a framework was created based on the relevant literature but also on the peculiarities of the creative industry. We also believe that the resulting questionnaire can be used in other Information Systems' research, i.e., in a study regarding the adoption of digital platforms in other industries in Greece.

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Encompassing Embodiment in Entrepreneurial Learning

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Abstract

The present conceptual article discusses non-cognitive aspects of entrepreneurial learning. Entrepreneurs are known to undergo extreme experience phases during establishing their firms where peak experience, peak performance and flow counteract. As a result, increasing anxiety and stress may hamper their performance. Non-cognitive skills that consider simultaneously mental processes, emotions and spirit in connection with the human neurophysiological system in a holistic, human learning process, could appear more efficient in describing how entrepreneurial learning occurs in stressful situations. In the present discussion somatic learning education is suggested as a possibility to enhance entrepreneurial learning, creativity and performance in stressful situations. As non-cognitive entrepreneurial skills have been overlooked in the extant literature, the present discussion initiates a discussion for further research in the field. The concepts of holistic entrepreneurial learning, embodiment and somatic learning are described while their relevance to stressful business start-upping and entrepreneurial well-being is sought. The article concludes with relevant research questions for further examination.

Key words: entrepreneurial education, embodiment, somatics, peak performance, peak experience, flow, well-being, stress regulation, innovation, creativity

Introduction

Core concept in today's "knowledge economies" era is how the knowledge base dynamically expands, coheres and allocates affecting economic development. In opposition to resources' scarcity, knowledge is abundant but the ability to exploit it can remain limited (Lundvall & Johnson, 1994). Traditionally, in the Western social thought and academic routine a fragmentation of body-mind prevails, rooted to the Cartesian dualism, mostly narrowing learning into cognitive-based orientations, shaping specific notions of consciousness that become dominant (Johnson, 2000). Most studies in entrepreneurial learning adopt the cognitive standpoint. Nevertheless, from an extensive literature review there is a growing level of evidence that rational decision-making processes, emotional and sensory elements seem to be essentially intertwined in explaining the way an entrepreneur thinks and acts (Nicolaou et al., 2019; Porges, 2011). Weaving a more holistic model encompassing body, mind, emotions and spirit aligns more with the continuous spectrum of being and learning (Gieser, 2008; Macintyre Latta & Buck, 2008). Somatic/embodied knowing, for example, overcomes limitations of "received knowledge" (Brockman, 2001), as it is perceived from within the human being, putting senses in the center of perception, while transcending various cultural contexts (Gieser, 2008; Macintyre Latta & Buck, 2008). The field of *somatics* - among other contexts - as a non-cognitive ability to learn, perceive and reflect (Cope & Watts, 2000) offers a possibility to examine how entrepreneurs cope with ordinary entrepreneurial tasks or specific processes that are ambiguous, non-linear, challenging and risky. Key concepts from the field of neurobiology such as "neuroplasticity" or "neuroception" (Krueger & Welp, 2014; Nicolaou et al., 2019; Porges, 2001) signify the central role of the nervous system to return to its optimal zone of conscious functioning addressing experience beyond repetitive neuromuscular pathways (Johnson, 2000) or affecting homeostasis through tissue re-organization (Rich, 2000). These overlooked perspectives impose a reconsideration of the entrepreneurial learning skills, especially the non-cognitive ones, that may lead to better entrepreneurial performance.

Learning in the modern "value habitus"

Modern innovative entrepreneurship is generally known to depend on both knowledge and resources. As mentioned, in opposition to resources' scarcity due to global economic crises, the ability to exploit knowledge may remain limited though knowledge is abundant itself (Lundvall & Johnson, 1994).

Concurrently, a “value habitus” for entrepreneurship has been historically shaped rendering specific notions of consciousness dominant. The entrepreneurial “value habitus” signifies, in turn, the quality and importance of entrepreneurial “growth”. Habitus is a Bourdieusian sociological notion referring to the norms, values, attitudes, and behaviors of particular social groups (Bourdieu, 2017). Evidently, a fragmentation of body-mind nowadays prevails after the “scientific revolution” rooted to the Cartesian dualism, mostly narrowing learning into cognitive-based orientations. Likewise, most studies in entrepreneurial learning, i.e. the way that entrepreneurs dynamically acquire and exploit knowledge or think and act (Cope & Watts, 2000), adopt the cognitive standpoint.

Nevertheless, from an extensive literature review there is a growing level of evidence that rational decision-making processes, emotional and sensory elements seem to be essentially intertwined in explaining the way an entrepreneur thinks and acts (Nicolaou et al., 2019; Porges, 2011). Thus, a more holistic framework, encompassing body, mind, emotions and spirit is needed in researching entrepreneurial learning processes. According to Loehr & Schwartz (2001) (also Schindehutte et al., 2006) it is asserted that a possible *integrated model* of high-performance should holistically consider the body, the emotions, the mind and the spirit, while Nicolaou et al. emphasize that “behaviour is also contingent on other physical systems such as the body, other people and the environment” (Nicolaou, Lockett, Ucbasaran, & Rees, 2019).

Additionally, there is a growing level of evidence that the emotions and the body are connected (Porges, 2001, 2011; van der Kolk, 2014; Rich, 2000). Somatic knowing, for example, overcomes limitations of “received knowledge” according to Belenky, Clinchy, Goldberger and Tarule (see Brockman, 2001), as it is perceived from within the human being, putting senses in the center of perception while transcending various cultural contexts. These developments have been poorly researched in the context of entrepreneurial learning.

Entrepreneurship and eudaimonic well-being

Entrepreneurship is uniquely stressful (Tahar et al., 2022). Internal or external critical events promote in a rapidly demanding way a better understanding of the factors associated with entrepreneurial burnout (Shepherd et al., 2010). While entrepreneurs often report high emotional demands involving stress/frustration, uncertainty/risk, fear/anxiety, limited leisure time, sleep issues, high workload and loneliness, literature review indicates that

“salutogenic” factors can buffer “pathogenic” ones giving new direction in eudaimonic well-being research. In other words, seems as enhancing coping resources serves as an antidote to entrepreneurial burnout leveraging the “undoing hypothesis”. This means that higher levels of “psychological capital” (resilience, hope, optimism) outbalance negative emotions improving their “well-being” (Tahar et al., 2022). Seems that autonomy, self-acceptance, purposeful life, positive relationships, environmental mastery and a sense of personal growth are key dimensions to well-being (Ryff, 2018)

On the contrary, entrepreneurial ill-mechanisms are usually related to high degrees of autonomy, meaningfulness and personal identification that entrepreneurs depict which in turn, often leads to overcommitment, blurred work-life boundaries, intense workload, uncertainty, loneliness or insomnia. This resource depletion creates distress that urges a need for detachment. Disconnection and disengagement through certain recovery interventions (e.g. quality sleep, mindfulness, physical exercise) from the above mentioned states could reduce stress’s harmful impact on the body and mind and boost productivity. However, entrepreneurs due to their demanding daily routine and their typical personality characteristics described above often crowd out opportunities for recovery or even underestimate and ignore the need for it. This “Recovery Paradox” leads to a “wear and tear” of inflammatory, metabolic and cardiovascular systems if recovery resources and interventions are being incessantly postponed and ameliorated (Williamson, Gish & Stephan, 2021).

Embodiment

The above mentioned recapitulate the marginalized power of our bodies to form and inform self and others (Macintyre Latta & Buck, 2008), although admittedly “there is a weird tendency to avoid ourselves instead of penetrating our core essence of our beingness” (Humpich, 2012). Simultaneously, Brockman (2001) indicates that:

“Though often communicated and inculcated via cultural-linguistic means, bodily (somatic) knowing is not acquired thereby. Rather, it is directly experienced. In short, neither culture nor language are the source of somatic knowledge. Somatic knowledge is received from within the human being; cultural knowledge is received from without the human being. Some of the limitations of cultural-linguistic models of knowing arise because the cultural and linguistic dimensions

of knowing have been divorced from the more fundamental, direct, somatic dimensions of knowing” (p.5)

“Embodied knowledge” holds the ontology we “are” bodily, to mention Heidegger rather we do not “have a body”. While Dewey draws attention to this disregard for the body suggesting that it is indeed “fear of what life may bring forth”, many more thinkers and scholars such as Merleau - Ponty or Levin turn to the body as the focal point of sense making. Embodied teaching/learning develops a vital space for the omnipresent body permeating subject or any “otherness” as a bound entity so as a lostness and foundness of the self signifies the process itself (Macintyre Latta & Buck, 2008). As Dewey pointed out:

“... this interplay reestablishes an on-going-on equilibrium with the surroundings of the live being which is primarily viscerally understood” (Macintyre Latta & Buck, 2008). “Reflexivity is at the heart of flesh, asking us to look at the sense and selves being made on a continual basis. Falling into trust with the body’s role in teaching and learning is a reflexive undertaking embracing the contingencies of a becoming self.” (p.124)

Within this inquiry, the process of ‘becoming’ exceeds pre-determined results enabling a forward thrust and a creative flux (Macintyre Latta & Buck, 2008). In turn, this creative flow signifies the “living” leading to gradual harnessing of innovative and heuristic ranges once this internal movement is initiated. A multiplied potentiality closely related to the living’s own nature is being enriched leading the live being to an “irreversible crossroad between the “old forces” and the “forces of change”. A strong chiasm of maintenance and change that enhances the opposites without intermingling them or distincting them” (Humpich, 2012).

All in all, this provokes a deeper transcendence in space and time to express our deepest self. It is a provocation for a double learning opportunity: “to learn how to perceive and simultaneously to cultivate our expressing upon what ourself perceived without interference”. To achieve this a new quality of inner attention is required for this introspection with the observer being aware upon his own presence shaping a self-referred empathy (Humpich, 2012).

Somatic learning

Somatic or Somatics - the origin of the word is from the Greek language - means related to the body (soma) beyond the material aspect. There is a crucial differentiation, though, between somatic learning and embodied learning. First, as Freiler (2007) underlines:

“... closely aligned with somatic learning, embodiment is associated with an evolving awareness of bodily experiences as a source of knowledge construction representing a domain of learning derived from engagement through lived body experiences of physicality, sensing and being in both body and world (Beaudoin, 1999; Brockman, 2001; Clark, 2001;)” (p12)

Second,

“Somatic learning will refer to learning directly experienced through bodily awareness and sensation during body-centered (somatic) approaches and movements such as yoga, while embodiment will refer to a more holistic view of constructing knowledge that engages the body as a site of learning also in possible connection with other domains of knowing (e.g., spiritual, affective, symbolic, cultural, rational)” (p.13).

Somatic approaches initiate an inquiry into human experience through exercises of sensing, paying sustained attention to sound making, breathing and various ranges and depths of body movement, both voluntary and involuntary beyond old formalisms of the “static” body (Conrad, 2007; Johnson, 2004). A series of intrinsic movement explorations accompanied by toning sequences are introduced in order for the tissue to re-organize and elicit new more refined responses building new neural networks. The overall goal is to enhance fluid resonance and non-local interactions heightening the “formative tendency” that urges organisms - in terms of Prigogine- to more complex levels of organization (Conrad, 2007).

All in all, the field of somatics - among other contexts - as a non-cognitive ability to learn, perceive and reflect offers a possibility to examine how entrepreneurs cope with ordinary entrepreneurial tasks or specific processes that are ambiguous, non-linear, challenging and risky.

Noteworthy, the idea that a person's brain chemistry can change or regulate through bodily experience is pivotal when one considers the field of "somatics", firstly introduced by Hannah (Van Vleet Goelz, 2015). While behavioral psychology studies the body from the outside or as an object, somatic psychology studies the body as a subject and believes in the "intrinsic wisdom" of the body to heal itself, as Serlin points out (Van Vleet Goelz, 2015; Johnson 2004). Thus, somatic learning generally refers to learning directly experienced through bodily awareness and sensation during purposive body-centered movements (Freiler, 2008). Also, somatic learning shifts the dominant narrative as it belongs mainly to "afferent approaches" through which regulation of our nervous system affects cognitive functions (bottom-up processing), while "efferent approaches" (top-down processing) focus primarily on how cognitive structures and functions affect emotions and instinct systems (Heller & LaPierre, 2012).

Gieser (2008) clarifies eloquent the perception mechanism:

"Following Damasio, Milton proposes a model of perception mechanism where incoming sensations from environmental stimuli trigger neural patterns related to the sensed, together with an associated emotion pattern. This so-called neural map then induces minor changes in the bodily state (the emotion). Again, these inner changes can be perceived (in a similar way as environmental stimuli) and trigger a corresponding feeling, that is to say, a somatosensory image of an emotion. As almost all perceptions undergo this process (Damasio, 1999, p. 58), we learn to associate environmental features or situations with emotions by repeated experience (Damasio, 1999, p. 57)." (p.305)

Respectively, a progressive evolution has been made in the field of entrepreneurship "from the "semantic level" to the "symbolic level" up to "neurological" level" (Krueger & Welp, 2014), where neural/physiological processes and activities are being examined in order to explain entrepreneurial

action that may often seem automatic (Krueger & Welp, 2014; Nicolaou et al., 2019). Hence, there is growing consensus in the literature that the central nervous system reacts differentially to risk (Krueger & Welp, 2014). Key concepts from the field of neurobiology such as “neuroplasticity” or “neuroception” (Porges, 2011) signify the central role of the nervous system to return to its optimal zone of conscious functioning addressing experience beyond repetitive neuromuscular pathways (Johnson, 2000). Similarly, Damasio (Rich, 2000) argues that through bodily practices we alter states in all tissues of an organism- including cells of the nervous system - that affect subsequently occurring representations in particular brain sectors regulating altered states of consciousness, thus affecting homeostasis.

From another similar point of view, *grounded cognition* (Barsalou, 2008) rejects standard theories of cognition advocating that cognition is inseparable from the brain’s modal systems for perception (e.g. vision, audition, action (e.g. movement, proprioception) and introspection (e.g. mental states, affect). This theory involves the assumption that simulations, situated actions and occasionally bodily states are involved in cognition. Many scholars of grounded cognition (Barsalou et al., 2003, Lakoff & Johnson, 1980) focus on roles of the body impacting cognitive states, especially through the skill of simulation “meaning the reenactment of perceptual, motor and introspective states that were acquired during experience with the world, body and mind” (Barsalou, 2008). They basically draw connections between perception, action, body and environment when pursuing a goal.

Through the above-mentioned simulations due to the mirror neurons within our motor system the perceiving subject represents internally not only the action itself but also the goal of the action while actively preparing for analogous potential action in our brain’s grasping circuit. The speed and the accuracy of situated action mirrors the “habitus” of our somatosensory system and establish a primate mechanism for *lived empathy* since they titrate imitation and social coordination (Barsalou, 2008, Gieser, 2008). Especially bodily states rather cause social cognition than just being affected by it through communicative interaction (Barsalou, 2008). As Gieser (2008) puts it:

“Imitation must obviously be more than a matter of the mind’s taking a perspective and translating it to a body that executes its orders. Imitation must also be more than one body copying the movements of another separate body. As apprentice and teacher are both to be understood as being-in-the-world and, hence, who are related to each other, imitation

can be seen as a complex intersubjective process comprising minds, bodies, and (social and natural) environments. Instead of asking for locations of processes (and hence focusing on just the mind or the body), my proposed approach positions learners and teachers as nodes within their respective fields of relationships (Bateson, 1972, 1980; Ingold, 2000)” (p.303)

“However, this attention directed towards the other person is just an intermediary stage in learning situations. In order for learning about the world to take place, attention must be refocused from the person-person-relationship (primary intersubjectivity) towards a person-person-object-relationship (secondary intersubjectivity). So, being aware of the other person’s perceptions, I begin to switch my focus to the objects of these perceptions. I expand my being to include the other’s being just as blind persons use their canes in order ‘to see’ ... The observer perceives the environment not directly but via the demonstrator while experiencing himself and the other as one phenomenological unity.” (p.310)

Somatics and entrepreneurship

The point to which somatic education dissects with entrepreneurship is that they both articulate an unfolding integrative process of managing effectively complex “environments” in the underlying pursuit of human fulfillment. Both of them orchestrate in a holistic way local and non-local internal/ external interactions serving as a forward thrust for a more complex level of organization. Both of them ground on an ongoing process consisting an evolving “creation” that are impacted by the felt experience of the subject. Arguably, though, as Schindehutte et al. (2006) indicate:

“Much has been written regarding the nature of the entrepreneurial process and how it can be successfully exploited (e.g., Low and Macmillan, 1988; Shane and Venkataraman, 2000; Zahra and Dess, 2001), yet relatively little is known regarding how individual entrepreneurs actually experience the process. Few insights are available regarding the sensory and emotional elements that come into play within the entrepreneur as the venture takes form and evolves. Although it could

be argued that every entrepreneur has a unique experience, it is worth questioning whether there are commonalities in terms of what entrepreneurs are experiencing, how they experience it, and the implications of common experiences for personal and business outcomes.” (p. 1)

“The list of potential characteristics of the experience is limitless, with the uncertainty (Bird, 1989; Stevenson, 1985), ambiguity (Shane et al., 2003), a sense of achievement (McClelland, 1961), varying perceptions of being in control (Morris, 1998; Mueller and Thomas, 2000), stress (Boyd and Gumpert, 1983; Buttner, 1992), a sense of loneliness (Boyd and Gumpert, 1983), and self-actualization (Vesper, 1998)”. (p.1)

The field of psychology signifies three key dimensions that deepen our understanding of the more intense periods (extreme experiences) that occur when creating and growing a venture termed as: peak experience, peak performance, and flow. According to Schindehutte et al (2006, p. 352): “Peak performance can be defined as an episode of superior functioning or reaching the upper limits of human potential as manifested in excellence, productivity, or creativity. It is performance that transcends what normally could be expected in a given situation”. The authors also note “*Peak performance* may affect and be affected by peak experience. Peak experience is a prototype of feeling. It is defined as an intense and highly valued moment or period that surpasses the usual level of intensity, meaningfulness and richness both perceptually and cognitively ...”. Furthermore, flow has been described by Csikszentmihalyi. Schindehutte et al (2006, p. 352) state: “*Flow* refers to the psychological state underlying peak performance ... It is a state of focused energy, a transcendent state of well-being, involving a spiritual dimension and a euphoric sensation and ecstatic moments (Waitley, 1991), and is characterized by total focus and absorption of transcendent awareness (Jackson and Csikszentmihalyi, 1999). Flow is an autotelic experience, one that is intrinsically rewarding that we choose to do for its own sake (Csikszentmihalyi, 1990).” Considering intense start-up phases like the previous extreme experiences, then entrepreneurial learning may exceed the usual cognitive dimension into the holistic somatic learning.

Interestingly, Beaudoin (1999) conducted research on how integrating proponents of somatic education transfer their learning to the context of

everyday life. Integral transfers in circumstances from different aspects of everyday life were traced whether reproducing the action model itself or adapting it to what was appropriate. In entrepreneurship education the same propensity of integral transference of somatic education components would be very promising to investigate if they really enable phenomena of peak experience, peak performance and flow especially during critical periods of high stress and complexity.

Conclusion and research agenda

In conclusion, entrepreneurial tasks are known to be ambiguous, non-linear, challenging and risky endeavors like somatic approaches in learning. In this circumstance, a paradigm shift inquiry could be initiated through somatic movement education giving rise to non-conscious, automatic, inductive, implicit and intuitive processing in learning. This new *modus operandi* could possibly lead to a more humane morality that represents a departure from the traditional emphasis on entrepreneurship as a vehicle for wealth generation, job creation, economic development and innovation, towards a process that fulfills human potentialities, renews the self, while giving a deeper sense of meaning and purpose in life (e.g. EntreComp, Bacigalupo et al., 2016, LifeComp, Sala et al., 2020).

Consequently, there are questions to be researched in the future. Firstly, do entrepreneurs value personal non-cognitive skills as helpful to their effort? Can somatic education - as an afferent approach - enable regulation of our nervous system and entrepreneurs' in particular? Could neuroregulation be a valuable key leading to productivity, "success" and "growth"?

Secondly, when entrepreneurs confront moments of high experience, high performance and flow, how do they react in these circumstances? Can entrepreneurs make their own peak experience, peak performance and flow moments a more frequent event (Schindehutte et al., 2006) through somatic movement education? Is somatic movement education beneficial for them and in which way?

Third, could somatic movement education impact entrepreneurs' stress regulation and regulate well-being during periods of intense pressure? Could it be an antidote to entrepreneurial burnout? Could it possibly be a resourceful mechanism leading to entrepreneurial well-being? Even further, could entrepreneurship be grounded on a more humane morality informing ourselves, others and the environment we live in?

Fourth, could somatic movement education enhance entrepreneurial creativity, innovation or “a-ha” moments as a more frequent event releasing intuition and instinct? Could bottom-up processing approaches bridge an innovative discourse between the conscious and the subconscious human potentiality?

All in all, entrepreneurial learning and action may need to be explored via encompassing somatic approaches as personal (non-cognitive) capacities in order to be more vast, more humane and accordingly more efficient in increasing sense of flow when coping with extreme experience and peak performance entrepreneurs undergo during establishing their ventures. After all, to insist with Dewey and Bresler “moving minds” demand embodied teaching and learning. If entrepreneurship equals identification, evaluation and exploitation of opportunities (Shane & Venkataraman, 2000) why not encompassing all means of learning along the way respecting heterogeneity?

The present conceptual article discussed non-cognitive aspects of entrepreneurial learning. Such an approach is novel in the field and can be met in peak experience phases of business start-upping (Schindehutte et al., 2006). Future research will focus on somatic learning practices (or interventions) in entrepreneurial learning able to reveal its non-cognitive aspects with regard to research questions emerging from the present discussion.

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Occupational Accidents in Greece in the period 2014-2019, Causes and Cost

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ABSTRACT

Human labor is the main shaper of the creation of economic values or otherwise social wealth. The quantity as well as the quality of work determine the increase or decrease of these values. Even gold or silver, oil, gas, the products of agriculture would have no value if man did not intervene with his labor before they reached our necks, our cars, our plates. This process is not an easy task. There are dangers more or less serious for the physical and mental integrity of workers. Occupational accidents are common, as are occupational diseases. In Greece, thousands of occupational accidents are registered every year and hundreds of them are fatal. This paper deals with the occupational accidents that occurred in Greece in the period 2014-2019. The purpose of the work is to understand and highlight such a serious social problem. With this work we are looking for: The causes of occupational accidents and occupational diseases in Greece, as well as the consequences they have on workers, the state and businesses. The cost of occupational accidents in Greece, both for the workers and for the state and businesses. We mention the weaknesses of recording occupational accidents as well as the difficulties of calculating costs at country level. The figures we used come entirely from the tables on occupational accidents published by ELSTAT (Hellenic Statistical Authority). We also collected valuable information from the websites of the EFKA - IKA (National Social Security Fund), the GSEE (General Confederation of Greek Workers), the Ministry of Labour and Social Affairs, from printed and electronic articles, from student theses, etc. **KEYWORDS** Occupational Accidents, Occupational Diseases, Cost of Occupational Accidents.

At this point we should mention that this article is part of a larger research paper on Occupational Accidents and Occupational Diseases in Greece in the period 2014-2019, which can be found in its entirety at the link: <https://drive.google.com/file/d/1yRAUZp3t4KHYZnyqHsN2aC2kmXZdahJa/view?usp=sharing>

INTRODUCTION

Human labor is the main shaper of the creation of economic values or otherwise social wealth. The quantity as well as the quality of work determine the increase or decrease of these values. Even gold or silver, oil, gas, agricultural products

would have no value if man did not intervene with his work before they reach our neck, our car, our plate. This process is not an easy task. There are dangers. Risks more or less serious for the physical and mental integrity of workers. Accidents at work are common, as are occupational diseases. In our country, thousands of occupational accidents are registered every year and hundreds of them are fatal.

This paper deals with the occupational accidents that occurred in our country in the period 2014-2019.

The purpose of the work is to understand and highlight such a serious social problem.

The work is divided into two parts. In the first part, we try to approach the subject theoretically, studying the concepts and definitions given by legislation and official bodies to the terms occupational accident-occupational disease.

We are looking for: 1) the causes of occupational accidents and occupational diseases, as well as the consequences they have for workers, the state and enterprises 2) the costs of occupational accidents, both for workers and for the state and enterprises. We mention the weaknesses of recording occupational accidents as well as the difficulties of calculating costs at country level.

3) We record the mechanisms for improving the health and safety conditions at work, as they are provided by the legislation 4) We examine the ways of dealing with occupational accidents from the side of the state proposing measures that could be adopted by the state.

We collected valuable data from the websites of the IKA-EFKA, the General Confederation of Greek Workers, the Ministry of Labor, etc., from printed and electronic articles, from student theses. The personal experiences from the various professions we have been engaged in have helped us quite a bit.

The second part of the work - Appendix consists of the tables with the figures of the occupational accidents and their analysis. The data comes entirely from the tables on occupational accidents published by EL.STAT. The attentive reader will easily perceive that the data given in the tables and their results, totals, averages, percentages, confirm the causes, the consequences, the proposed measures of improvement, which we mentioned in the first part. What we mentioned about the weakness of the state's mechanisms for the correct registration of occupational accidents is also verified. and by extension the cost of accidents.

1. Elements of the past - HISTORICAL REVIEW

The natural environment was the first workplace for man. High or low vegetation, large forests, arid landscapes, mountains, rivers, lakes, rain, snow, springs, high or low temperatures, wild animals were the factors that shaped the conditions, in which the first people were forced to live. These factors shaped, in today's terminology, the working conditions in which our distant ancestors operated. The attempt to cover their needs in food, housing, clothing

proved to be a difficult and dangerous process that carried risks. Accidents, we call them industrial accidents today, were frequent. Physical injuries, disabilities and death were the price our Neanderthal ancestors paid for their survival. Archaeological findings prove this. The Archman found in Halkidiki was a 40-year-old Neanderthal. Older. He suffered from arthritis and a form of paralysis with a fractured jaw. He was cared for by other Neanderthals in order to keep himself alive. They ensured his sustenance since he himself could not hunt, i.e. work. Another example of caring for the incapacitated Neanderthal, was the man of "Shanidar". This man had suffered while working (hunting) an injury to the left eye socket with deformation of the bone cavity. This injury caused loss of vision in the left eye and paresis (paralysis of the right half of the body - hemiplegia). Neanderthals due to the developed work consciousness, since hunting for work gives the maximum to the whole group and is a cohesive link, considered Shanidar's injury as a "work accident" since the external risk factors in hunting cannot be predicted. The helpless Shanidar was compensated by the group of other Neanderthals by offering him food and care for the rest of his life, that is, medical care and a pension (enet.gr).

We have no record of occupational accidents in Ancient Greece. The negative attitude held by the Greeks towards manual labor was also the reason for their non-systematic engagement with the improvement of working conditions and the treatment of occupational diseases (in Athens there was a sanctuary of the goddess Ergani).

Christianity elevated the place of work in man's consciousness, even if it was the result of God's punishment of man for his sins. "If you want to work, don't sleep", man must ensure his means of survival through his work.

In 1833 an industrial inspection body was established in England. The new laws that were passed were more strict regarding the hours and working conditions of children. They limited working hours in the textile industry and later in all industries to ten hours a day. Gradually, measures were taken which prohibited the work of children under ten years of age, night work, weekend work and set time for education. "The Condition of the Working Class in England", published in 1844 by Friedrich Engels, realistically and passionately described the destitution of English factory workers and the diseases from which the workers suffered.

In 1867, Karl Marx published the first volume of "Capital" describing the industrial accidents and occupational diseases experienced by the workers as a result of the capitalists' effort to achieve ever greater surplus value.

On April 27, 1914, Louis Tikas (Ilias Spantidakis) is murdered during a strike at the Rockefeller mines in America. The term "occupational accident" appears for the first time in the text of the International Labor Organization (ILO) in 1925 with convention 17/25 on compensation for occupational accidents, without giving a clear definition of the concept "Work Accident". The rapid development of the labor movement around the world, alongside the

development of capitalist relations of production, was the catalyst for the intervention of the state in matters of Health and Safety at Work (OHS).

The twentieth century was marked by the prevalence of the October Revolution. The Tsarist Empire is dissolved and the first workers' state in the world, the USSR, is established. In this state the working week was one of the shortest in the world. Social security became public and compulsory. In Tsarist Russia social security covered only 2 out of 11 million workers. 3/5 of the basic subscriptions were covered by the employees themselves. After the revolution, social security became universal with contributions coming from the funds of businesses, institutions, kolkhozes and the state budget. Old-age, disability and survivor's pensions were established. Workers and employees who were employed in heavy and unhealthy jobs received a pension at 50 for men and 45 for women. The general retirement age for other workers was 60 years for men and 55 years for women.

The trade union committees of the enterprises had the right to "veto" the decisions of the management on dismissals, while the inspection of each branch union could suspend the operation of the department or the factory if the safety and protection regulations of the work were not observed. By the middle of the 1980s, occupational accidents and occupational diseases were reduced by 20% (Rizospastis). The industrial accident at the Chernobyl nuclear power plant proved that despite "good intentions" workplace safety does not tolerate complacency, bureaucratic mentality, unscientific management methods. Humanity is far from being able to safely manage its scientific achievements.

In Greece, the first legislative intervention for the victims of a work accident was made with the commercial law (ND 19-4-1835) which recognized the right of compensation to the affected seaman regardless of his degree of responsibility.

In our country, the Social Insurance Institution (IKA) was established by Law 6298/34. It began to operate on December 1, 1937 as the Social Insurance Institution. In its first year of operation, it opened 3 branches in Athens-Piraeus-Thessaloniki. The following year, three more branches operate in Patra, Volos, Kalamata and shortly before the war in Kavala, Chania, Ioannina.

2. Theoretical approach

i. Definition of Occupational Accidents - Work Accident

The law does not define which of the accidents are work-related. In the conceptual definitions of article 8 of A.N. 1846/1951 and in paragraph 4, the meaning of the term "accident" is given by the phrase "the violent event at work or as a result of it and the occupational disease". For the above reason, the insurance practice and especially the jurisprudence of the courts have determined the cases in which, under certain conditions, an accident can be characterized as work-related.

Generally as Work Accident is defined as the death or incapacity of the insured person for work caused by a violent event that occurred during the performance of the work of the insurer at IKA-ETAM (EFKA) or because of it and is directly or indirectly connected to the work in a cause-effect relationship. (STE 2464/77, 4697/83, 1664/84 etc.). The sudden and extraordinary incident must be considered not to be within the circle of usual, depending on the case of employment conditions (IKA circular No 45/24- 6-10).

ii. Which Accidents are Characterized as Working

The death or disability of the worker which is proven to be due to the excessive effort he exerted under unusual working conditions at the time or was forced to work under extremely adverse weather or other conditions, even if the worker was already suffering from the disease aggravated by his work because of the excessive effort he made to respond to these adverse conditions. Of course, it must be proven that the death or disability of the employee is due to an unusual, sudden and extraordinary incident (STE 3968/81, 1664/84, 4084/85 etc.).

- They are characterized as Occupational Accidents those that happen during work breaks for food or coffee inside the workplace or outside it but close to it, in order for the employee to cover a basic need (food) which is not covered by the company. It is considered that the local and temporal link with his work is not interrupted.
- Death or incapacitation caused by a violent event that occurred during the employee's transition from home to work, or during his return from work to home as long as there is a causal link between work and the accident. If the employee did not follow the usual route to and from work, the causal link between work and accident is broken and the accident is not considered work-related. (document 37615/23-3-65). Occupational accidents and those that occurred at the worker's residence before he put away his tools, equipment and work clothes were considered on the road.

As a rule, it is considered the front door of the insured's house. If he lives in an inner house it is not the general outer door of the house but the outer door of the inner house. In an apartment building, the staircase can be considered.

- Accidents that occur during normal leave with paid leave and during the employee's transition to the employer to collect his salary and within the premises of the business are considered work-related because there is a relationship between work and the accident. —
- Death from a wasp sting in the workplace, regardless of any allergic predisposition of the insured, is considered a work accident (Gen. Eng 162705/24-10-67).

- Accidents during a strike are considered work-related if the insured refuses to participate in the strike.
- The employee's argument with his colleague at the workplace on the occasion of his work and not for personal reasons is considered a work accident.
- An occupational accident has been characterized as that which occurred due to a heavy assignment to an unrecovered worker.—
- Suicide which resulted from a disturbance of mental or intellectual functions caused by work stress or adverse working conditions can be considered an occupational accident (occupational accident art. 34 AN 1846/51 IKA Circular 22/02-03-2004).

iii. Not Characterized as Working Accidents

The deterioration of the insured's health and his death from it, when it is a consequence of the continuation of the work with unfavorable terms and conditions since the work by its nature can only be performed under these terms and conditions.

- Accidents that occur inside the home of the insured unless they claim and prove that the accidents are directly or indirectly related to the performance of their work.
- Accidents that occur during the performance of work that are not insured in the institution.
- Suicide and any violent event caused by the will of the insured (occupational accident no. 34 A.N. 1846/51 IKA Circular 22/02-03-2004).

3. Occupational Diseases

i. Definition Of Occupational Disease

According to the definition given by medical science, an occupational disease is a disease related to the type of risks to which the sufferer was exposed due to his work. In other words, it is any disease that can be proven on the basis of medical criteria to be attributed to the type of work and the risks to which the employee has been exposed due to the work.

The second definition is based on the insurance reality that applies to each country. In other words, occupational disease is the disease that is recognized as such by the current insurance system of the country with the conditions and limitations that it sets each time.

ii. EU-OSHA and Occupational Diseases

According to the European organization for safety and health at work (EU-OSHA) an occupational disease is any disease related to work that is caused or aggravated by it. It is any disease caused primarily by exposure to physical, organizational, chemical or biological risk factors at work or a combination of

these factors. Occupational diseases are mainly those listed in national legislation as diseases caused by exposure to risk factors at work.

The employee may be entitled to compensation if a causal relationship between the occupational exposure and the disease is established.

It is estimated that work-related diseases are responsible for 2.4 million deaths worldwide each year, of which 200,000 in Europe. The annual number of non-fatal work-related accidents is estimated to be 160 million (iatrikiergasias.gr).

In our country, it was only in 2003 that the IKA started recording incidents of occupational diseases and by 2009 only 112 workers had retired due to occupational diseases. Their recognition procedures in the IKA (EFKA) are labyrinthine and virtually non-existent in the other funds, while their announcement and registration is almost nil.

4. Causes and Consequences of Occupational Accidents

i. Causes of Labor Accidents

The workplace by its very nature is dangerous for workers. The risks involved can be big or small, common or less common or rare. In any case, the immediate victim is mainly the employee. The main causes of E.A. and occupational diseases are the following:

- Work intensification and flexible forms of employment
- Non-observance of safety rules
- Psychological overwork. Work stress
- The poor condition of the building infrastructure of technological equipment and means of transport
- Insufficient training of employees
- Lack of ergonomics
- Lack of cleanliness-arrangement
- Bad habits of employees
- Unexpected factors

The main characteristic of modern production is the effort of an ever-increasing production result – be it industrial production or the service sector – at the lowest possible cost. Thus the competitiveness of the business increases, more customers are won and profits increase. New machines are introduced into production, new methods of administration, distribution, transport and sale. create economies of scale driving the company's indicators to ever higher levels.

But man is not a machine. It wears out faster than that in its attempt to meet the needs of production. The human body is not "built" to withstand the confrontation with mechanical production, it gets tired, it makes mistakes more easily than a machine and at some point the accident is caused. Usually the last working hours are the most dangerous for the worker precisely because of fatigue.

In recent years flexible working relationships have increased significantly and continue to increase. Stable and permanent work with a salary that will be able to satisfactorily cover the employee's needs is receding, giving way to shift work, part-time work, etc. Many workers are forced to work two or more jobs to make ends meet. According to the data of the IKA, the number of workers declared as multiple workers reached 134,153 in 2016. Of these, 65,428 workers who had full-time employment also had other jobs - jobs:

45,754 workers have 1st job, 19,674 workers have more than 1 job. Also 68,725 part-time workers are insured by 2, 3 or 4 jobs, 51,568 workers are declared in 2 jobs, 10,566 workers are declared in 3 jobs, 6,591 workers are declared in 4 jobs.(ERGANIS 2016)

The above indicative figures for one of the years we are examining imply an increase in the employee's fatigue reaching the limit of professional exhaustion, the well-known "burnout" of the psychological breakdown of the disruption of the employee's family and personal life. Of course, they are the causes of serious accidents at work.

This paper deals with the six years 2014-2019. Years of economic crisis, high unemployment and major deregulation of the labor market. The percentages of Occupational Accidents that appear reflect the situation that took place in the workplace after the signing of three economic adjustment programs (Memoranda).

- Non-observance of safety and hygiene rules is another serious cause of Occupational Accidents and occupational diseases. Lack of Personal Protective Equipment and violation of safety protocols are usually noticed when the accident occurs.

Masks suitable for the workplace, protective helmets, overalls, gloves, glasses, etc. are unfortunately absent from many workplaces. Many companies, small or large, either do not provide workers with the appropriate Personal Protective Equipment, resulting in the latter being exposed to risks, or provide them with inappropriate PPE for the work they do. The same happens with self-employed manual workers and small professionals. The number of accidents in these categories confirms the above. This is how we often see construction workers performing work on wooden logs literally floating in the air without goggles, helmets, protective masks.

Welders without proper overalls and gloves, food delivery men without helmets moving in the cold, rain and snow. Cleaners not to wear special masks to absorb particles and other dangerous toxic substances, cleaning and garbage collection workers mobile human sanitary bombs at best to wear PPE that is suitable for cleaning a house but certainly not suitable for the work they do. Saleswomen and salespeople in stores to stand up even when there is no customer in the store.

In modern marketing it is considered that chairs for employees spoil the image of the company. Who cares about workers' joints and ligaments? Workers in warehouses with high rates of Occupational Accidents that they also work without suitable gloves, masks, shoes, carrying with their hands most of the time even dangerous toxic or other substances, violating all safety protocols. It is certain that the use of the appropriate Personal Protective Equipment and the observance of safety protocols would result in the avoidance of many injuries and even deaths.

- The psychological fatigue and stress that the employee feels during work are proven factors in causing accidents.

The intensification of work, the job insecurity felt by the worker due to high unemployment and high labor mobility, the low incomes of workers are the generative causes of causing mental disorders and increasing work stress.

In 2005 - 2006 stress, depression and anxiety disorders cost the UK £530 million. In the UK an estimated 70 million working days are lost each year due to mental health problems and 10 million of these are a result of anxiety disorder and depression (Editors Note). Studies estimate that 50%-60% of lost working hours in the EU are related to stress. Stress affects almost one in four workers in the EU. Stress leads to mental and physical problems such as musculoskeletal problems, but it can also threaten workplace safety.

The main effects of work stress for businesses are the following:

- Prolonged absences from work
- Loss of personnel
- Discipline problems
- Reduced productivity
- Errors and accidents
- Violence and psychological harassment
- Increased reimbursement or health care costs.
- While the effects at the individual level are:
- Sleep disorders, anxiety, irritability, depression, alienation, burnout.
- Cognitive reactions? difficulty concentrating, recalling memory, making decisions, learning new things.
- Behavioral problems. Use of drugs, alcohol, self-destructive acts. Pathophysiological reactions, musculoskeletal problems, heart problems, etc. (iatroi-ergasias.gr)

In our country, the main psychosocial factors reported by employees were:

- Time pressure 46%
- The lack of influence at work 39%
- Job insecurity 32.2% (of editors)

Also, stress is linked to the percentage of Public Debt. 73% of workers in countries with public debt above 90% of GDP choose job insecurity or job reorganization as a common cause of stress (INE-GSEE).

The new labor legislation where it regulates working time to the detriment of workers, establishing 10 hours of work for all industries with two hours of overtime without pay for six months, where it increases overtime from 96 a year to 150 a year, is sure to lead to an increase in occupational stress and mental disorders and of course to an increase in occupational accidents.

- It is a frequent phenomenon in workplaces where the use of machines and sharp objects is extensive, mainly young workers taking on tasks without having been sufficiently trained in the subject of their work. Without having pointed out to them the dangers that exist both for themselves and for their colleagues. Thus, "carelessness", "relaxation", "negligence", oversight, "human error" often happens to be linked to insufficient knowledge of the subject of the work. The data on the accidents of the age groups lead us to such a conclusion.
- The poor state of technological equipment, means of transport and building infrastructure are the main causes of occupational accidents. Poorly maintained cars and trucks, with worn tires of old technology, rickety lighting, ventilation, cooling, heating, air purification systems are factors in accidents and occupational diseases. The data on Occupational Accidents by 'contact material' gives us a lot of information about this cause of Occupational Accidents.
- Ergonomics is the applied science that aims to improve human performance of health well-being through its contribution to the design of methods machine tools and work environment. Its basic principle is to put the needs of the user at the center of the design

An ergonomic intervention can concern the morphology, for example car driver's seat, the technology, e.g. alarms, software, the basic parameters such as lighting, noise, ventilation, room temperature. It aims to improve the efficiency and reliability of the overall man-machine system. Thus, ergonomics, studying the anatomical and anthropocentric characteristics of the human worker in relation to the type of work he performs, makes interventions and changes in the workplace such that they reduce the musculoskeletal and physiological load, contributing to the reduction of Occupational Accidents and occupational diseases. It intervenes in the organization of communication management, the workload between employees, the analysis of mistakes as well as the study of decision-making (ergonomics.gr).

The specifications of the workplaces are provided in a provision of the legislation such as P.D16/1996 concerning the minimum safety and health standards in the workplaces in compliance with the directive 89/654 EEC. The correct ergonomic design of the space and workplaces is related to the use of the correct equipment and the correct body posture not only in office work but also in work carried out in industries, crafts, shops, etc. Thus, the correct posture when working on a computer, sitting in a chair designed for this work, is an ergonomic intervention. The appropriate lighting, ventilation, heating in

an office, in a shop in a warehouse. The placement of bulky folders not too much above the average human height but not too low, the existence of free space for the movement of the legs of machine operators when they work standing up the most correct division of labor to avoid the overwork of some workers taking into account anatomical and anthropocentric characteristics of workers, are just some examples of ergonomics intervention with the aim of improving working conditions and avoiding Occupational Accidents and occupational diseases.

- a) The cleanliness and tidiness of the workplace plays a very important role in avoiding E.A. and occupational diseases. Floors and stairs swept from water, oils, dust and material residues. Workshop tools arranged in tool boxes, parcels arranged on the shelves of a warehouse, office documents in files numbered and placed on the appropriate shelf. Empty boxes from goods receipts in a special area and not in the corridors, clean toilets, with soapy paper and disinfectant are sure to help reduce EAs and occupational diseases.
- b) The use of alcohol and drugs, excessive smoking even during working hours are causes of Occupational Accidents.
- c) It is estimated that a 5% EA is due to unexpected factors, for example earthquakes, floods, lightning, etc.

ii. Consequences of Working Accidents and Occupational Diseases

Accidents in the workplace have serious consequences both for the employee and his relatives, as well as for the company and the state.

iii. Consequences for Employees:

- Injury or death
- Orphans or widows
- Human pain, sorrow
- Psychological problems
- Reduced incomes
- Decrease in standard of living and quality of life of the victim and his family

iv. Consequences for Businesses:

- Destruction of material and fixed equipment
- Reduction in production
- Reducing the efficiency of other employees
- Negative impact on the company's image
- Expenditures for replacement of fixed equipment and materials
- Expenses for replacement of casualty workers
- Increase in expenses for accident insurance
- Administrative and other fines from the state

- Employee reactions

v. Consequences for the State:

- Increase in costs of retirement, hospitalization and medical care
- Increase in costs of widowhood, disability, protection of minor children
- Social reactions
- Political instability

The consequences of the Occupational Accidents we mentioned concern the recorded Occupational Accidents from the "legitimate" work. Accidents that are not recorded, that are not made known to society, it is logical that the consequences for the company and also for the state are less important. The burden of the EAs of "black work", i.e. the uninsured, immigrants, minors is mostly borne by the victim. Also in countries with a lower level of economic development, social cohesion, organization of workers and development of Public health and welfare, the burden of Occupational Accidents falls almost entirely on the back of the victim and his family.

In countries more developed in the above sectors, the consequences of Occupational Accidents are shared by both the victim, the business and the state. The participation rate is determined by the social security system and the legislation of each country. In countries with a privatized social security and pension system, the consequences fall more on the employee through insurance premiums and pension contributions and less on the state and businesses. Where there is a compensatory social insurance and retirement system, the consequences fall less on the worker-victim and more on the state. The burden on businesses depends on their participation rate in the insurance and pension system but also on the legislation of each country regarding the responsibility of the business when an occupational accident occurs. Finally, the consequences of Occupational Accidents in the field of crime and the "underworld" burden, as is reasonable, almost entirely on the victim and his family.

5. Measuring the cost of occupational accidents

i. Cost of Working Accidents

The cost is the monetary valuation of the consequences of OA and occupational diseases for the worker, the business and the state. It is called private for business and social for the state.

ii. Cost for Business (Private Cost)

The most common method of calculating costs for a business is that of cost benefit analysis. It is a method in which businesses determine the benefits and costs before making a decision. An advantage of this method is the conversion into a monetary value of all cost-benefit elements.

The basic distinction between costs is internal and external. The external cost is indifferent to the business. Only the internal cost is of interest to the business and based on this it makes its decisions.

Internal costs are divided into:

- Fixed cost
- Variable cost

Fixed costs do not depend on the number of accidents in a business for example cost of compliance with legislation. The variable depends on the accidents, for example compensations, restitution, etc.

So for the company the fixed cost includes:

- The cost of prevention (I)
- The cost of insurance for employees, buildings, etc. (II)
- The cost of compliance with legislation (II)

Variable costs include:

- Extraordinary cost of prevention (expansion of the causes of the accident (IV)
- Workers and infrastructure insurance costs (when the premium is adjusted after each accident)(V)
- Cost of treatment and rehabilitation (VI)
- Wage costs (payment of wages without the offer of work by the victim and his colleagues) (VII)
- Cost of destruction of materials, infrastructure and technological equipment (VIII)
- Cost of replacing materials, infrastructure and technological equipment (IX)
- Cost of emergency prevention and workplace safety measures, for example installation of an electronic fire warning system (X)

We know that: **Total Cost = Fixed Cost + Variable Cost**

Therefore **Total cost = I + II + III + + X**

Variable costs motivate businesses to make improvements in the areas of safety and health and are taken into account in business decisions.

Fixed costs are unavoidable and given by law.

Direct and Indirect Cost

Another distinction of costs is in direct and indirect:

The Direct Cost includes:

- Cost of equipment and facilities
- Cost A of aids
- Cost of hospital and medical treatment
- Compensation cost

- Cost of administrative penalties and fines from the state

It is immediately noticeable and latent.

Indirect costs include:

- Costs from the interruption of production activity
- Cost of lost orders. It particularly concerns small or medium-sized businesses with a low level of inventory. Large companies will cover the reduced production possibly through their stocks. Thus in the short term they absorb part of the cost of lost orders. However, the need to restore stocks to the normal level leads to an increase in production with the aim of creating a stock rather than meeting demand. In other words, you transfer the cost of lost orders to the future
- Reduced productivity of injured workers. Many times workers are afraid of losing their job and due to the pressures exerted by employers they come to work without having fully recovered from an Occupational Accidents or chronic condition, resulting in low productivity. Research in the US and Australia shows that the productivity of these workers is reduced by 1/3 or more. Some experts estimate that these costs, due to "presenteeism" as this phenomenon is called, are three times higher than those resulting from absences due to illness and accidents (2nd Panhellenic Conference on Health and Safety at Work)
- Cost of lost working hours for care
- Creating a bad image of the company in the society
- Cost of restoration of material infrastructure and equipment
- Cost of replacing the victim and retraining staff on safety issues
- Costs from employee reactions, work stoppages, strikes
- Accident investigation and registration costs
- Cost of effect on the morale of colleagues

Indirect costs belong to variable costs and are always greater than direct costs. According to the **Iceberg theory**, the direct cost is equal to 1/5 of the Total cost. In small and medium enterprises the percentage of indirect costs is small. While in economies with a high level of development, with a strong welfare system, low official unemployment and a reliable accident registration system, the direct costs for businesses are high. The opposite happens in developing economies with high rates of undeclared work where the concealment of accidents is high, with large social inequalities and low representation of workers in trade unions. There the direct cost is very small for businesses.

iii. Cost for the Employee

The employee is the direct victim of an occupational accident. The costs he undertakes are:

- The monetary cost: loss of income due to his inability to work
- The non-monetary cost: it is the most important because the good of life and health of the employee is affected.

The possibility of valuing non-monetary costs in a monetary value is difficult and often runs afoul of ethical rules. Ultimately, any monetary valuation is a pure social contract with often different moral and social content in different countries.

Non-monetary costs include:

- Loss of life- injury
- Deterioration of health
- Degradation of the quality of life of the employee and his family
- Emotional and psychological collapse
- Mental anguish

Research in New Zealand has shown that the cost of mental distress accounts for 95% of the total cost to society of poor OSH conditions, so you need to do the math.

As in businesses, the accident costs for employees are divided into:

- a) Fixed cost
- b) Variable cost

Fixed Cost

The fixed cost for the employee consists of:

- Contributions to the insurance system
- Increased cost of purchasing products that he buys as a consumer, due to the transfer of the cost of accidents from the business to the citizens
- Cost of private security for himself and his family
- State taxes to cover costs from the state

Fixed costs cannot be covered by compensation as they do not correspond to specific benefits.

Variable Cost

Variable costs consist of:

- All expenses covered by the employee himself and not by the state, the employer or the insurance company, as well as by a possible increase in insurance premiums due to health deterioration
- The part of the variable cost (loss of income from a second job) is not covered by insurance
- The portion of the variable cost corresponding to lost wages is partially covered by the insurance

So Total Cost = Fixed Cost + Variable Cost – Benefits (benefits, pension, compensation).

The cost estimation methodology plays a role in the final result as well as the insurance systems, the evolution of the salary, the amount of compensations.

The cost of Occupational Accidents for the employee varies from country to country. The cost borne by the employee ranges from 100% to 25% depending on the country. It is smaller in developed economies with developed social security systems, low unemployment and undeclared work with an organized trade union movement and larger in developing countries with high rates of

insecure work, weak trade union representation with ineffective public management and with health and welfare systems that do not cover all employees. The type of work (manual or non-manual) the company in which he works (small, medium, large, multinational, public company) affect the cost of the accident for the employee. Salary differences between employees, their age, their family status affect the formation of the final cost for the employee. The higher paid workers having greater savings, greater compensation from employers and insurance organizations, due to paying higher insurance premiums are in better conditions to deal with the damage to their health. Thus, they return to work faster, perhaps even healthier. The elderly and those with many children are in a more difficult position in terms of costs than the young single or married to none with one or two children.

iv. Cost for the State (Social Cost)

Interest in the economic consequences of OA and occupational diseases at the national level began around 1970 when the phenomenon was presented at the global level, the increase in losses due to accidents exceeding the increase in GDP.

The intensification of work and the mass processing and production of dangerous products (chemical, nuclear) resulted in industrial accidents with a large number of victims, not only workers but also citizens. Calculating costs at the state level presents greater difficulties than at the individual or business level.

Individuals and businesses can relatively easily determine their costs. Calculating costs at national level is not simply the sum of the costs of the individual parts.

According to the European organization, for health and safety at work (OSHA) costs for the calculation of costs are divided into five main categories:

- a) Productivity costs: costs related to the reduction of performance or production.
- b) Health care costs. Direct medical costs eg pharmaceuticals, first aid and indirect for example time for patient care.
- c) Deterioration of the quality of life. Monetary assessment of the deterioration of the quality of life, for example that caused by physical pain, mental decline, melancholy, depression, etc.
- d) Administrative costs: payment of social security contributions, administrative fines
- e) Insurance Expenses: Insurance expenses, compensation, insurance premiums

In our opinion, one more should be added to the five categories.

- f) Environmental costs. We refer to the cases of industrial accidents with effects on society. Destruction of the environment (air pollution, water pollution, etc.). Degradation of the quality of life and health of some citizens. OSHA

emphasizes that the responsibility of complying with the law rests primarily with employers. Employers in case of EA bear much less costs than the employee and the state. The loss of productivity is prolonged until the victim is replaced by a new worker. It should be taken seriously by policy makers.

v. Private and Social Cost

It is necessary to make some observations about private and social costs.

The private cost does not necessarily enter the social, nor the social into the private. This means that the costs incurred by a private company from an occupational accident, for example the cost of lost orders or the cost of reduced productivity, do not concern society. This cost will be covered by the benefits that other companies producing similar products will have, with the result that the total supply of the product will remain stable in the short term. We refer mainly to the cases of companies that operate under a competitive regime - Small & Medium Businesses. When the company is a monopoly, for example Public Power Corporation

PPC, the cost of lost orders or reduced productivity is passed on to society in the form of a drop in living standards or an increase in prices. Reduced production will be covered by imports burdening the trade balance and increasing social costs.

Businesses have the possibility of transferring the cost of occupational accidents, by transferring it to product prices or to insurance funds. The loss of an employee's income and the drop in his/her standard of living due to Occupational Accidents or occupational disease is balanced by the improvement in the life and income of his replacement.

Businesses are indifferent to this form of cost, just as they are indifferent to the social cost of occupational accidents which concerns:

- a) New legislation on work accidents
- b) Modernization of control mechanisms
- c) Restoration of the environment
- d) Improvement of infrastructure such as roads, internet, hospitals, etc.

A general finding is that the smallest part of the costs of work accidents are borne by the companies. The legislation, the insurance system and the health system of each country determine the percentage of participation in occupational accidents of the state and the employees.

vi. Difficulties of Calculating the Cost at the National Level

Calculating the costs of Occupational Accidents and occupational diseases at the national level involves a high degree of subjectivity despite all the efforts that have been made. They vary depending on the methodological approach and the considered economy (labor, capital, know-how intensity).

Factors that contribute to the difficulty of calculation are:

- Incomplete recording of occupational accidents and occupational diseases. As far as occupational diseases are concerned, the cost is borne by the IKA (EFKA), due to the absence of a special occupational risk insurance body. This cost is difficult to calculate due to the lack of data, especially for occupational diseases, which, due to their non-recognition and registration as occupational, burden the IKA as common diseases. The cost for the IKA is high and exceeds the contributions for occupational risk, even if the cost of occupational diseases is not taken into account, as well as the medical care and rehabilitation of the victims of Occupational Accidents (1st Panhellenic conference (1st Panhellenic Conference on Health and Safety at Work 2010)
- Hiding accidents
- Belated declaration of them to the competent authorities
- The long duration over which the costs of Occupational Accidents and Occupational diseases extend
- Impossibility of accurate and objective quantification of cost elements related to human life, grief, etc.
- Refusal or inability of businesses to cooperate with the state in OSH issues and to comply with national legislation. This particularly concerns small and medium-sized enterprises (SMEs) which, due to a lack of know-how, appropriate human capital, and high costs, are unable to assimilate modern requirements in matters of health and safety.

As far as our country is concerned, the first three factors are directly linked to the ineffectiveness of the mechanisms for recording and controlling occupational diseases and occupational diseases and their understaffing. Audit activities are limited, due to insufficient organizational structure and spatial coverage, inability to conduct audits in the vast majority of small and very small businesses, where they present high rates of Occupational Accidents.

The limited number of inspectors (20,000 across Europe i.e. one inspector for 9,000 workers) as well as the lack of technical support for the inspections are also factors that contribute to the incorrect recording of EA and Occupational diseases and therefore to the non-calculation of costs (European committee Brussels 6-6-2014).

Corruption of control mechanisms and client relationships both in our country and in the rest of Europe contribute to insufficient costing.

vii. Cost of Working Accidents in Greece

In Greece, only the direct costs of Occupational Accidents amount to more than one billion per year, without counting the costs of care and permanent disability benefits.

Accepting the theory of the Iceberg that we mentioned, that the direct cost is equal to 1/5 of the total cost, this means that more than 5 billion euros a year

are the costs of EAs in Greece on an average annual basis. We also mentioned that EU-OSHA and ILO calculate a minimum cost of 2.6% of GDP and a maximum cost of 4% as EA costs. Based on these estimates, we can calculate the cost that our country has for the lower and upper price (in millions of euros). Based on these estimates, the following is a table for calculating the cost of occupational accidents.

Occupational Accidents Cost Calculation Table.

GDP	2014	2015	2016	2017	2018	2019	SUM	AVERAGE
MARKET PRICES	180,87	176,62	175,25	176,47	179.914	183,06		58
X 2,6%	0,026	0,026	0,026	0,026	0,026	0,026		
COST IN BILLIONS EURO	4,7	4,59	4,55	4,58	4,67	4,76	27,8	4,6
X 4%	0,04	0,04	0,04	0,04	0,04	0,04		
COST IN BILLIONS EURO	7,23	7,06	7,01	7,06	7,2	7,3	42,8	7,1
AVERAGE IN BILLIONS EURO	5,96	5,82	5,78	5,82	5,93	6,03		5,85

GDP Source: EL.STAT. (Own Processing)

From the data in the table, it appears that the cost of Occupational Accidents during the six-year period 2014-2019 is approximately 6 billion euros (5.85) on an annual basis. The amount is huge for a country where in the last decade it lost 25% of its GDP due to the economic crisis and political choices.

If the appropriate measures are taken and the cost of occupational accidents is reduced to at least 20%, i.e. approximately 1.2 billion euros will be saved and this money will be invested in Occupational Safety and Health, the benefit for the national economy given that returns on Occupational Safety and Health investment is 2.09 it will be 2.5 billion per year. (European Commission - General Directorate of Employment, Social Legislation and Integration).

6. Effects of Occupational Diseases

i. Occupational Diseases

The health of workers is significantly affected by working conditions. Workplaces pose health risks to workers.

The World Health Organization estimates that:

- 37% of back pain
- 16% of hearing loss
- 13% of chronic obstructive pulmonary disease
- 11% of bronchial asthma
- 10% of lung cancer
- 8% of injuries but also the
- 9.6% of all cancer deaths are due to work

According to the director of the European Agency for Safety and Health at Work (EU-OSHA) on 18-10-2014 "cancer is the first cause of work-related mortality, followed by cardiovascular and respiratory diseases".

Cancer, as is typically noted, affects the working class (Efimerida ton Syntakton – efsyn.gr).

In our country, farmers have the highest incidence of lung diseases, some types of cancer, acute and chronic chemical poisoning, dermatitis and musculoskeletal syndromes. All the above occupational diseases are presented in a higher percentage than workers in other economic activities. Also the loss of hearing and vision, mental disorders due to stress, financial problems, isolation, disappointment due to a bad harvest and the effects of Biotechnology are directly related to the occupation of the farmer.

In Greece, the issues of Occupational Safety and Health in agricultural operations are unclear as there is no organized system of control and recording of the situation. In addition, there are no unions of land workers. Our country has not ratified the International Labor Convention 129 "On Labor Inspection in Georgia" of the International Labor Organization (ILO). It is imperative to establish a national Occupational Health and Safety Organization (Efimerida ton Syntakton – efsyn.gr).

APPENDICES

The Tables with the numerical data for Occupational Accidents, their Analysis

as well as the entire Research Paper "Occupational Accidents and Occupational Diseases in Greece in the period 2014-2019" can be found in the following link:

<https://drive.google.com/file/d/1yRAUZp3t4KHYZnyqHsN2aC2kmXZdahJa/view?usp=sharing>

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The linkage between financial development, income inequality, and economic growth: empirical evidence from European Union countries-members

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Abstract

This study aims to investigate the linkages between financial development, income inequality, and economic growth in the 27 countries-members of European Union using annual panel data over the period 1988-2017. Various proxies of financial development are used to measure the depth, the efficiency and the stability of banking system and stock markets. The Granger non-causality test in heterogenous panels is employed to check the direction of causality between financial development, income inequality and economic growth. In addition, the difference generalized method of moments (GMM) panel data estimation is applied to identify how financial development and income inequality affect the economic growth. The results mainly confirm the existence of the feedback causality hypothesis between financial development and economic growth, income inequality and economic growth, but also between financial development and income inequality. Regarding the role of financial development on economic growth, the results reveal a negative impact of banking depth on economic growth, while the stock markets size promotes the economic growth. Also, the banking instability measured by non-performing loans can hinder the economic growth. The coefficient of income inequality is positive but statistically insignificant. The investment and trade openness are other important factors that can be beneficial for the economic

growth. The policymakers need to strengthen the financial supervision to improve the capital allocation to more productive investment and to reform the lending regulations ensuring more creditworthy investors.

Keywords: economic growth, financial development, inequality, difference-GMM estimator, Granger causality

JEL classification: C33, G20, O11

1. Introduction

Over the past decades, the relationship between financial development, economic growth, and income inequality has received much attention in the economic literature. Theoretically, a well-developed financial system can lead to economic growth by providing better financial functions through producing information about investment opportunities and easing capital allocation, monitoring firms about the provided resources, exerting corporate governance, providing mechanisms for trade, diversity, and managing risk, pooling of savings, and facilitating exchange (Levine, 2005). Since capital is a substantial inflow in the production process, the ability of firms to access capital will lead to higher productivity and growth. Financial development can expand the availability of financial services to individuals with previous constraints, influence investments in human capital, diminish the inequality gap, and enhance economic growth (Galor and Zeira, 1993). In addition, the financial system can also improve the financial services of high-income individuals and well-established firms since they are able to repay their loans. Therefore, financial development could disproportionately aid the rich, widening inequality and perpetuating economic opportunity differences (Demirguc-Kunt & Levine, 2009).

Financial development plays a crucial role in economic growth through capital accumulation and total factor productivity. Some studies have found that

financial development has a positive impact on economic growth (Durusu & Ciftci et al., 2016), while others have shown a negative impact (Ahmed, 2016; Ayadi et al., 2015; Ehigiamusoe et al., 2019). More recently, it has been found that financial development is beneficial, but “there can be too much finance” when financial sectors are already well developed, causing slower growth and higher exposure to crises (Cournede et al., 2015). The debate about the causal relationship between financial development and economic growth remains without universal consensus since the empirical evidence is sensitive to the proxy of financial development and is dependent on the econometric method (Kar et al., 2011). The direction of causality between financial development and economic growth has been extensively studied. Several studies support the supply-leading hypothesis, where the development of the financial system leads to economic growth (Schumpeter, 1912; Christopoulos & Tsionas, 2004; Cavenaile et al., 2014), the demand-following hypothesis that assumes that financial development follows economic growth (Robinson, 1952; Zang & Kim, 2007; Bist, 2018), the hypothesis of feedback causality, meaning the existence of two-way causality between financial development and economic growth (Demetriades & Hussein, 1996; Apergis et al., 2007; Kar et al., 2011) and the hypothesis of neutrality (Lucas, 1988; Shan et al., 2001; Hsueh et al., 2013).

Also, a fundamental question is whether inequality retards or accelerates economic growth. The ongoing debate rotates around possible negative as well as positive effects of inequality on growth through different transmission channels. Inequality has a positive impact on economic growth by providing incentives for innovation and higher productivity and fostering saving and investment (Forbes, 2000). Inequality increases during periods of technological innovations by enhancing the mobility and the concentration of high-ability workers in technologically advanced sectors, and this can generate higher rates of growth (Galor and Tsiddon, 1997). On the other hand, inequality can be

harmful to growth due to credit market imperfections and social and political instability (Persson and Tabellini, 1994; Alesina and Perotti, 1996; Ostry and Berg, 2011). In addition, a few studies have investigated the causal relationship between economic growth and income inequality resulting in conflicting evidence (Assane & Grammy, 2003; Risso & Sanchez-Carrera, 2012; Risso et al., 2013; Jihène & Ghazi, 2013; Amri, 2018; Vo et al., 2019). Concerning the direction of causality between financial development and income inequality, little evidence is reported to conclude that financial development causes income inequality (Gimet & Lagoarde-Segot, 2011; Sehrawat & Giri, 2016).

This study investigates the causal and dynamic relationships between financial development, economic growth, and income inequality for 27 European Union countries during the period 1988-2017. To determine the direction of causality between financial development, economic growth, and income inequality, this study carries out the Granger non-causality test in heterogeneous panel proposed by Dumitrescu and Hurlin (2012). In addition, the study employs the difference-GMM estimator to assess the impact of financial development and income inequality on economic growth. The novelty of this study is the selection of various proxies of financial development representing different characteristics of the banking system and stock markets, such as depth, efficiency, and stability, instead of the standard measures of financial deepening or a composite index of financial development.

The remainder of the paper is organized as follows: Section 2 presents the data; Section 3 describes the methodology; Section 4 provides and interprets the results, and Section 5 concludes the study.

2. Data

This study uses annual panel data of 27 European Union countries over the period from 1988 to 2017. The data were obtained from Global Financial

Development Database, World Development Indicators of the World Bank and the Standardized World Income Inequality Database derived by Solt (2019).

Different proxies of financial development to capture various dimensions such as the depth, the efficiency, and the stability of financial system.

Banking depth

- private credit (PRV) which is the financial resources provided to the private sector by domestic money banks as a share of GDP,
- bank asset (BAS) equal to the total assets held by deposit money banks as a share of sum of deposit money bank and Central Bank claims on domestic nonfinancial real sector,
- liquid liabilities (LLY) which is the ratio of liquid liabilities to GDP,

Banking efficiency

- net margin interest rate (INT) which is the accounting value of bank's net interest revenue as a share of its average interest-bearing assets,

Banking stability/instability

- Z-score (ZSC) which is the probability of default of a country's commercial banking system,
- non-performing loans (NPL) equal to the ratio of defaulting loans (payments of interest and principal past due by 90 days or more) to total gross loans

Stock market depth/size/activity

- stock market capitalization (SMC) as the total value of all listed shares in a stock market as a percentage of GDP,
- value traded (VTR) as the total value of all traded shares in a stock market exchange as a percentage of GDP,

Stock market efficiency

- turnover ratio (TOR) equal to the total value of shares traded during the period divided by the average market capitalization for the period,

Stock market stability

- stock price volatility (SPV) which is the average of the 360-day volatility of the national stock market index.

Economic growth (GDP)

- GDP per capita based on constant 2010 U.S. dollars

Income inequality (GIN)

- Gini index as the estimate of disposable income after tax and after transfers.

Control Variables

- Research and development expenditure (% of GDP)
- General government final consumption expenditure (% of GDP)
- Gross capital formation (% of GDP)
- Inflation, consumer prices (annual %)
- Trade (% of GDP)
- School enrollment, secondary (% gross)

3. Methodology

3.1 Granger Causality Test

The empirical analysis adopts the Granger non-causality test in heterogenous panel proposed by Dumitrescu and Hurlin (2012). Firstly, to detect the cross-section dependence, this study employs the Breusch and Pagan (1980) LM test, the Pesaran (2004) CD test, and the Pesaran et al. (2008) bias-adjusted LM test. Secondly, the second-generation panel unit root test, CIPS, proposed by Pesaran (2007) is carried out

to check the stationary for each series.

Dumitrescu and Hurlin (2012) provide an extension of Granger (1969) causality test to examine causality in panel data considering a heterogeneous panel data model with constant time dimension and different cross-section individuals. The test is built on vector autoregressive model (VAR) with the following regression:

$$y_{i,t} = \alpha_i + \sum_{k=1}^K \gamma_{ik} y_{i,t-k} + \sum_{k=1}^K \beta_{ik} x_{i,t-k} + \varepsilon_{i,t} \text{ with } i = 1, \dots, N \text{ and } t = 1, \dots, T \quad (1)$$

where $x_{i,t}$ and $y_{i,t}$ are the observations of two stationary variables for individual i in the period t . The lag order K is assumed to be identical for all cross-section units and the panel must be balanced. The null hypothesis corresponds to no existence of causality relationship from x to y for all individuals against the alternative hypothesis which assumes that there is a causal relationship from x to y for a subgroup of $N-N_1$ individuals.

The null hypothesis and the alternative hypothesis are defined as:

$$H_0: \beta_{i1} = \dots = \beta_{iK} \quad \forall i = 1, \dots, N$$

$$H_1: \beta_{i1} = \dots = \beta_{iK} \quad \forall i = 1, \dots, N_1$$

$$\beta_{i1} \neq 0 \text{ or } \dots \text{ or } \beta_{iK} \neq 0 \quad \forall i = N_1 + 1, \dots, N$$

where $N_1 \in [0, N - 1]$ is unknown but satisfies the condition $0 \leq N_1/N < 1$.

The test statistic is based on the average of the individual Wald statistics of Granger non causality across the individuals and is computed as:

$$\bar{W} = \frac{1}{N} \sum_{i=1}^N W_i \quad (2)$$

Under the assumption that the Wald statistics W_i are independently and identically distributed across individuals the average Wald statistic is shown to converge sequentially to a standard normal distribution

$$\bar{Z}_{N,T}^{HNC} = \sqrt{\frac{N}{2K}} (\bar{W}_{N,T}^{HNC} - K) \quad T, N \rightarrow \infty, N(0,1) \quad (3)$$

3.2 Difference GMM Estimator

The impact of financial development and income inequality on economic growth is investigated in the context of dynamic panel data model employing the difference generalized method of moments (GMM) estimator developed by Arellano and Bond (1991).

The regression has the following specification:

$$y_{i,t} = \alpha y_{i,t-1} + \beta X_{i,t} + \eta_i + \varepsilon_{i,t} \quad (4)$$

where $y_{i,t}$ is the dependent variable, $y_{i,t-1}$ is the lag of dependent variable, $X_{i,t}$ is the set of explanatory variables, η is an unobserved country-specific effect, ε is the error term, i is the countries, and t represents the time-period.

Taking first differences the country specific effect is eliminated:

$$\begin{aligned} (y_{i,t} - y_{i,t-1}) - (y_{i,t-1} - y_{i,t-2}) \\ = \alpha(y_{i,t-1} - y_{i,t-2}) + \beta(X_{i,t} - X_{i,t-1}) + (\varepsilon_{i,t} - \varepsilon_{i,t-1}) \end{aligned} \quad (5)$$

To solve the problem of correlation between the lagged dependent variable $(y_{i,t-1} - y_{i,t-2})$ and the error term $(\varepsilon_{i,t} - \varepsilon_{i,t-1})$ and the potential endogeneity of the explanatory variables X , Arellano and Bond (1991) proposes the use of instruments. The lagged levels of the explanatory variables are used as instruments under the assumptions that the error term ε , is not serial correlated and the explanatory variables X are weakly exogenous.

The following moment conditions are used to calculate the difference GMM estimator:

$$E[y_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \text{ for } s \geq 2; t = 3, \dots, T \quad (6)$$

$$E[X_{i,t-s}(\varepsilon_{i,t} - \varepsilon_{i,t-1})] = 0 \text{ for } s \geq 2; t = 3, \dots, T \quad (7)$$

The difference estimator is provided after running two steps. In the first one, the error terms are assumed to be independent and homoscedastic across countries and over time. The residuals retained at this step serve to construct consistent estimate for the variance–covariance matrix. Thus, the difference estimator is asymptotically more efficient than the first step estimator.

The consistency of the GMM estimator depends on the validity of no second-order serial correlation for the error terms and the validity of the instruments. To account for autocorrelation, Arellano and Bond tests for first and second order autocorrelation in the first-differenced errors are performed to examine the hypothesis that the error term is not first-order serially correlated but second-order serially correlated. The Sargan test of over-identifying restrictions, tests the overall validity of the instruments by analyzing the sample analog of the moment conditions used in the estimation process.

3.3 Models specification

Models to determine the causality relationships are specified as:

$$\Delta GDP_{i,t} = \alpha_{1i} + \sum_{k=1}^K \gamma_{11ik} \Delta GDP_{i,t-k} + \sum_{k=1}^K \beta_{12ik} \Delta FINANCE_{i,t-k} + \varepsilon_{1i,t} \quad (8)$$

$$\Delta GDPP_{i,t} = \alpha_{2i} + \sum_{k=1}^K \gamma_{21ik} \Delta GDP_{i,t-k} + \sum_{k=1}^K \beta_{22ik} \Delta GIN_{i,t-k} + \varepsilon_{2i,t} \quad (9)$$

$$\Delta FINANCE_{i,t} = \alpha_{3i} + \sum_{k=1}^K \gamma_{31ik} \Delta FINANCE_{i,t-k} + \sum_{k=1}^K \beta_{32ik} \Delta GIN_{i,t-k} + \varepsilon_{3i,t} \quad (10)$$

where FINANCE = {PRV, BAS, LLY, SMC, VTR, INT, TOR, ZSC, NPL, SPV} and k is the optimum lag length, selected through Schwarz Information Criteria (BIC).

To estimate the impact of explanatory variables on economic growth, we perform the two-step difference-GMM estimator proposed by Arellano and Bond (1991). The difference GMM estimator is efficient when the number of individuals on the panel exceeds the number of periods. Consequently, we construct panel data with six periods using averaged over five-years intervals from 1988 to 2017.

In more detail, the estimated regression equation has the following general form:

$$GDP_{it} = \alpha_0 + \beta_1 \text{lag} GDP_{it-1} + \beta_2 FINANCE_{it} + \beta_3 GIN_{it} + \beta_4 CONTROL_{it} + u_i + \varepsilon_{it} \quad (11)$$

where GDP is the economic growth, FINANCE represents the proxies of financial development, GIN is the income inequality and CONTROL is the set of control variables, u is an unobserved country-specific effect, e is the error term, and the subscripts i and t represent country and time period, respectively.

4. Results

Before determining the causality between financial development, economic growth, and income inequality, it is required to perform panel unit root tests. Table 1 shows the results of cross-sectional dependence tests. The three alternative test statistics for all the variables reject the null hypothesis of cross-sectional independence at a 1% significance level. This result means that a

shock in any European Union country may also affect other countries. Therefore, for more reliable findings, the second-generation panel unit root test is applied. The results of the CIPS test proposed by Pesaran (2007) are illustrated in Table 2. All variables are stationary in the levels or integrated of zero order.

Table 1: Results of Cross-sectional dependence										
	PRV	BAS	LLY	SMC	VTR	INT	TOR	ZSC	NPL	SPV
LM	2637	2619	2283	2576	2458	2409	2427	3073	3152	3721
LM adj*	261.9	260.4	220.9	254.5	241.6	236.1	238.6	313.6	322.3	3721
LM CD*	21.03	22.53	19.78	17.46	15.66	16.02	17.24	23.45	22.92	26.46
Notes: 1% significance level.										

Table 2: Second-generation panel unit root test CIPS test			
	Levels		Integration order
	Constant	Constant & trend	
PRV	-2.538***	-2.635*	I(0)
BAS	-3.625***	-3.442***	I(0)
LLY	-2.444***	-3.155***	I(0)
SMC	-2.679***	-2.867***	I(0)
VTR	-2.743***	-3.220***	I(0)
INT	-3.606***	-3.642***	I(0)
TOR	-2.831***	-3.408***	I(0)
ZSC	-3.142***	-3.620***	I(0)
NPL	-2.373***	-3.230***	I(0)
SPV	-2.419***	-3.415***	I(0)
GDP	-3.926***	-4.131***	I(0)
GIN	-2.209**	-2.819***	I(0)
Notes: The ***, ** and * means rejection at 1%, 5% and 10% significance level, respectively.			

After the cross-sectional dependence and unit root test, Dumitrescu and Hurlin (2012) panel causality test was applied to determine the direction of the relationship between the variables. Table 3 shows the panel causality test results. Most importantly, the results reveal that there exists a bidirectional causality between financial development and economic growth except for a unidirectional causality from economic growth to stock market volatility. These findings confirm the feedback causality hypothesis. Regarding the causality relationship between economic growth and inequality, the results indicate a

two-way causality between inequality to economic growth. Finally, a bidirectional causality exists between financial development and income inequality, but a unidirectional causality runs from inequality to turnover ratio.

Table 3: Dumitrescu-Hurlin panel causality test				
Null hypothesis	W-bar	Z-bar	p-value	Decision
PRV → GDP	3.2083	8.1138	0.0000	Bi-directional causality
GDP → PRV	6.0257	10.4590	0.0000	
BAS → GDP	4.7293	13.7023	0.0000	Bi-directional causality
GDP → BAS	19.3029	14.6829	0.0000	
LLY → GDP	5.3460	15.9682	0.0000	Bi-directional causality
GDP → LLY	7.3093	23.1817	0.0000	
SMC → GDP	9.4971	19.4782	0.0000	Bi-directional causality
GDP → SMC	1.7814	2.8709	0.0041	
VTR → GDP	2.4521	5.3353	0.0000	Bi-directional causality
GDP → VTR	6.6280	12.0238	0.0000	
INT → GDP	2.7909	6.5803	0.0000	Bi-directional causality
GDP → INT	2.6020	5.8861	0.0000	
TOR → GDP	1.4935	1.8131	0.0698	Bi-directional causality
GDP → TOR	1.9335	3.4297	0.0006	
ZSC → GDP	3.7675	10.1684	0.0000	Bi-directional causality
GDP → ZSC	39.5865	41.0321	0.0000	
NPL → GDP	1.9359	3.4388	0.0006	Bi-directional causality
GDP → NPL	1.7493	2.7532	0.0059	
SPV → GDP	1.1214	0.4460	0.6556	Growth to financial development
GDP → SPV	24.3315	21.2152	0.0000	
GIN → GDP	7.6300	24.3602	0.0000	Bi-directional causality
GDP → GIN	73.7970	85.4728	0.0000	
PRV → GIN	27.8221	25.7497	0.0000	Bi-directional causality
GIN → PRV	31.4150	30.4170	0.0000	
BAS → GIN	34.3684	34.2536	0.0000	Bi-directional causality
GIN → BAS	24.2469	21.1053	0.0000	
LLY → GIN	23.5505	20.2007	0.0000	Bi-directional causality
GIN → LLY	2.8913	6.9493	0.0000	

SMC→GIN	54.5883	60.5200	0.0000	Bi-directional causality
GIN→SMC	5.0112	14.7382	0.0000	
VTR→GIN	23.5595	20.2124	0.0000	Bi-directional causality
GIN→VTR	5.9381	10.2315	0.0000	
INT→GIN	24.2504	21.1099	0.0000	Bi-directional causality
GIN→INT	3.5983	9.5468	0.0000	
TOR→GIN	2.2292	0.5955	0.5515	Inequality to financial efficiency
GIN→TOR	2.4322	5.2621	0.0000	
ZSC→GIN	27.5153	25.3511	0.0000	Bi-directional causality
GIN→ZSC	2.6178	5.9443	0.0000	
NPL→GIN	20.2729	15.9430	0.0000	Bi-directional causality
GIN→NPL	51.4531	56.4472	0.0000	
SPV→GIN	2.9630	2.5019	0.0124	Bi-directional causality
GIN→SPV	3.0948	2.8445	0.0044	
Notes: The ***, ** and * means rejection at 1%, 5% and 10% significance level, respectively.				

Table 4 reports the results of the difference GMM estimator. Each column refers to a model that includes each one of the financial development proxies, the Gini index, the control variables, and the lag of GDP per capita. The estimates across models are reliable since both the AR (2) test of serial correlation and the Sargan test of instrument validity show that the p-values are above the 5% significance level and fail to reject the null hypotheses. Therefore, the Sargan test confirms the validation of instruments, and the test for autocorrelation confirms no second-order correlation.

The results show that the coefficient of private credit is statistically significant at a 5% significance level and has a negative impact on economic growth. The other two measures of banking depth, bank assets, and liquid liabilities, have a positive impact on growth, but the coefficients are statistically insignificant. These results are aligned with some recent studies (Cheng et al., 2021; Mhadhbi et al., 2020). Arcand et al. (2015) have also shown a negative relationship

between financial depth and economic growth due to the lack of accountability, regulation, and monitoring of the banking system. Another possible explanation is due to the financial crisis, and that private credits are directed more toward consumption rather than more productive investment (Asteriou & Spanos, 2019).

Stock market capitalization has a positive and significant impact on economic growth, while total traded value and turnover ratio have a positive and insignificant effect on economic growth. Stock markets may achieve an important role in growth even though the stock markets are very thin in most transition economies. However, the regulations can be well developed, and the measures taken must reduce the excessively volatile share prices since the stock price volatility may seriously hamper economic development (Singh, 1997). Bank Z-score has a positive impact on economic growth, whereas stock price volatility has a negative impact on economic growth. Both coefficients of these variables are statistically insignificant. Non-performing loans have a negative and significant impact on economic growth. This finding is in line with Creel et al. (2015), who found supportive evidence that financial instability has a negative effect on economic growth. This implies that an increase in non-performing loans can slow economic growth.

The Gini index has a positive but insignificant impact on economic growth. This finding is consistent with Benos and Karagiannis (2018), who examined the relationship between top income inequality and growth in the U.S. and concluded that changes in inequality do not have an impact on growth. For control variables, the negative convergence effect is not confirmed since the coefficient of lagged GDP is positive and statistically significant. Research and Development expenditure has a negative and insignificant effect on growth. Also, government expenditures have a negative impact on economic growth at a 10% significance level. Awaworyi Churchill and Yew (2018) have established

an insignificant negative relationship between government expenditure and economic growth. Inflation has a negative but mainly insignificant impact on economic growth. Investment and trade openness have a positive and statistically significant effect on economic growth. Finally, the years of education have a positive but statistically insignificant effect on economic growth.

Table 4: Difference GMM estimator – Dependent variable: GDP										
GDP _{t-1}	0.7544*** (0.0677)	0.6539*** (0.0584)	0.64675*** (0.0558)	0.6632*** (0.0459)	0.6760*** (0.0454)	0.6798*** (0.0529)	0.6723*** (0.0514)	0.6751*** (0.0506)	0.6526*** (0.0379)	0.6804*** (0.0379)
PRIV	-0.0527** (0.0209)									
ASSET		0.0958 (0.1539)								
LLY			0.0178 (0.0179)							
SMCAP				0.0316*** (0.0111)						
VALTRADED					0.01223 (0.0074)					
INTEREST						0.0179 (0.0181)				
TURNOVER							0.0029 (0.0125)			
ZSCORE								0.0105 (0.0171)		
NPL									-0.0265** (0.0106)	
PRVOL										-0.0173 (0.0138)
GINI	0.1105 (0.2227)	0.1257 (0.2876)	0.0391 (0.2342)	0.1266 (0.2236)	0.1321 (0.2211)	0.0744 (0.2173)	0.1019 (0.2198)	0.0056 (0.2674)	0.1704 (0.2074)	0.0641 (0.2097)

RESDEV	-0.0206 (0.0312)	-0.0369 (0.0403)	-0.0407 (0.0360)	-0.0222 (0.0443)	-0.0388 (0.0416)	-0.0390 (0.0339)	-0.0404 (0.0390)	-0.0431 (0.0376)	-0.0221 (0.0338)	-0.0384 (0.0344)
GOVEXP	-0.1361 (0.1104)	-0.2514* (0.1597)	-0.2337* (0.1198)	-0.2511** (0.1193)	-0.2447* (0.1281)	-0.1952* (0.1124)	-0.2206* (0.1206)	-0.1453 (0.1634)	-0.2573** (0.1077)	-0.1881* (0.1073)
INVEST	0.4376*** (0.0334)	0.3935*** (0.0361)	0.4020*** (0.0337)	0.3415*** (0.0385)	0.3809*** (0.0379)	0.4007*** (0.0369)	0.4032*** (0.0368)	0.40226*** (0.0373)	0.3135*** (0.0422)	0.3939*** (0.0332)
INFLATION	-0.0205* (0.0109)	-0.0144 (0.0133)	-0.0187* (0.0112)	-0.0069 (0.0129)	-0.0148 (0.0128)	-0.01967* (0.0117)	-0.0177 (0.0115)	-0.0209* (0.0116)	-0.0124 (0.0103)	-0.0166* (0.0101)
TRADE	0.2165*** (0.0663)	0.2409*** (0.0809)	0.2429*** (0.0729)	0.1849*** (0.0649)	0.2253*** (0.0669)	0.2375*** (0.0799)	0.2362*** (0.0763)	0.2461*** (0.0751)	0.1951*** (0.0602)	0.2148*** (0.0654)
EDUSEC	-0.0202 (0.0377)	0.0347 (0.0482)	0.0194 (0.0397)	0.0213 (0.0359)	0.0293 (0.0417)	0.0155 (0.0411)	0.0174 (0.0439)	0.0137 (0.0409)	0.0750 (0.0471)	0.0095 (0.0358)
constant	1.6389** (0.6775)	1.6768 (1.5076)	2.5146*** (0.8997)	2.2014*** (0.7184)	1.9581** (0.7890)	2.1365*** (0.8025)	2.0715*** (0.8467)	2.3488*** (0.8225)	1.9894*** (0.7032)	2.2826*** (0.7473)
N. instrument	12	12	12	12	12	12	12	12	12	12
AR(1) p-value	0.0744	0.0217	0.0195	0.0498	0.0501	0.0278	0.0287	0.0244	0.0138	0.0135
AR(2) p-value	0.3583	0.0518	0.0766	0.1669	0.2880	0.1281	0.1635	0.0987	0.0759	0.0561
SARGAN test	0.8180	0.1623	0.3884	0.3479	0.1465	0.3786	0.2546	0.3710	0.8598	0.9950

5. Conclusions

This study aims to investigate the causal and dynamic relationships between financial development, economic growth, and income inequality in 27 European Union countries during the period 1988-2017. The results show that the impact of financial development on economic growth is sensitive to the proxies of financial system dimensions. The expansion of the banking system can hinder economic growth, but the size of stock markets can promote economic growth. Also, banking instability plays an important negative role in economic growth.

The main findings show that banking expansion harms economic growth due to inadequate regulation and the absence of monitoring of the intermediaries that allocate resources to no profitable investment. Also, the negative impact is a potential result of the financial crisis. Financial stability is an essential component of financial development. Lack of stability can increase the non-performing loans and can create banking distress and financial crisis. This leads to severe economic downturn that reduces the growth opportunities. Large stock markets can promote economic growth. Income inequality is not an essential factor for economic growth. The divergence reflects the adverse impact of the crisis on Southern and Eastern Countries members.

Regarding policy implications, policymakers should draw the proper strategy to promote economic growth. Governments should improve the credit allocation process by strengthening credit regulation to reform the supervision of financial intermediaries and ensure sound prudential lending practices. Furthermore, more credit needs to be allocated to highly productive projects.

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The role of digital marketing in tourism businesses: empirical investigation

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Abstract The rapid development of digital internet technologies, the advent of smartphones as well as the COVID-19 pandemic, have opened new avenues for the introduction of innovative sales and marketing technologies. Digital marketing techniques and tools, especially in the tourism industry, have made significant changes in consumer attitudes, as customers have constant access to online information.

The growing role of digital technology, such as websites and social media, has influenced the way businesses, their products and services are promoted and how they interact with existing and new customers, as new ways of approaching have evolved. of the target audience. In order for companies to be competitive in the new market, they need to formulate value proposition for their customers and their operating models, taking advantage of the opportunities of digital transformation.

As the tourism industry in Greece faces significant challenges and opportunities posed by the COVID-19 pandemic, additional needs have arisen for tourism businesses to adapt more quickly to digital operations and to enhance digital marketing through multiple distribution channels and the use of digital assistants. .

The purpose of this study is to investigate the use of digital marketing tools by tourism companies as well as the overall satisfaction of the company with its use, the areas of impact of digital marketing from the COVID-19 pandemic and then to highlight all those features that stand out from their competitors as well as the creation of an appropriate marketing strategy that will ensure the flow of new customers and increased revenue. To meet this purpose, an empirical survey was conducted in tourism companies in order to provide answers to research questions. As tourism businesses have not yet made sufficient use of digital media as a strategic marketing tool, this research is the basis for further research into the use of technology and digital tools to reach customers and create a more personalized experience for them.

KEYWORDS

tourism industry, digital marketing, Covid-19, websites, social media, digital transformation

Introduction

The tourism industry is one of the first industries that has highly adopted new technologies and platforms and digitized business processes on a global scale. Businesses in the tourism industry have prioritized managing the customer experience in the multi-

channel environment and have automated the process of attracting and serving customers. The digital transformation trends that are developing and the main sources of technology in tourism businesses are artificial intelligence (AI), virtual reality (AV), machine learning, cloud computing), the block chain (blockchain), the internet of things (IoT), the interaction with customers (engaging with customers), social media (social media) as well as big data (Big Data) which concern the utilization of various data sources and analysis tools aimed at creating business intelligence systems and decision-making by tourism service managers (Imtiaz et al., 2019).

Literature review

The travel industry is a dynamic and competitive industry and marketing is taking on an increasingly important role given the developments in global markets as well as the COVID-19 pandemic (Fletcher, 2018). **Tourism marketing** is the set of systematic and coordinated actions carried out by a tourism unit, with the aim of achieving the maximization of consumer satisfaction and the profitability of tourism businesses. As it is known, the most important marketing tool is the Marketing Mix 4P, which consists of **4 variables**: Product, Price, Place, Promotion (Kotler, 1999). As marketing evolved, other **3Ps** were added, People, Process and Physical Evidence (Booms & Bitner, 1981). From the 90s onwards, marketing adapted to the digital age. The 4Cs, which concern customers are also taken into account and are customer cost, customer solution, convenience and communication (Lauterborn, 1990).

Given the specifics of the tourism sector and current trends in marketing, the classic model of the marketing complex "4P" for tourism enterprises has been modified into the model 4P + E. This model along with the 4 classic elements also includes the **element emotions** (Fedoryshyna, 2021). The element emotions includes a set of tools, the use of which in the process of presenting and implementing a tourist product should enhance the positive feelings of the consumer (Podgorna et al., 2020). The positive impressions and emotions of the tourist experience, contribute to the high evaluation of the tourist product, the tourist area and, consequently, will promote the tourist brand. This, in turn, is likely to lead to the desire to repeat his positive experience, as well as to share his impressions with friends, acquaintances, who may also decide to purchase the tourist product. Therefore, the marketing and management of tourism and services consider the tourist as a partner, a "co-creator" of the tourism product and the service provision process (Romanenko & Chaplay, 2016).

Online customer journey is the set of online touch points, such as website visits or interaction in online advertisements, between consumer and seller through online channels, before the potential purchase decision (Anderl et al., 2016). In the tourism sector, the penetration of the internet and its use by millions of users worldwide, the advent of smartphones as well as the conditions of the COVID-19 pandemic, contributed to changing the way the tourist product is presented and promoted, consumers think and

act and book as it is characterized by multiple devices and channels. (Rathonyi, 2013). Digital marketing applies to all points of a customer's customer journey, and businesses that want to optimize their results plan strategies and tactics using various digital marketing techniques and tools.

The marketing system for a tourist enterprise includes the following elements: sales promotion, analysis of prices and their changes, the use of advertising to attract, customer revenue growth forecast, customer needs study, planning of services and range of goods. To achieve its goals, the company chooses its own set of marketing tactics using digital tools and communication channels as each of them has a different function and achieves different goals. Digital marketing includes marketing through social media, video, mobile devices, search engines, email, affiliate network, online advertising, word of mouth, SEO, website, analytics, text and multimedia content creation. The success of online promotion depends on the strategy chosen by the tourism business. (Ziakos et al., 2021; Yasmin et al., 2015, Kapoor et al., 2021; Sinha et al., 2021; Cojocea et al., 2019)

Methodology

The **purpose of this research** is to investigate the use of digital marketing and internet advertising tools by Greek tourism businesses, the overall satisfaction of the business with its use, the impact of the covid-19 pandemic onwards as well as the problems they face businesses from using it. The collection of primary data was carried out using two separate electronic questionnaires, from two random samples of the population and specifically from tourism businesses, active in the accommodation and food & beverage sector from all over Greece. The questionnaires have been sent via e-mail to businesses, with a personal message to hotel managers and restaurant managers on the linkedin platform and with a message to businesses that had a Facebook page. It took place 5 months and were collected 143 questionnaires from accommodation companies and 127 questionnaires from food & beverage businesses, fully completed and useful for processing.

Results

In the first part of the survey results, a profile of the survey participants was presented. Of the one hundred and forty three accommodation companies that answered the questionnaire, the position they held in the company was forty nine point seven percent (49.7%) the owner of the company, while the smallest percentage was the position other with seven percent (7%). Sixty-six point four percent (66.4%) were men and the largest percentage in the sample age groups was thirty-five percent (35%) between 36-45 years old. With regard to the educational level of the sample, the participants mainly held a master's degree with a rate of thirty eight point five percent (38.5%). Sixty four point three percent (64.3%) of the sample were hotels, with the largest percentage of twenty one percent (21%) being 4 stars. The largest percentage of the sample are businesses from

Magnesia twenty one percent (21%), the Cyclades eleven point nine percent (11.9%) and Attica seven percent (7%). Forty eight point three percent (48.3%) were businesses that have been active for more than 15 years. Seventy nine point seven percent (79.7%) do not belong to a chain and fifty-one percent (51%) operate all year round. Responsible for the implementation of digital marketing is thirty three point six percent (33.6%) the owner of the business, who possesses basic knowledge and the smallest percentage is two point eight percent (2.8%) other.

For the one hundred and twenty seven who answered the questionnaire related to food & beverage businesses, the position they held in the business was sixty-eight point five percent (68.5%) the owner of the business, seventy-six point four percent (76.4%) were men and the largest percentage in the age groups was thirty-eight point six percent (38.6%) between 36 and 45 years old. Participants were mainly Bachelor's Degree with forty one point seven percent (41.7%). Regarding the business profile, seventy eight point seven percent (78.7%) are restaurants. The largest percentages of the sample are businesses from Magnesia twenty two percent (22%), the Cyclades sixteen point five percent (16.5%) and Attica twelve point six (12.6%). (41.7%) forty one point seven percent are businesses that have been active for more than 15 years. (86.6%) eighty six point six percent do not belong to any chain/group and fifty nine point one percent (59.1%) operate all year round. (33.1%) thirty three point one percent are responsible for the implementation of digital marketing, the business owner who possesses basic knowledge, and the smallest percentage is three point one percent (3.1%) other.

In the second part of the research results, the results of the questionnaire parameters are analyzed in relation to the theoretical framework and the literature review of previous researches, in order to answer the research questions.

The main **qualitative** characteristics of the websites of the companies are Googlemaps, with seventy-one point three percent (71.3%) for accommodation businesses and forty point nine percent (40.9%) for f&b businesses. In 2nd and 3rd place are Google My Business and Responsive & Mobile Friendly, respectively. The smallest percentages are four point two percent (4.2%) that do not have any quality characteristics for accommodation businesses and the blog with six point three percent (6.3%) for f&b businesses. Regarding the method most often used for reservations by accommodation companies, it is with an online reservation system sixty point eight percent (60.8%), while for the f&b business it is done without immediate notification of reservations twenty nine point nine percent (29.9%).

By far the most **popular social media** for accommodation businesses are Facebook with an average value of five point twenty-four (5.24) and Instagram with an average value of four point fifty-six (4.56). Snapchat has the lowest frequency of use with an average value of one point twenty seven (1.27). Similarly, for f&b businesses, the main advertising channels are Facebook with an average price of five point forty one (5.41) and Instagram with an average price of five point zero one (5.01). It is observed that Facebook and

Instagram have quite a big difference in usage from the rest of the platforms, which are hardly used at all.

As for which channels businesses intend to use in the future. Facebook, Instagram and YouTube hold the top three positions for accommodation businesses and similarly for f&b businesses.

The degree of **impact of the use of social media** in relation to customers is quite satisfactory, as the average value is on the seven-point likert scale from five (5) and above in all sectors and for the 2 business sectors. More specifically, for accommodation businesses, the use of social media has a great impact on creating / improving the company's image, while for f&b businesses, it has an impact on providing information to customers. Furthermore, no business considers a presence on social media pages unimportant.

The most used **form of marketing** by both business sectors is affiliate marketing, with four point ninety four (4.94) average value for accommodation businesses and three (3.00) average value for f&b businesses. The lowest average was found for accommodation businesses in the viral Marketing technique and f&b businesses in Video Marketing.

As evidenced by the results, businesses **take feedback** very seriously as the average value is above 5 on the likert scale for both business sectors. But as far as the use of Web analytics is concerned, the average value is at the neutral point (4) for both business sectors. More specifically, accommodation businesses have a four point seventy six (4.76) average price and f&b businesses have a four point twenty (4.20) average price.

As evidenced by the survey results, the **use of digital marketing** since the pandemic has had a fair to great effect as all results are from the neutral point (4) and above the 7-point Likert scale for both business sectors. The largest means of significance are the increase in the readability of the business with an average value of six point seventeen (6.17) for accommodation businesses, and five point eighty-five (5.85) for f&b businesses and the improvement of the image of the business with an average value of six point twenty-six (6.26) for accommodation businesses and five point seventy-two (5.72) for f&b businesses. The main **barriers** faced by businesses from using digital marketing are insufficient knowledge and training with an average value of five point ten (5.10) and lack of trained workforce in the labor market with an average value of four point ninety-eight (4.98) for accommodation businesses. For f&b businesses it is lack of time with an average value of five point zero six (5.06) and the presence of annoying ads and spam with an average value of four point eighty-nine (4.89). The smallest problem faced by both branches of business is the existence of technophobia.

In the present research there are also some **limitations** that must be taken into account. The largest percentages of the research sample were businesses from Magnesia and the time duration, since if it lasted longer, the sample would be larger. Another limitation of the research is the possibility that some questions were not understood by the questionnaire participants, as there was terminology in the questions about digital

marketing that they may not have known. Despite the fact that a high sample of participants has been collected, the results of the research cannot be generalized, as the tourism industry consists of a wide variety of businesses in terms of type and size. However, the existence of the above limitations in no way reduces the contribution of this research, as the results offer a description of the existing situation regarding digital marketing, its impact and the obstacles/problems faced by businesses.

Conclusion

As evidenced by the research, the owners of the Greek tourism businesses, manage the digital marketing of the business themselves and who possess basic knowledge. While the lack of qualified staff was evident, which may lead to the subsequent misuse of digital marketing. They mainly use facebook, instagram and youtube and which they intend to use in the future. They should take advantage of other available social media, as they hardly use them at all, but also use them properly so as to take full advantage of their advantages. Customer comments on online platforms are taken very seriously by businesses. However, they do not use enough predictive analysis (analytics) to evaluate many factors related to purchasing behavior. Greek tourism businesses adopt digital marketing techniques that can be implemented easily, quickly and without high costs, such as affiliate marketing and SEO. The pandemic has affected the company's readability and image improvement as well as the way they communicate with customers. There have been leaps and bounds in business familiarity with technology, and this is proven by this research. The main problems are incomplete knowledge, lack of specialized staff, spam messages, as well as lack of time.

Digital marketing is not expected to replace traditional marketing, but both should co-exist with interchangeable roles throughout the customer journey. As evidenced by the results, the tourism industry in Greece does not effectively use all the digital marketing techniques and tools currently available. Especially for SMEs, a multifaceted strategy is required to enable them to survive and find ways to restore stability in the changing business environment. Moreover, it is very important that they realize the necessity of integrating social and environmental values into their strategy and redefine their marketing strategy, taking advantage of Greece's comparative advantages, such as cultural heritage, climate, culinary tradition and other elements. For tourism professionals it is an opportunity to explore competitive advantages and to understand that the role of appropriate human resources in a business is greater in importance than the existence of high marketing budgets.

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Readiness of Greek public sector employees in moving to accrual basis of accounting for improve financial accountability: The case of Ministry of Finance

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Abstract

In Greece, with Presidential Decree 54/2018, the introduction of the accrual accounting basis was legislated for all entities of the General Government from 1/1/2025. The purpose of this paper is to investigate the level of acceptance and preparation of the employees of the Ministry of Finance of Greece regarding the introduction of the accounting accrual basis with 54/2018, and its effects on the achievement of accountability. We used quantitative method and the data collection tool was the questionnaire. The research sample consisted of forty-eight employees of the General Secretariat of Fiscal Policy of the Ministry of Finance. Findings showed that the application of the accrual accounting to the entities of the General Government will reasonably and truthfully depict the financial operations, financial performance and property status of each entity. The financial statements will be homogeneous. At the same time, the comprehensibility of public finances will be facilitated. The comparability of accounting information will be supported and the accountability will be strengthened. It was found that employees need to be trained in the new accounting framework either through seminars or university programs. In addition, it is necessary to hire employees with knowledge of accrual accounting, the creation of a special department that will deal exclusively with the implementation of the new accounting framework, the creation of a website that will contain all laws, presidential decrees and circulars, and support from abroad partner. Successful implementation requires cooperation among employees, a change in employee mentality and culture and an appropriate information system that will provide immediate and reliable accounting information.

JEL Classifications: H83, P41, M48.

Key words: General Government, Ministry of Finance, Accrual Basis Accounting, Accountability.

1. Introduction

The incorporation of the European Directive 2011/85 led to the institutionalization of Law 4270/14, which defined the issuance of a Presidential Decree for the establishment of a new Accounting plan and the introduction of the accounting accrual basis in the entities of the General Government. In implementation of Law 4270/2014, Presidential Decree 54/2018 was issued, the objective of which is the transition of all General Government entities to a modernized accounting system based on the accrual basis, through which there will be effective fiscal management, transparency in financial transactions and direct knowledge of the financial data of the State's obligations and requirements based on the standards of the European System of Accounts 2010. Presidential Decree 54/2018 was originally intended to apply from 1/1/2023 to all entities of the General Government, but from 30 July 2022 with Law 4964/2022 this date was postponed to 1/1/2025. Until then, each sub-sector of the General Government will apply its own accounting system, which is provided for by a corresponding Presidential Decree. More specifically, the entities of the Central Administration apply from 1/1/2019 the Presidential Decree 54/2018, the entities of the Central Government, excluding the entities of the Central Administration, apply the Presidential Decree 205/1998 and the Presidential Decree 146/2003 the public health entities. Entities of the Local Self-Government Organizations sub-sector apply Presidential Decree 315/1999 and entities of the Social Security Organizations sub-sector apply Presidential Decree 80/1997.

The reform of the fiscal legislative framework through the introduction of the accrual basis and the preparation of a new unified chart of accounts was imperative as there was a fragmentation of the charts of accounts. However, the introduction of the accrual basis to the General Government agencies is of major importance and is a long-term reform. The purpose of this paper is to examine the effects of the accrual basis accounting on the financial information of the entities, the level of preparedness of the employees of the Ministry of Finance and the difficulties arising from its application. Hence the paper aims to provide answers to the following research questions:

1. How useful is the new accounting framework, as defined in Presidential Decree 54/2018 for General Government entities, in terms of correct financial information?
2. Is it necessary to train the employees of the financial services of the General Government entities that are responsible to implement the new accounting framework, is it necessary to hire additional staff?
3. What are the difficulties that will arise from the implementation of the new accounting framework?

The expected outcome is to deliver a paper which will give answers on the above mentioned research questions. The rest of this paper is organized as follows. The literature review is presented followed by the methodology. Next, the results are offered, with the conclusions, limitations and directions for further research.

2.Literature review

New Public Management (NPM) has brought about the change in thinking about the role and nature of the work of public administration managers who strive to increase the productivity of public organizations, improve accountability to citizens and provide them with better services (Bromwich & Lapsley, 2002). The NPM proposed a new way of organizing and operating the state, in which by introducing the business principles of the private sector, the efficient and effective provision of public services would come (Connolly & Hyndman, 2006). Practices and tools from the private sector were adopted, as traditional public sector management methods were seen as lacking in trust. In the context of implementing tools from the private sector to the public sector, many states adopted accrual accounting as it was considered superior to cash accounting (Newberry, 2014). This hypothesis was based on economic rationality and the optimal economic results achieved by private organizations through accrual accounting compared to public ones (Falkman & Tagesson, 2008). In addition, the international spread of the NPM led to the shift towards accounting information as the main source for decision-making in public organizations. Although some researchers question the effectiveness of private sector tools in the public sector, the international trend is to adopt accrual accounting in the public sector instead of cash accounting (Naughton & Spamann, 2015).

The international spread of the philosophy and tools of NPM and the fiscal crisis of Greece that started in 2008, necessitated the adoption of new modern accounting measures of visualization throughout the Public Sector. In this context, Greece fulfilled its obligation to incorporate into national law the European Directive 2011/85 regarding the requirements for the fiscal frameworks of the member states of the European Union (Council of the European Union, 2011). The incorporation of the European Directive 2011/85 led to the institutionalization of Law 4270/14, which defined the issuance of a Presidential Decree for the establishment of a new Accounting plan and the introduction of the accounting accrual basis in the entities of the General Government.

According to the European Commission report (2013) accrual accounting is the only generally accepted information system that provides a complete and reliable picture of the financial and economic position and performance of a government, by capturing in full the assets and liabilities as well as revenue and expenses of an entity. Accrual basis accounting implementation in the public sectors around the globe has been proven far from uncomplicated and straightforward. One of its main drawbacks is that they do not consider public sector dynamics or the divergence between the government structures and their organization theories. Moreover, in many countries the use of budget-based accounting systems creates a conceptual (let alone technical) gap between the existing accounting system and the new accrual accounting (Redmayne & Vasicek, 2021). Additionally, several countries public sectors are currently under reform towards new

public management trend, requiring a significant cultural change. All these reforms create additional high costs for their implementation but also a need for public servants' education, technologies etc. Despite the abovementioned difficulties for its implementation, accrual accounting in the public sectors is expected to provide significant benefits for public-sector management and governance, regulators, investors, auditors and society. Effectiveness and efficiency in public administration is expected to improve, as accrual accounting will inevitably modernize governmental accounting; decision making will be based on more reliable information regarding assets, liabilities and expenses (Rossi et al., 2016). Transparency and accountability will increase as all necessary data will be provided in a credible and timely manner leading towards the fulfillment of the primary objective of public sector organizations, which is to deliver public policy and promote social welfare (Kaur & Lodhia, 2019). Consequently, citizens' trust in governments will be restored (Brusca & Martinez, 2016).

At the same time the implementation of NPM theory is considered a significant enhancement for the modernization of public governmental administration and is expected to accelerate the accrual accounting reform. The shift from old bureaucratic systems towards a "market oriented" public administration requires several reforms, technical, procedural and more importantly cultural. It necessitates 'innovations' that are about to increase efficiency by not just changing the process but also people's mindsets (Caperchione et. al, 2019). These reforms are expected to advance the requirement for accrual accounting albeit taking into consideration that several managers engage in creative resistance to change (Allain, Lemaire & Lux, 2021). On the other hand, as studies reveal there is frequently a mismatch between the needed accounting and performance measurement information for internal and external purposes assessed on the basis of the administrative system in place and required by law for decision-making and accountability (Cohen, Manes-Rossi & Brusca, 2019). The combination of accrual accounting with the New Public Management reform is expected to reveal the financial condition and the financial performance of public sector entities (Hyndman & Connolly, 2011) around the world and decrease the information mismatch by improving governmental effectiveness and efficiency. Nevertheless, according to external users, the figures provided by the reported financials usually differ from the needed information for decision-making procedures. All the above in conjunction with the growing need for accountability towards public stakeholders, which is enhanced by the implementation of New Public Management theory, makes popular financial reporting imperative.

In a nutshell, global harmonization, standardization and comparability of the accounting financial reporting of public entities are an ongoing project that requires constant verification for all participant countries, in order to adjust and mitigate any indigenous or external disadvantages. The implementation process depends on several factors in relation to every country's administrative organization, existing accounting system and level of accounting readiness. The abovementioned transformations will need

to take into consideration users needs in order to move forward to a more user-friendly financial reporting that will increase governmental transparency but also will help users in their decision-making processes.

In their research, Hytis et al. (2020) dealt with the level of readiness of Greek Local Government Organizations to adopt IPSAS. They found that employees, while accepting the need to adopt them, are not familiar with IPSAS. But the municipalities are not properly prepared for their adoption and there are delays in their adoption. The reasons for the delay were found to be the lack of experienced and qualified personnel to implement IPSAS and the inability of existing information systems to meet the requirements of IPSAS. A smooth transition requires staff training in IPSAS and a change in the mindset of both employees and elected officials about the impact of IPSAS implementation on transparency and accountability.

Cohen and Karatzimas (2016; 2017) studied the quality of financial statements prepared at the Central Government level of Greece under modified cash basis accounting, an intermediate basis before accrual basis accounting. The conclusions of the study came to the fact that the financial information provided by the modified cash basis was not characterized by a high level of quality and the information was necessary to a moderate extent. Moreover, the standard-setting process was not effectively monitored by the country's politicians and lenders. Cohen and Karatzimas (2015) found that accounting change at the government level is influenced by various actors with different roles, such as politicians, consultants and citizens. Management consultants for the change of basis of accounting were promoting the recent developments in IPSAS, but without understanding the difficulties arising from the lack of specialized staff, inadequate accounting information systems and the lack of information of the public administration about the procedures. Stamatiadis (2009) investigated the views of finance employees of public hospitals in Greece regarding the implementation of accrual accounting (IPSAS) by the Greek National Health System. His findings showed that the rate of adoption was satisfactory, but the rate of adoption of the accrual accounting system was not deemed sufficient.

3. Methodology

Questionnaire Survey

All of the above compose a picture of intense interest, reflection and investigation of the subject of the introduction of the accrual basis in the entities of the General Government of Greece. The methodological tool for data collection for this research was the questionnaire, which contained closed-ended questions. Efforts have been made to ensure that the survey questionnaire does not contain ambiguous terms, inaccuracies and ambiguities, so as to achieve that level of precision necessary for it to be understood by

the participants. The questions were to the point, short and comprehensive to avoid the fatigue of the respondents. They were sequenced, as each question followed the previous one and prepared for the next. The questionnaire was based on the previous literature review on topics related to the present work, the purpose and the research questions of the research (Robson, 2010). Forty-eight employees of the General Secretariat of Fiscal Policy of the Ministry of Finance were asked to complete the questionnaire.

After determining the research object, defining the purpose and research questions, searching for other relevant research, defining the population and writing a first plan of the questionnaire, a pilot study was first carried out for the reliability and validity of the questionnaire (Robson, 2010). Thus, initially, by the researcher himself, a distribution of 5 questionnaires was made to employees, in order to ensure the best possible conditions for the implementation of all procedures. In this way, the response to the questionnaire was examined, the time needed by the participants to complete it, and a check was made for the clarity of the questions and the filling instructions. The main purpose of this questionnaire was to identify the shortcomings and weaknesses that make it difficult to complete the questionnaire, any ambiguities, difficulties and problems that existed and to determine the time period for completing the questionnaire (Creswell, 2011). Finally, the drafting of the final questionnaire followed and finally the implementation of the research.

The questionnaire in its final form contained closed-ended questions. Closed-ended questions provided participants with predetermined response options (Creswell, 2011). In the present research, these questions were structured and numbered based on a Likert scale with numerical elements from 1 to 5, with the respondents expressing the extent to which they agree with each statement (1=Not at all, 2=A little, 3=Not at all more or less, 4=Much, 5=Very Much). The questionnaire was divided into four main axes, which were based on the research questions and were formulated in the form of a question, in an affirmative way. The first axis includes questions 1-24, which are related to the quality of the financial information that will be provided to the General Government entities by the application of the accrual basis in the light of Presidential Decree 54/2018. The second axis is based on questions 25-35 which investigate the necessity of training the employees of the financial services of the entities, the necessity of recruiting staff and the support from an external partner. The next set of questions 36-47 deals with the difficulties that appear or will appear during the implementation of the new accounting framework. The last axis of questions 48-53 contained questions of a demographic nature, such as gender, educational level, age, years of service and administrative position of the participants (position of responsibility) and its aim is to describe the profile of the participants.

Sampling

The sampling method used was stratified sampling. The population of the research was the employees of the General Secretariat of Fiscal Policy of the Ministry of Finance. This General Secretariat was chosen as its task is to plan the country's fiscal strategy through the reliable recording of fiscal data and figures during the preparation of the Medium-Term Fiscal Strategy Framework and the Budget of the General Government and the preparation of a methodology for the conversion of cash data of the bodies of the General Government on an accrual basis when categorizing the international and European standards, on the basis of which the objectives of the Budget and the Medium-term Framework of Fiscal Strategy are calculated. Therefore, its employees deal with accrual basis accounting in the General Government and are responsible for the implementation of Presidential Decree 54/2018. The General Secretariat is divided into four General Directorates (layers) from which the sample was extracted using the simple random sampling method. More specifically, the four General Directorates are the General Directorate of Treasury and Financial Rules, the General Directorate of Treasury and Financial Rules, the General Directorate of Financial Controls and the General Directorate of Co-financed Program Controls. The stratified sampling method was deemed appropriate as the population of the four General Directorates is uneven in terms of knowledge and application of the accrual basis in light of Presidential Decree 54/2018. More specifically, between the General Directorates (layers) there is a large dispersion in relation to the subject under study, while within the General Directorates there is a smaller dispersion. Of the four General Directorates, the employees of the General Directorate of Treasury and Fiscal Rules know quite well and in depth the accrual basis accounting and the provisions of Presidential Decree 54/2018, while on the other hand, the employees of the General Directorate of Controls of Co-financed Programs know to a lesser extent the accounting of the accrual basis and the provisions of Presidential Decree 54/2018. From each General Directorate, 12 employees were selected by simple random sampling.

Procedure

Data were gathered through a questionnaire and responders took 10-15 minutes of an average for its completion. The participants were informed about the right to privacy and voluntary participation, the anonymity and confidentiality. It is also important to explain why the completion of the research will help to improve some aspects of his or her job life and, in general, it should address the feeling of altruism of the recipient of the questionnaire. The survey lasted one month, from the end of May to the end of June 2022.

Data analysis

After the forty-eight questionnaires were collected, they were checked for completeness and accuracy of their responses, numbered and coded so that they were in a suitable format for analysis. All questionnaires were completed and no questionnaire was found

to have the same answers to all questions. Quantitative coded data were entered into Excel sheets and analyzed using the statistical program SPSS for Windows v.26.0. (Statistical Package for the Social Sciences). In the descriptive section of the results, means and standard deviations are presented for each question in the questionnaire. In order to test if there is a statistically significant difference in the opinions of the participants in terms of gender, years of professional experience and the level of education of the participants, ANOVA analyzes were used and the statistical significance was set at the .05 level of confidence.

Results

Demographic Data

The sample of this research consists of 48 employees of the Ministry of Finance, of which 26 were men, a percentage of 54.2% and the remaining 22 were women, a percentage of 45.8%. Their age ranged from 31 to 65 years old, the majority belonged to the age category of 41-50 years old (43.6%) and the minority to the age category of 61-65 years old (10.4%). Regarding their work experience, more than half ($n=26$) had from nine years up to sixteen years experience, followed by those who had 17-24 years ($n=10$), followed by those who had 25-32 years ($n=6$), followed by those who had 33-40 years ($n=4$) and those from one year up to eight years ($n=2$). The 16.6% of the participants had a bachelor's degree, 70.8% a master's degree and the rest 12.6% a doctoral diploma. As for their level of the job position, the largest part of participants was employees without a management position (83.3%) and the 16.7% head of department.

Usefulness of the new accounting framework in terms of correct financial reporting

In their majority, the participants consider that the new accounting framework helps the homogeneity of the financial statements of the General Government entities ($M=4.58$, $SD=.79$). The statement of financial position ($M=4.44$, $SD=.94$), the statement of financial performance ($M=4.39$, $SD=.93$) and the statement of changes in net worth ($M=4.2$, $SD=.99$), when they will be drawn up with accrual basis accounting, they are considered to provide more reliable information in relation to the existing accounting framework. While cash flow statement ($M=1.87$, $SD=1.31$), financial reporting statement ($M=2.60$, $SD=1.26$), budget/statement statement ($M=2.17$, $SD=1.18$) and the explanatory notes of the financial statements ($M=2.89$, $SD=1.37$), are considered to a lesser extent to improve the financial information they provide, as their preparation is not based on accrual accounting.

The financial elements that will be objectively captured to a greater extent with the new accounting framework are non-current assets ($M=4.47$, $SD=.92$), long-term liabilities ($M=4.38$, $SD=0.89$), current assets ($M=4.32$, $SD=0.99$), accrued income and expenses ($M=4.30$, $SD=0.95$) and current liabilities ($M=4.29$, $SD=1.09$) of entities. To a

lesser, but significant extent, net worth ($M=4.02$, $SD=1.09$) and net period surplus or deficit of the entity ($M=3.95$, $SD=1.21$) will be depicted. On the other hand, the data resulting from the budget (on a cash basis) are a good indication of the quality of the financial management of the entity's operation ($M=1.87$, $SD=1.21$).

The above opinions led employees to believe to a high degree that the new accounting framework will help General Government entities to provide reliable data about their operation ($M=4.63$, $SD=.74$), improve their financial position ($M=4.48$, $SD=.91$) and provide the resources for appropriate management decision-making ($M=4.39$, $SD=.89$). To a lesser extent, they consider that there will be appropriate management of the available resources ($M=3.78$, $SD=1.23$) and show a neutral attitude regarding the existence of a detailed expenditure audit ($M=3.02$, $SD=1.09$). The participants strongly believe that the implementation of accrual accounting will facilitate the understanding of public finances by a range of stakeholders (citizens, lenders, investors), as they will be harmonized with a commonly accepted accounting framework ($M=4.62$, $SD=.63$). However, a difference of opinion was found among the participants regarding the comparability of accounting information, as they believe to a high degree that it will be strengthened between public bodies and between Greece and the rest of the countries that have adopted accrual accounting ($M=4.32$, $SD=.92$), but not between public sector entities and private sector enterprises ($M=2.02$, $SD=1.49$).

Need to train employees and hire additional staff

Participants consider that the existing staff in the financial services of the entities to a small extent have the ability to support the new accounting framework ($M=4.42$, $SD=.95$). The lack of staff information-training regarding the operation of the new accounting framework under Presidential Decree 54/2018 seems to contribute to this ($M=4.28$, $SD=.97$). Therefore, it was deemed necessary to organize educational programs related to accrual accounting. Participants showed a high preference for training in accrual accounting either through studies at a university institution ($M=4.64$, $SD=.451$) or through seminars at a university institution ($M=4.51$, $SD=.658$). To a lesser extent, but significantly, they want seminars from the National Center for Public Administration and Local Government ($M=4.02$, $SD=1.12$) and from specialized staff of the Board of Certified Auditors ($M=3.97$, $SD=1.11$). They showed their least preference for the organization of educational programs by specialized staff of the Ministry of Finance ($M=3.61$, $SD=1.12$).

In addition to training, which they consider necessary for the implementation of accrual accounting, the participants consider it very useful to hire specialized personnel for the autonomous support of accrual accounting ($M=4.61$, $SD=.52$). In addition, the support from an external partner is also considered extremely useful for following the new accounting system ($M=4.19$, $SD=.78$). However, the creation of a special department in each entity that will exclusively monitor the implementation of the new accounting framework is not considered useful enough ($M=3.18$, $SD=1.19$). On the other hand, it

would help a lot to create a website that would contain all the laws, presidential decrees and circulars for the new accounting framework (M=4.57, SD=.61) and to a lesser extent the creation of an electronic platform in which questions will be submitted by employees and these will be resolved by a competent team (M=3.53, SD=1.14).

Difficulties in implementing the new accounting framework

The transition of General Government entities to accrual accounting does not appear to be or will be an easy process as it is a multi-dimensional undertaking. Participants consider that the existing accounting information systems (IT) of all entities respond to a small degree to the need for reliable accounting information (M=4.48, SD=.68). This is why they believe that it is necessary to modernize information systems (IT) in order to satisfy users' need for immediate and reliable information (M=4.39, SD=.71). Shared belief of the participants that the existing logistical infrastructure of the General Government entities to a small extent can support the operation of the new accounting framework under the provisions of Presidential Decree 54/2018 (M=4.29, SD=.79).

In addition to the information systems and the logistical infrastructure of the entities, an important obstacle to the transition can also be human resources. To a very large extent, it is believed that the attitude and culture of civil servants can stand in the way of accounting reform in the public sector (M=4.58, SD=.58). The human resources of the entities to a moderate degree have the culture and ability to cooperate with their colleagues to deal with problems arising from the implementation of the new accounting framework (M=3.19, SD=1.29). The participants consider to a high degree that the transition to accrual accounting will make the daily work of financial services employees more difficult in the short term (M=4.42, SD=.73) and to a high degree that it will be easier in the long term (M=3.91, SD=1.07).

Finally, it is strongly believed that the covid-19 pandemic affected the transition schedule of all General Government entities to the new accounting framework of Presidential Decree 54/2018 (M=4.39, SD=.84). All of the above led participants to moderately consider that the goal of transitioning to the new accounting framework is an achievable goal for all General Government entities (M=3.79, SD=1.26).

Reliability of the questionnaire

To conduct the reliability check on the said questionnaire, the method used is the analysis of Cronbach's α (alpha) reliability index. This method was used, both for all the questions of the questionnaire and for each thematic section of questions separately. So, both for the set of questions in the questionnaire and for each research question separately (except for the one that concerns only the demographic data, i.e. the profile of the participants) the values of the Cronbach's α index are presented in the following table:

Table 1: Cronbach's a values for the whole and for each question section of the questionnaire

Questionnaire	Cronbach's a value
Total Questions (1 – 47)	0,862
1st research question (questions 1-24)	0,816
2nd research question (questions 25-35)	0,793
3rd research question (questions 36-47)	0,762

As we can see from the table above, the results of the reliability test show that for all the questions in the questionnaire, the value of the α index is equal to $0.862 > 0.7$, which means that the questionnaire as a whole is characterized by a high degree of reliability.

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Inductive Statistics

At this point, after the presentation of the descriptive statistical analysis, it was considered appropriate to present an inductive statistical analysis, which will try to highlight some useful conclusions for the entire population based on the results obtained from the specific sample. Therefore, in this section it will be investigated, in addition to the conclusions reached by the descriptive statistics, if there is a statistically significant difference in the opinions of the participants regarding three demographic data: a) gender, b) years of professional service and c) level education. This particular test can be done with a tool called Analysis of Variance (ANOVA) and is a hypothesis test for comparing the means of a continuous variable in two or more independent comparison groups.

In particular, in the ANOVA test, hypotheses (null and alternative) considered are the following:

H0: $\mu_1 = \mu_2 = \dots = \mu_k$

H1: at least two means differ from each other

with k the number of independent comparison groups.

In our research, a differentiation test of these means was carried out with respect to an independent variable (gender, years of professional experience, level of education).

As for the technical part, the null hypothesis H0 is rejected when, according to the criterion of the probability value (p-value), $p < 0.05$ and thus H1 is accepted, while when $p > 0.05$ H0 is not rejected and therefore does not exist statistically significant differentiation of the examined variables with respect to a specific factor. In the case where $p = 0.05$, H0 can either be rejected or not rejected, which depends on the circumstances and the nature of the problem under consideration. A value of $p = 0.05$ was not met in the present analysis. Note that in general, we cannot have extreme values such as $p = 0.000$ and $p = 1.0000$, so in these cases we usually write that $p < 0.001$ and $p > 0.999$.

Based on this tool, it will be investigated whether the conclusions reached by the descriptive statistics in the previous section differ with respect to these three variables. In summary, the

ANOVA analysis for each research question separately and for each variable is presented in the following table. Note that in this table only those variables are presented that are statistically significant and differ significantly with respect to at least one of the dependent variables.

Table 2: Statistical significance of variables according to the ANOVA test in terms of gender, years of professional experience and level of education of the participants.

Questions	Gender (<i>p value</i>)	Years of Senior Service (<i>p value</i>)	Education level (<i>p value</i>)
1st Research question			
Better resource management	0.045		
Homogeneity of financial statements		0.001	
Reliable data for operation		0.032	
Comparability of accounting information			0.045
2nd Research question			
Website creation	0.046		
Organization of educational programs		0.007	
Recruitment of specialized staff		0.012	
Support from an external partner			0.027
3rd Research question			
Existing logistical infrastructure	0.015		
Modernization of information systems		0.037	
Employee attitude and culture		0.023	
Ease of work in the long term			0.001

From the above table we can observe the following. First, with regard to years of service, it appears that, compared to the other two variables, it shows a higher degree of variation in more independent variables. Specifically, for the most part, the degree of differentiation seems to satisfy mainly variables concerning the usefulness of the new accounting framework for correct financial reporting. The variable that appears to have

the greatest degree of differentiation is the years of service of the participants. In particular, it is observed that regarding the homogeneity of the financial statements, the reliable image of the operation of the entity, the organization of training programs, the recruitment of specialized personnel, the modernization of information systems and the mentality and culture of the employees, the opinions of the participants differ according to their years of service. More specifically, the more years an employee has, and especially those with 17-24 years of service, the more he believes that the new accounting framework will provide more homogeneity in the financial statements and provide a more reliable picture of the entity's operation. However, they are also the ones who support more the usefulness of organizing educational programs, the recruitment of specialized personnel, the modernization of information systems and the change of mentality and culture of employees. The gender variable shows differences regarding the fact that the new accounting framework will bring about better management of resources, regarding the creation of a website to solve employees' queries and regarding the possibility of implementing the new accounting framework under the existing logistical infrastructure of the entities. Men are the ones who believe more that the new accounting framework will lead to a better management of resources and women are those who believe more that the creation of a website is needed to solve the questions and that the existing logistical infrastructure of the entities is an obstacle to its implementation new accounting framework. Finally, master's degree holders believe to a greater extent than graduates and PhD holders that the new accounting framework will improve the comparability of accounting information, that support from an external partner is necessary for the implementation of the framework, and that it will facilitate of workers in the long term.

Conclusions

From the results of the survey, we find that participants are in favor of the necessity of switching to the accrual basis accounting established by Presidential Decree 54/2018 for the entities of the General Government since they consider it necessary for the reasonable and correct depiction of the financial situation of each entity. The financial statements shall be homogeneous and provide comprehensive information on the financial elements of the statements of financial position and financial performance. The findings agree with Christensen (2002) and Chan (2003) that accrual accounting presents more accurately the financial condition of public sector entities and determines its financial result. Participants to a high degree believe that there can be better management of available resources and better decision-making on the part of the administration. The findings concur with Cohen et al. (2013), Newberry (2014), Veggeland (2015) and Bracci et al. (2015) who established that accrual basis accounting transactions are presented in a uniform manner and accounting information is made reliable for decision making. In addition, they believe that it facilitates the understanding of public finances by a range of

stakeholders and improves the comparability of accounting information between public sector entities both nationally and internationally. Finding consistent with Jones and Pendlebury (2010) and Domingues et al. (2017).

With regard to the necessity of training the employees of the financial services of the General Government entities, all participants were absolute. They unanimously agree that training employees in accrual accounting is essential. The finding concurs with Newberry (2014) and Christensen (2002) who found out that employee training in accrual accounting is a prerequisite for changing the accounting framework in public entities. To a high degree, participants prefer their training to be carried out primarily by a university institution. In addition, the hiring of specialized staff and the support of an external partner to support the implementation of accrual accounting were considered very useful. Belief according to Rossi et al., (2016) and Chytis et al. (2020). At the same time, it would be very useful to create a website that would contain the entire legal framework for the new accounting framework.

However, the modernization of the entire accounting framework of all entities of the General Government is expected to run into some difficulties. Participants' views converged on the lack of an appropriate accounting information system and the inability of the existing logistical infrastructure of the General Government entities to respond to accrual accounting. A finding we encountered in research by Chytis et al. (2020), Cohen and Karatzimas (2015) and Stamatiadis (2009). The mindset and culture of civil servants can be a barrier as they can resist change. At the same time, they may consider that their daily work will be difficult in the short term. We also met the same views of all participants regarding the fact that the covid-19 pandemic negatively affected the transition to accrual accounting from 1/1/2023, as it created delays in the reform as well as in several sectors of the Public Administration. The aforementioned difficulties led all the participants to consider that the implementation of the provisions of Presidential Decree 54/2018 in all the entities of the General Government is a goal with a high degree of difficulty of achievement. This is why, with the provisions of Law 4964/2022 enacted on July 30, 2022, the provisions of Presidential Decree 54/2018 are expected to be implemented from 1/1/2025.

Limitations and Future Research

This research has some unavoidable limitations which could trigger directions for future research. The research sample because of time and access constraints regarding samples focused on employees of the Ministry of Finance and was small compared to the large percentage of employees in financial services of the General Government entities. Therefore, it is a first step towards drawing conclusions on the issue of applying accrual accounting to entities of the General Government of Greece but the results are not generalizable to all entities. However, they are indicative to be used in future research, which should be expanded to include several forms of public organizations. In addition,

future research can analyze the issue with a qualitative approach, that is, create an interview protocol from this research and conduct individual interviews, which will be analyzed with qualitative analyses. Finally, it is necessary to carry out a future research, in approximately 2 years, in order to investigate whether the difficulties that appeared and the weaknesses faced by the staff were addressed in order to smoothly implement the transition to the accrual basis accounting on 1/1/2025. Finally, using inductive statistics, we found that the responses of the trainees differ based on gender, years of experience and level of education. In this direction, a research could be carried out which would investigate the reasons for the differentiation of the two males.

Implications

This research has theoretical and practical application. The findings of the research contribute significantly to the scientific dialogue on the need for convergence of accounting on an accrual basis to General Government entities. The research provides useful information on the process of implementing accrual basis accounting in General Government bodies, to all parties involved in this reform, such as politicians, decision makers, public sector workers, regulators, institutional organizations and control bodies. Findings of the research demonstrate the need to introduce and apply accrual accounting in a unified framework to the General Government entities, as it emerged that the quality and reliability of the agencies' financial statements will improve and citizens will be better aware of the results of decisions on of public finances. At the same time, the results of the research highlight two main difficulties that delay the transition to accrual accounting, those of the lack of suitable personnel and the lack of a suitable information system. Difficulties that seemed to lead to the extension of the transition date, which was implemented one month after the survey was conducted, as on July 30, 2022 with Law 4964/2022, 1/1/2025 was legislated instead of 1/1/2023, as the transition date. The above must be taken into account by the Ministry of Finance to deal with, so that there is no further extension of the transition date.

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The Controversy of Concentration-Stability in Banking Industry: Evidence from the MENA Countries

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Abstract

This paper attempts to investigate the relationship between banking concentration and financial stability using a sample of 15 MENA countries, that includes Algeria, Bahrain, Egypt, Jordan, Kuwait, Lebanon, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Tunisia, Turkey and UAE over the period from the 2008 to 2020. Market concentration is measured by Herfindahl-Hirschfield Index (HHI) and Boone indicator of competition (Boone), while financial stability is measured by the traditional measure Z-Score and Aggregate Banking Stability Index (ABSI).

The concentration-stability relationship is still a controversial topic. According to "concentration-stability" view, a concentrated banking structure is less prone to financial crises. Besides, banks operating in uncompetitive banking systems may enhance profits and reduce financial fragility by maintaining higher levels of capital that protects them from external economic and liquidity shocks. The proponents of the "competition-stability" view argue that larger banks are more likely to receive public guarantees by managers who take on risky investments with the knowledge of being protected under the government's safety net. Investments may be inefficiently managed due to moral hazard problem and thereby raising the probabilities of failure.

For the whole sample of 15 MENA countries, results support the significance of HHI effect on Z-Score and the Boone effect on ABSI. Signs of regression coefficients are positive, which means that financial stability is affected positively by banking concentration. So, results support the "stability-concentration" view. When conducting the analysis for African countries, the same effects have been supported. In Near-East countries, Boone seems to have significant effects on each of Z-Score and ABSI. Besides, stability seems to be more sensitive to efficiency, compared with African countries. In Gulf countries, results support the significance of each of HHI and Boone effects on Z-Score with negative β_1 and β_2 , which means that financial stability is affected negatively by banking concentration. So, results support the "stability-competition" view.

Key Words: banking competition, financial stability, GMM technique, panel analysis

Introduction

There is an extended and growing literature concerning the measurement of financial stability. Besides, many global, regional and governmental bodies are established for its investigating and elaborating. The Financial Stability Board (FSB) is established to address financial system susceptibilities and to drive the development and implementation of strong regulatory, supervisory, and other policies which enhance financial stability. Also, the Financial Stability Forum (FSF) has been set up by the G-7 in the wake of the Asian crisis in 1999, with an expanded membership (drawn mainly from the G-20).

In US, the legislation Restoring American Financial Stability Act of 2010 focuses on how to promote the financial stability. The UK Financial Services Authority (FSA) requires stricter capital rules than those proposed by the Basel Committee on Banking Supervision (BCBS). The European Central Bank (ECB) is in charge of monitoring and assessment of financial stability. Presently, the Committee of European Banking Supervisors (CEBS) provides regular bank sector analysis, performs assessments on banking risks, to be reported to the European Union political institutions.

Schinasi (2004) lists the key principles for defining financial stability as a generic concept, embodying the varied aspects of the financial system. The author addresses that financial stability relates not only to the absence of financial distress but also to the capability of the financial system to limit, contain, and deal with such situations. Besides, **Schinasi** (2006) addresses "stability" as the ability of financial system to resolve systemic risks. He argues that financial system is stable if the system is capable to perform three key functions: 1) allocation of resources from savers to investors; 2) assessment, pricing, and allocation of financial risks; 3) and absorption of financial and economic shocks.

On the other hand, **Bartholomew & Whalen** (1995) defines systemic risk as "an event that has an effect on the entire banking, financial and economic system, rather than just one or a few institutions". Moreover, **Kaufman** (1995) believes that systemic risk is "the risk of chain reactions that cause collapse of interconnected institutions". Moreover, **Borri, Caccavaio, Giorgio & Sorrentino** (2014) defines systemic risk, as the risk of a collapse of the entire financial system, typically triggered by the default of one, or more, interconnected financial institutions.

Dobravolskas & Seiranov (2011) addresses two kinds of stability and two kinds of factors violating stability. The authors argue that financial stability characterizes smooth flow of funds between savers and investors, while monetary stability characterizes ability to preserve stable level of prices for goods and services and to keep acceptable levels of currency fluctuations. They divide factors violating stability of financial system

into external and internal factors. The first group includes macroeconomic disproportions in production and consumption, saving and investment processes, and the second arises from imperfect nature of financial markets. In the context of an emerging economy banking sector, **Swamy** (2011) analyzes the determinants of banking sector soundness, as measured by banking stability index (BSI) and considers the core set of soundness indicators for the construction of the index for the Indian financial system during the period 1997- 2009.

Financial stability is the condition where the financial intermediation process functions smoothly. Financial instability on the other hand is characterized by financial system shocks interfering with information flows, deviation from optimal saving, financial markets bubbles and volatility in financial markets. Besides, financial stability is a prerequisite for the optimal allocation of resources (**Dyk**, 2010). In the same context, **Alber** (2016) investigates the relationship between banking efficiency and financial stability in 15 MENA countries, from the 2004 to 2013. Moreover, **Alber** (2018) indicates that "Optimality of Banking Financial Structure" may affect both of "financial stability" and "banking efficiency".

It's important to analyze the relationship between stability and market structure, within the structure-conduct-performance paradigm, the market structure that the firm stays will influence the conduct decision of the firm, and then influence the firm's performance.

Amidu & Wolfe (2009) argues that competition- stability relationship is inconclusive. According to "competition-fragility view", monopolistic banks operating in uncompetitive banking systems may enhance profits and reduce financial fragility by maintaining higher levels of capital that protects them from external economic and liquidity shocks. The proponents of the "competition-stability view" on the other hand, argue that larger banks are often more likely to receive public guarantees and thus, are inefficiently managed and likely to fail, as the moral hazard problem becomes more severe for the manager who takes on risky investments with the knowledge of being protected under the government's safety net. **Wen & Yu** (2013) discusses the "concentration-stability" view which argues that a concentrated banking structure is less prone to financial crises.

Another one is the "concentration-fragility" view that depicts a more concentrated banking sector may decrease market power and profit of the bank and then enhance fragility of the bank sector. **Vives** (2010) reveals two basic channels through which competition affects stability. The first is that competition increases instability by exacerbating the coordination problem of depositors on the liability side and fostering bank runs. The second is by increasing the incentive to take on more risk on either side

of the balance sheet and thereby raising probabilities of failure.

Recently, financial inclusion is demonstrated in terms I-SIP (e.g. Nsanzabaganwa, 2014 and Alber, 2019). **Nsanzabaganwa** (2014) explores the linkage between financial inclusion, stability, integrity, and consumer protection using the Rwandan case. This study argues that so far, managing the trade-offs and harnessing the synergies between financial inclusion, financial stability, financial integrity and financial consumer protection in Rwanda has been a difficult but feasible. Recently, **Alber** (2019) attempts to demonstrate the 4 dimensions of I-SIP in terms of both of its conceptual framework, measurement indicators and related literature. Moreover, it tries to present and discuss the linkages between financial inclusion and the other 3 dimensions.

In brief, this paper tries to investigate “concentration-stability” (or “competition-fragility”) versus “concentration-fragility” (or “competition- stability”) views in MENA region. The paper is arranged as follows: after this introduction, section 2 reviews research literature that has concerned with “financial inclusion”. Section 3 explains how to develop hypotheses and measure variables. Section 4 presents descriptive and diagnostic statistics. Section 5 is for empirical work, presenting results, discussing how these results answer research questions with a robustness check. Section 6 summarizes the paper and provides remarks about conclusions.

Literature Review

This section tries to present some of previous work, which has been conducted in the fields of financial stability and banking concentration. Some papers concern with financial stability (e. g. **Wagner**, 2004; **Demirgüç-Kunt & Detragiache**, 2011; **Dobravolskas & Seiranov**, 2011 and **Buston**, 2012). Others illustrate banking concentration (e.g. **Panzar & Rosse**, 1987; **Claessens & Laeven**, 2004 and **Bikker**, 2004). Regarding the concentration-stability relationship in banking industry, (e.g. **Franklin & Gale**, 2004; **Schaeck, Cihák & Wolfe**, 2007; **Berger, Klapper & Turk-Ariss**, 2009; **Uhde & Heimeshoff**, 2009; **Amidu & Wolfe**, 2009; **Wen & Yu**, 2013 and **Schaeck & Cihak**, 2014).

Regarding financial stability, **Wagner** (2004) finds that increasing liquidity in normal times doesn't affect stability, as measured by banks probability of default. By contrast, he argues that an increase in asset liquidity in times of crisis reduces stability.

Demirgüç-Kunt & Detragiache (2011) studies the effect of compliance with the Basel core principles for effective banking supervision on bank soundness. Using data for more than 3000 banks in 86 countries, the authors find that neither the overall index of compliance with the Basel core principles nor the individual components of the index are robustly associated with bank risk measured by Z-scores. This may cast doubt on

the usefulness of the Basel core principles in ensuring bank soundness.

Dobravolskas & Seiranov (2011) investigates the reasons of financial instability, during the 2007- 2008 crisis and studies the ways of rebuilding financial stability in the process of post-crisis regulatory reforms. Findings show that violation of stability is a result of deregulation processes in major financial markets since 1980s on the one hand, a result of inadequacy of national micro-prudential regulators on the other hand. The article studies how these targets are met in post-crisis regulatory reforms, in USA, the European Union and Lithuania.

Buston (2012) shows the net impact of two opposing effects of active risk management at banks on their stability. This has been applied on US BHCs using a sample of an unbalanced panel containing 7253 observations and 2276 banks, from 2005 to 2010. Empirical evidence supports the effects of active risk management at banks on their stability and show that active risk management banks are less likely to fail during the crisis of 2007- 2009.

Aduda & Kalunda (2012, p. 99) aims at finding out the relationship between financial inclusion and financial stability in Kenya with an attempt to find out if the two are complementary, supplementary or contrary. In doing so, it attempts to identify empirically and theoretically the relationship between financial inclusion and financial stability as a component of financial stability. Arguments have been brought forward as to whether financial sector development should be a goal or is an automatic outcome of the level of development and the needs of the economy at any state of development or is a cause of financial instability.

Regarding banking competition, **Panzar & Rosse** (1987) elaborates the relationship between competition and concentration and proves that the sum of the elasticity of revenue with respect to input prices is negative for a monopolist, equal to one for a competitive price-taking firm operating in long-run equilibrium, and ranges between 0 and 1 for monopolistic competition. We include the following macroeconomic control variables in the specifications: GDP growth, the real interest rate, inflation, changes in the terms of trade, changes in the foreign exchange rate, and real credit growth.

Claessens & Laeven (2004) finds that concentration is in fact a poor proxy for competition, and that concentration and competition describe different characteristics of banking systems. Similarly, **Bikker** (2004) highlights that relying on concentration as a measure of competition gives rise to misleading inferences and measurement problems since concentration measures such as concentration ratios tend to exaggerate the level of concentration in small countries and are increasingly unreliable when the number of banks is small. These difficulties reflect that concentration measures computed on the country level are at best a very noisy proxy for competition, and indicate the need to employ direct measures of competition derived from bank data.

Regarding the concentration-stability relationship in banking industry, **Franklin & Gale** (2004) indicates that competition policy in the banking sector is complicated by the necessity of maintaining financial stability. Greater competition may be good for (static) efficiency, but bad for financial stability. From the point of view of welfare economics, the relevant question is: What are the efficient levels of competition and financial stability? We use a variety of models to address this question and find that different models provide different answers. The relationship between competition and stability is complex: sometimes competition increases stability. In addition, in a second-best world, concentration may be socially preferable to perfect competition and perfect stability may be socially undesirable.

Schaeck, Cihák & Wolfe (2007) investigates the implications of competitive bank behavior with 45 countries for the period 1980-2005. They find that competition reduces the likelihood of a crisis and increases time to observing crisis. Using the Panzar and Rosse H-Statistic as a measure of competition in 45 countries, we find that more competitive banking systems are less prone to experience a systemic crisis and exhibit increased time to crisis. This result holds even when we control for banking system concentration, which is associated with higher probability of a crisis and shorter time to crisis. Our results indicate that competition and concentration capture different characteristics of banking systems, meaning that concentration is an inappropriate proxy for competition. The findings suggest that policies promoting competition among banks, if well executed, have potential to improve systemic stability. Using data for 45 countries for the period 1980–2005, we find that competition reduces the likelihood of a crisis and increases time to crisis. Our results also indicate that concentration decreases the crisis probability and increases time to crisis.

Berger, Klapper & Turk-Ariss (2009) supports the “competition-fragility” view using over 8235 banks in 23 developed countries for the years 1999-2005. Besides, **Uhde & Heimeshoff** (2009) analyzes over 2600 banks across the EU-25 during the period from 1997 to 2005 and their empirical results are consistent with the “concentration-fragility” view.

Amidu & Wolfe (2009) analyzes a panel dataset of 978 banks, during the period 2000-2007. Macro data is obtained from the World Development Indicator of the World Bank and International Financial Statistics database. They use H-statistic and the Lerner index as measures of the degree of competition in the banking sector, employ three stage least squares (3sls) estimation techniques, and investigate the significance of diversification in the competition-stability relationship. The core finding is that competition increases stability as diversification across and within both interest and non-interest income generating activities of banks increases.

Wen & Yu (2013) elaborates the effects of bank stability on market concentration,

financial deepening, bank income structure and international debt situation by using panel data for 18 emerging countries. Results supports that concentration affects financial stability in banking industry.

Schaeck & Cihak (2014) assemble a panel dataset from BankScope for European banks for the period 1995-2005. The sample covers Austria, Belgium, Denmark, France, Italy, Germany, Luxembourg, Netherlands, Switzerland, and the U.K, and consists of 17965 bank-year observations for 3325 banks. Results indicate that competition robustly improves stability via the efficiency channel.

Regarding the current study, comparing with previous work, it's important to pinpoint some differences that may justify its importance, as follows:

- 1- The current paper tries to test “concentration-stability” versus “concentration-fragility” views or “competition-fragility” versus “competition-stability” views, while most of previous work test only one of these two orientations.
- 2- This paper tries to test financial stability of developed countries, while most of literature is applied on developing ones.
- 3- The current paper reexamine the causal relationship between market concentration and financial stability on 3 sub-samples (African, Near-East and Gulf countries).

Measuring Variables and Developing Hypotheses

Financial stability is measured by Z-score that indicates the number of standard deviations that a bank's profit must fall to drive it into insolvency, where ROA is return on assets, E/A denotes the equity to asset ratio and σ ROA is the standard deviation of return on assets. Data are collected from World Development Indicators available by World Bank

(<https://databank.worldbank.org/data/source/world-development-indicators/preview/on>). Table (1) illustrates these variables as follows:

Table (1): Measuring research variables

Variable	Type	Sign
Z-Score measure of financial stability	Dependent	Z-Score
Aggregate Banking Stability Index	Dependent	ABSI
Herfenhal- Hirschfield Index	Independent	HHI
Boone indicator of competition	Independent	Boone
Data Envelopment Analysis indicator of banking	Control	DEA

efficiency		
Banking Operational Efficiency	Control	BOE

This paper investigates the effect of "financial stability" on "banking concentration" So, it aims attesting the following hypotheses:

1- There's no significant effect of "banking concentration" measured by HHI on "financialstability" measured by Z-Score.

2- There's no significant effect of "banking concentration" measured by Boone on "financialstability" measured by Z-Score.

3- There's no significant effect of "banking concentration" measured by HHI on "financialstability" measured by ABSI.

4- There's no significant effect of "banking concentration" measured by Boone on "financialstability" measured by ABSI.

The null hypothesis H_0 states that, $\beta = 0$, while the alternative one H_1 states

that, $\beta \neq 0$ where: $Z\text{-Score} = \alpha + \beta_1 \text{ HHI} + \beta_2 \text{ Boone}$ (1)

$ABSI = \alpha + \beta_1 \text{ HHI} + \beta_2 \text{ Boone}$ (2) Controlling for banking efficiency:

$Z\text{-Score} = \alpha + \beta_1 \text{ HHI} + \beta_2 \text{ Boone} + \beta_3 \text{ DEA} + \beta_4$

BOE (3) $ABSI = \alpha + \beta_1 \text{ HHI} + \beta_2$

$Boone + \beta_3 \text{ DEA} + \beta_4 \text{ BOE}$ (4)

Descriptive and Diagnostic Statistics

Tables (2) illustrates descriptive statistics of the research variables using a sample of 15 MENA countries, over the period from the 2008 to 2020, as follows:

Table (2): Descriptive statistics of research variables

Variable	HHI	BOONE	DEA	BOE	Z_SCORE	ABSI
Mean	0.109549	-0.025112	0.899594	0.433477	55.73075	-0.003254
Median	0.086917	-0.028743	0.922619	0.422646	53.28528	0.019262
Maximum	0.315183	0.919917	1.000000	0.703400	124.5504	1.002583
Minimum	0.012647	-0.225561	0.419889	-0.1525	14.52325	-1.316757
Std. Dev.	0.072531	0.082490	0.100860	0.123908	29.64600	0.396995
Skewness	1.002444	9.174320	-1.82083	-0.415113	0.706007	-0.332796
Kurtosis	3.301002	106.1393	7.587845	4.732336	2.539948	3.728739
Jarque-Bera	28.25750	75448.97	235.8814	25.37055	15.16236	6.696745
Probability	0.000001	0.000000	0.000000	0.000003	0.000510	0.035142

Source: outputs of data processing using EViews 10.

Regarding normality, Jarque-Bera values indicate that all variables are normally distributed at p- value of 0.05. Regarding multicollinearity, table (3) illustrates the correlation coefficients between independent variables as follows:

Table (3): Correlation coefficients between independent variables

	H HI	BOONE	DEA	BOE	Z_SCORE E	ABSI
HHI	1.00000					
BOONE	-0.08223	1.00000				
DEA	0.00358	0.09779	1.00000			
BOE	0.20242	-0.30082	-0.19933	1.00000		
Z_SCORE	-0.11229	-0.03002	0.02487	0.09500	1.00000	
ABSI	0.00263	0.17087	-0.03262	-0.13329	0.02281	1.00000

Source: outputs of data processing using EViews 10.

Table (3) shows that correlation coefficients between independent and control variables range from -0.30082 to 0.17087, which indicates that multicollinearity problem does not exist.

Testing Hypotheses

This section is for investigating the effect of each of HHI and Boone on “financial stability” measured by each of Z-Score and ABSI. To control for banking efficiency, DEA and BOE have been used. To investigate these effects, using a sample of 15 MENA countries, over the period from the 2008 to 2020, a panel data analysis has been conducted using GMM technique and provides the following results:

Table (4): Determinants of Financial Stability for 15 MENA Countries

	Model (1)	Model (2)	Model (3)	Model (4)
Variable	Z-Score		ABSI	
C	52.39008 (1.4698)***	70.99507 (7.0676)***	0.013135 (0.1058)	0.689665 (0.5183)
HHI	30.30016 (12.7301)**	35.36948 (12.924)***	0.059484 (0.9166)	0.413228 (0.9479)
BOONE	-0.848882 (5.9984)	-9.073990 (6.9066)	0.912148 (0.4319)**	0.455857 (0.5065)
DEA		-13.49332 (6.6288)**		-0.364104 (0.4862)
BOE		-16.67533 (7.3452)**		-0.920913 (0.5387)*
Controlling for Efficiency	No	Yes	No	Yes
R ²	0.6973	0.6992	0.0536	0.0758
DW statistic	0.204000	0.255005	1.167914	1.342202
Obs.	195	195	195	195

Source: outputs of data processing using EViews 10.

Model (1) supports the significance of HHI effect on Z-Score with explanation power of 69.73%. Besides, model (3) supports the significance of Boone effect on ABSI with explanation power of 5.36%. So, for the first and fourth hypotheses, the null hypothesis is rejected and the alternative one could be accepted. Signs of regression coefficients β_1 in model (1) and β_2 in model (3) are positive, which means that financial stability is affected positively by banking concentration. So, results support the “stability-concentration” view.

When controlling for banking efficiency, a panel data analysis has been conducted and provides the same results obtained in models (1) and (3). This could be considered as a robustness check where the same significances have been supported with a slightly higher R², where model (2) provides R² of 69.92%(compared with 69.73%) and model (4) has R² of 7.58% (compared with 5.36%).

The above-shown analysis covers a sample of 15 MENA countries that includes Algeria, Bahrain, Egypt, Jordon, Kuwait, Lebanon, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi Arabia, Tunisia, Turkey and UAE. A robustness check has been conducted on 3 sub-samples, where African countries include 5 countries (Algeria, Egypt, Morocco, Mauritania, and Tunisia), Near-East countries include (Turkey, Jordon, Lebanon and

Palestine) and Gulf countries include 6 countries (Bahrain, Kuwait, Oman, Qatar, Saudi Arabia and UAE).

To test the research hypotheses, for the African countries, over the period from the 2008 to 2020, a panel data analysis has been conducted using GMM technique and provides the following results:

Table (5): Determinants of Financial Stability for 6 African Countries

	Model (5)	Model (6)	Model (7)	Model (8)
Variable	Z-Score		ABS I	
C	22.47308 (3.2979)***	-12.63700 (19.259)	-0.034862 (0.1098)	0.535709 (0.6608)
HHI	112.7001 (24.913)***	109.2183 (27.761)***	0.451796 (0.8296)	0.538336 (0.9526)
BOONE	-5.390658 (12.2704)	-0.449684 (14.455)	0.73435 5 (0.4086) *	0.635162 (0.4960)
DEA		32.98116 (20.768)		-0.524020 (0.7126)
BOE		12.17375 (13.943)		-0.230932 (0.4784)
Controlling for Efficiency	No	Yes	No	Yes
R ²	0.2927	0.3468	0.0602	0.0784
DW statistic	0.667507	0.724222	0.99192 0	1.03660 9
Obs.	65	65	65	65

Source: outputs of data processing using EViews 10.

Model (5) supports the significance of HHI effect on Z-Score with explanation power of 29.27%. Besides, model (7) supports the significance of ABSI effect on Boone with explanation power of 6.02%. So, for the first and fourth hypotheses, the null hypothesis is rejected and the alternative one could be accepted. Signs of regression coefficients β_1 in model (5) and β_2 in model (7) are positive, which means that financial stability is affected positively by banking concentration. So, results support the “stability-concentration” view.

When controlling for banking efficiency, a panel data analysis has been conducted and provides the same results obtained in models (5) and (7). This could be considered as a robustness check where the same significances have been supported with a slightly higher R², where model (6) provides R² of 34.68%(compared with 29.27%) and model (8) has R² of 7.84% (compared with 6.02%).

To test the research hypotheses, for the Near-East countries, a panel data analysis has been conducted using GMM technique and provides the following results:

Table (6): Determinants of Financial Stability for 4 Near-East Countries

	Model (9)	Model (10)	Model (11)	Model (12)
Variable	Z-Score		ABSI	
C	91.42485 (11.441)***	18.46385 (52.066)	0.060329 (0.1063)	1.426108 (0.4542)***
HHI	-46.93800 (75.886)	-29.21408 (93.588)	-0.057850 (0.7052)	0.611563 (0.8164)
BOONE	280.5585 (147.673)*	255.8806 (153.060)*	1.270199 (1.3723)	2.312142 (1.335)*
DEA		85.45136 (44.020)*		-1.106179 (0.3840)***
BOE		-1.873884 (68.668)		-1.037606 (0.5990)*
Controlling for Efficiency	No	Yes	No	Yes
R ²	0.0902	0.1736	0.0207	0.2162
DW statistic	0.16683 9	0.216852	0.825636	0.855289
Obs.	52	52	52	52

Source: outputs of data processing using EViews 10.

Model (9) supports the significance of Boone effect on Z-Score with explanation power of 9.02%. Besides, model (11) supports the significance of Boone effect on ABSI with explanation power of 2.07%. So, for the second and fourth hypotheses, the null hypothesis is rejected and the alternative one could be accepted. Signs of regression coefficients β_2 in model (9) and β_2 in model (11) are positive, which means that financial stability is affected positively by banking concentration. So, results support the “stability- concentration” view.

When controlling for banking efficiency, a panel data analysis has been conducted and provides the same results obtained in models (9) and (11). This could be considered as a robustness check where the same significances have been supported with a higher R², where model (10) provides R² of 17.36% (compared with 9.02%) and model (12) has R² of 21.62% (compared with 2.07%). It's important to pinpoint that in Near-East countries, stability seems to be more sensitive to efficiency, compared with African countries.

To test the research hypotheses, for the Gulf countries, a panel data analysis has been conducted using GMM technique and provides the following results:

Table (7): Determinants of Financial Stability for 6 Gulf Countries

	Model (13)	Model (14)	Model (15)	Model (16)
Variable	Z-Score		ABS	I
C	70.24535 (4.1367)***	3.236353 (48.542)	0.017474 (0.0934)	-3.425475 (0.9840)***
HHI	-113.3226 (31.427)***	-102.9358 (32.397)***	0.066540 (0.7099)	-0.558350 (0.6567)
BOONE	-134.7297 (72.080)*	-160.9363 (74.214)**	2.347573 (1.6283)	3.650070 (1.5430)
DEA		46.47329 (45.251)		3.704399 (1.9172)***
BOE		54.45448 (28.010)*		0.176324 (0.5678)
Controlling for Efficiency	No	Yes	No	Yes
R ²	0.1912	0.2386	0.0321	0.2664
DW statistic	0.14152	0.161416	0.81197	1.09676
	3		2	2
Obs.	78	78	78	78

Source: outputs of data processing using EViews 10.

Model (13) supports the significance of each of HHI and Boone effects on Z-Score with explanation power of 19.12%. Besides, model (15) doesn't supports any significance of Boone effect on ABSI. So, for the first and second hypotheses, the null hypothesis is rejected and the alternative one could be accepted. Signs of regression coefficients β_1 and β_2 in model (13) are negative. It's important to pinpoint that in Gulf countries, financial stability is affected negatively by banking concentration. So, results support the "stability-competition" view.

When controlling for banking efficiency, a panel data analysis has been conducted and provides the same results obtained in models (13). This could be considered as a robustness check where the same significances have been supported with a higher R², where model (14) provides R² of 23.86% (compared with 19.12%).

Regarding the problem of autocorrelation, Durbin-Watson (DW) statistic has been conducted for the second 8 models concerning with ABSI and shows that DW values range from 0.811972 to 1.342202, which means that autocorrelation problem does not exist, as DW values are between 1 and 3.

Summary and Concluded Remarks

This paper attempts to investigate the relationship between banking concentration and financial stability using a sample of 15 MENA countries, that includes Algeria, Bahrain, Egypt, Jordan, Kuwait, Lebanon, Mauritania, Morocco, Oman, Palestine, Qatar, Saudi

Arabia, Tunisia, Turkey and UAE over the period from the 2008 to 2020.

The concentration-stability relationship is still a controversial topic. According to "concentration- stability" view, a concentrated banking structure is less prone to financial crises. Besides, banks operating in uncompetitive banking systems may enhance profits and reduce financial fragility by maintaining higher levels of capital that protects them from external economic and liquidity shocks. The proponents of the "competition-stability" view argue that larger banks are more likely to receive public guarantees manager who takes on risky investments with the knowledge of being protected under the government's safety net. Investments may be inefficiently managed due to moral hazard problem and thereby raising probabilities of failure.

For the whole sample of 15 MENA countries, results support the significance of HHI effect on Z-Score and the Boone effect on ABSI. Signs of regression coefficients are positive, which means that financial stability is affected positively by banking concentration. So, results support the "stability- concentration" view. When conducting the analysis for African countries, the same effects have been supported. In Near-East countries, Boone seems to have significant effects on each of Z-Score and ABSI. Besides, stability seems to be more sensitive to efficiency, compared with African countries. In Gulf countries, results support the significance of each of HHI and Boone effects on Z-Score with negative β_1 and β_2 , which means that financial stability is affected negatively by banking concentration. So, results support the "stability-competition" view.

To conclude, results support the significance of each of HHI and Boone on Z-Score and of Boone on ABSI, without any evidence regarding the effect of Boone on ABSI. So, for the first, second and fourth hypotheses, the null hypothesis is rejected and the alternative one could be accepted. Besides, for the whole sample, African countries and Near-East countries, result support the "stability-concentration" view. For Gulf countries, "stability-competition" view is supported, where larger banks are more likely to receive public guarantees by managers who take on risky investments with the knowledge of being protected under the government's safety net. Investments may be inefficiently managed due to moral hazard problem and thereby raising probabilities of failure. This needs to be more elaborated through further research.

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Consumer behavior and e-commerce pandemic period an empirical analysis.

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Abstract

The relationship between consumer behavior and e-commerce has become the subject of extensive analysis. The Covid -19 outbreak played a moderating role in the consumer's awareness of utilities, which encouraged shoppers to turn to online shopping. Consequently, it has turned out to be an opportunity for a noticeable increase in online shopping. This paper aims to define, both theoretically and empirically, the relationship between e-commerce and consumer behavior during the COVID – 19 pandemic by estimating a linear regression model for a cross-country sample using panel data analysis.

Key Words: consumer behavior, retail sector, e-commerce, pandemic, covid-19.

1. Introduction

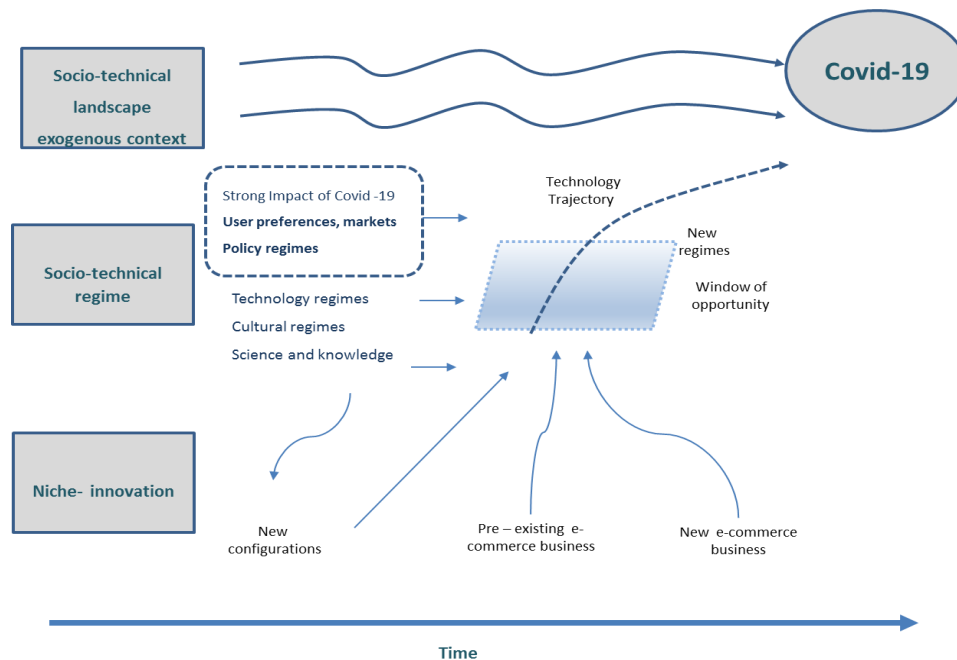
During the covid-19 pandemic, humanity faced great challenges. Especially, world economies had to adapt to a new, extremely vulnerable, environment (Tran, 2021). Both consumers and enterprises ought to change practices, politics, and tactics to achieve their individual goals. On the one hand, customers tried to cover their needs while confined to their homes and organizations struggled to survive and make profits under partial or full lockdowns.

During this extremely unstable and complex period, e-commerce platforms emerged as a window to market prosperity and sales boosting. The pandemic has changed the retail sector dramatically (Jiang & Stylos, 2021). Nevertheless, it has allowed online shopping evolution (Szasz, et al., 2022). Online shopping is nothing new, but the pandemic increased the rate at which business owners opened e-commerce shops and consumers shopped online.

Figure 1 depicts the short and long-term evolution of online purchases. Technological growth is not only depending on the technology itself but also turns on a broader sociotechnical frame. The strong impact of covid-19 affects consumer preferences and economic activity. Competition with the existing technology becomes more severe,

triggering wider changes and innovative technologies that may replace the old ones in the long term. Covid -19 has influenced social technical configurations of online purchases and opened a new window of opportunity for markets (Szasz, et al., 2022).

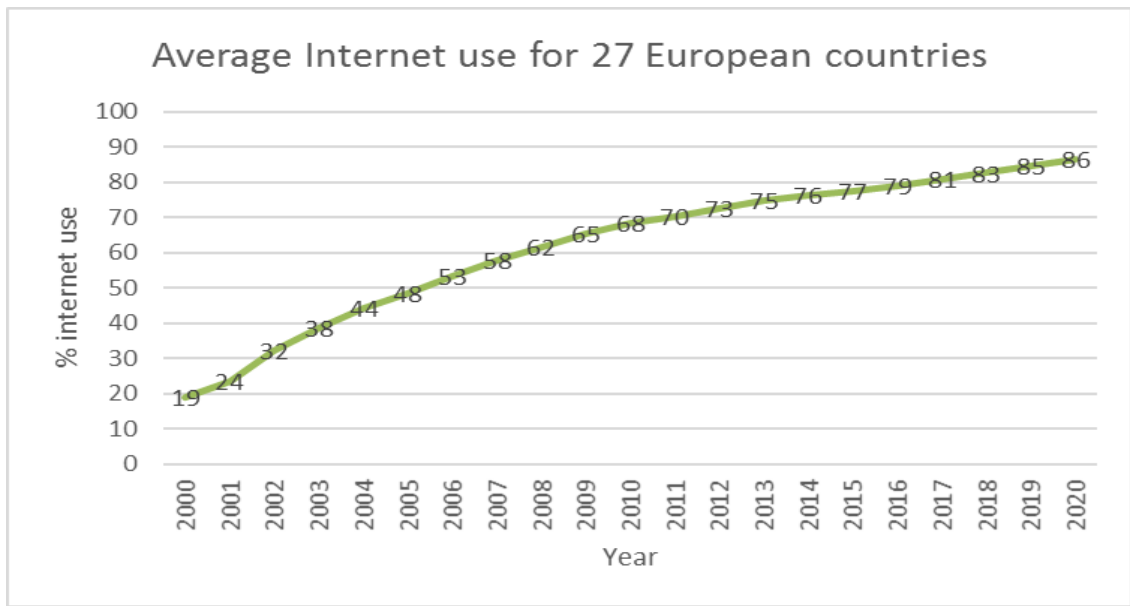
Figure 1 - COVID-19 and the trajectory of online retail evolution



Sources: Szasz, et al., 2022, Dannenberg et al., 2020

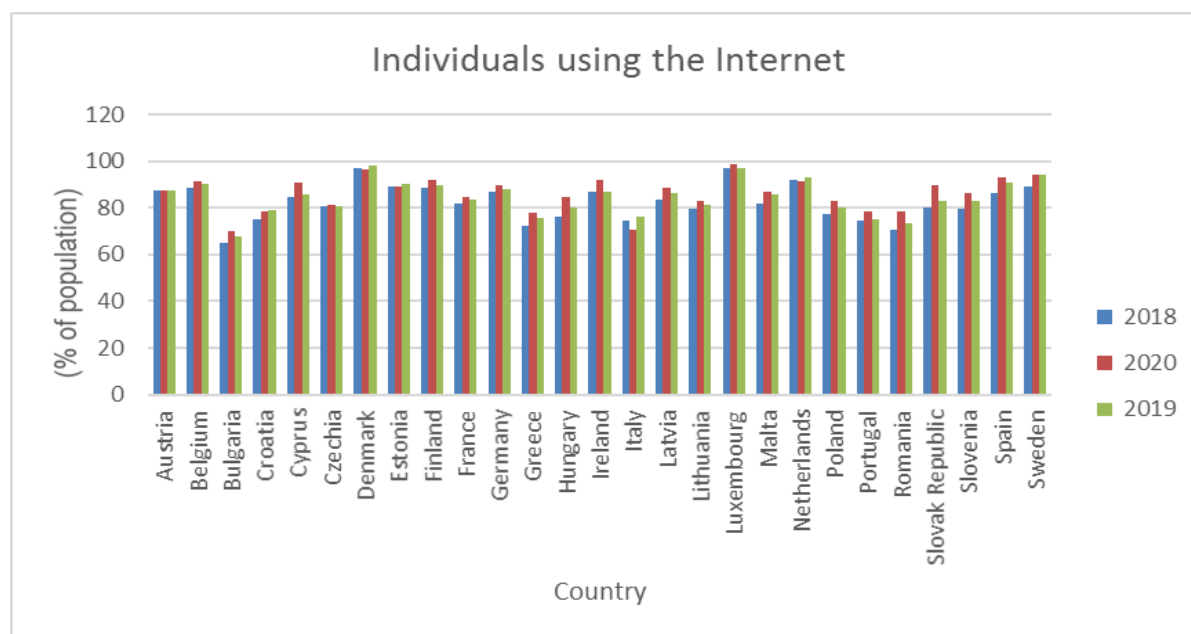
Studying the retail e-commerce in 27 European countries during the covid-19 pandemic we can observe a high growth rate for internet use for 27 European countries during the period 2002-2020. This can be easily explained by technological and social evolution in figure 2. Furthermore, figure 3 presents internet use in 27 European countries for the year 2018 to 2020. During the pandemic, internet use among Europeans has rapidly risen as we can infer from figure 3. Also in figure 4, we can conclude that online purchases had a great boost during the pandemic in most countries. Finally, figure 5 depicts the evolution of total turnover from e-commerce sales, which seems to increase significantly.

Figure 2 - Average Internet use for European Union



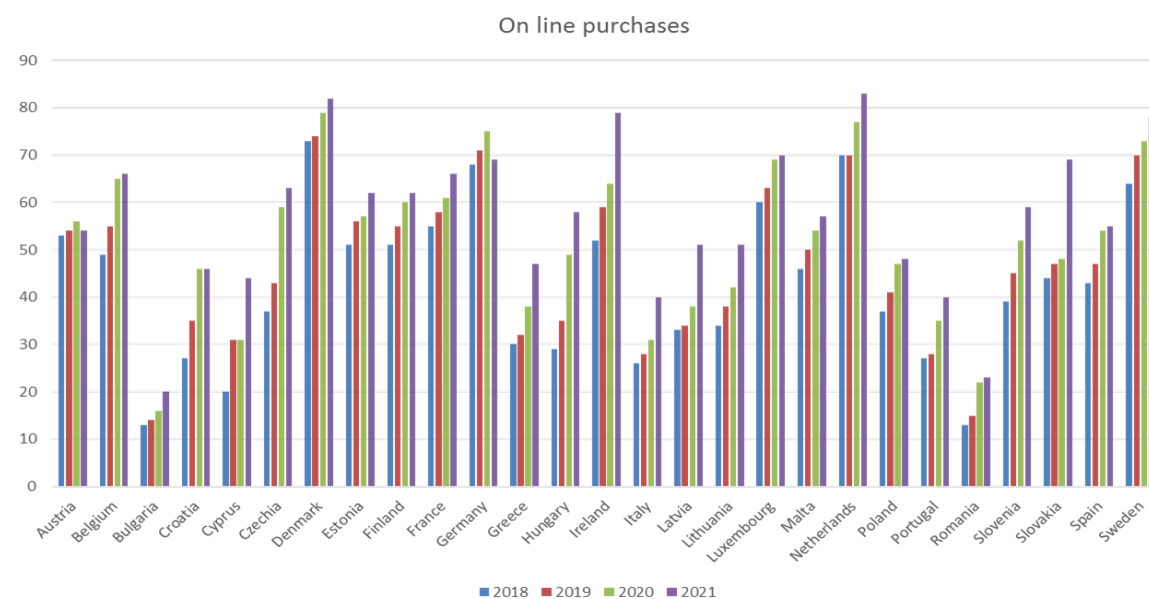
Source: Eurostat (<https://ec.europa.eu/eurostat/web/main/data/database>)

Figure 3 - Individuals using the Internet



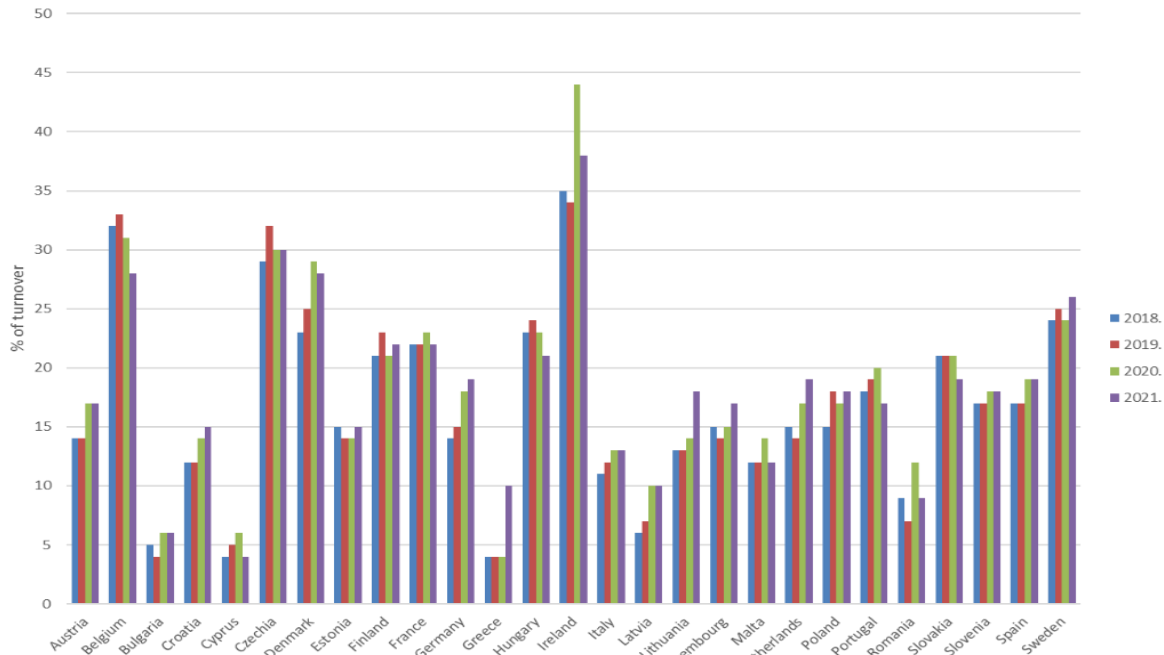
Source: Eurostat (<https://ec.europa.eu/eurostat/web/main/data/database>)

Figure 4 - Online purchases in Europe



Source: Eurostat (<https://ec.europa.eu/eurostat/web/main/data/database>)

Figure 5 - Enterprises' total turnover from e-commerce sales



Source: Eurostat (<https://ec.europa.eu/eurostat/web/main/data/database>)

2. Literature Review

Online shopping can be defined as the function of buying goods and services through the internet using a web browser or mobile app. The popularity of online shopping is deprived of the extensive variety of physical products and services it offers to consumers (Kripesh, Prabhu, & Sriram, 2020). Social distance, isolation, remote work and education, and further lockdown measures cultivated a prosperous ground for online shopping (Fernandes, 2020). The fear of the pandemic has influenced consumer awareness of the economic and environmental benefits of e-commerce platforms (Tran, 2021). Indeed, e-commerce sales blossomed during that period, but the question is whether this trend is permanent or not.

Reviewing the bibliography about the evolution of e-commerce during the pandemic, researchers introduced interesting theories about the development of online shopping and its future. Dannenberg et al (2020) in their study about e-grocery in Germany, argue that there was an expansion of the online grocery sector during the pandemic. Nevertheless, the window of opportunity may close again in the post-pandemic time. Consequently, radical and permanent socio-ecological changes should emerge for online sales establishments in the long term.

Sayyida et al. (2021), in their work, conclude that consumer behavior during the pandemic has shifted: Customers do not only buy online products but also, they seek digital information before their purchases. Though, after the intense phase of the pandemic, buyers prefer physical shops. This can be easily explained by the human need for touching and feeling physical products.

According to Pham et al. (2020) the covid -19 outbreak has divulged an opportunity for a notable increase in e-commerce in Vietnam. Their research works towards discovering how online customers respond to their purchasing behaviour during the Covid-19 period in terms of perceived benefits perspective. Furthermore, Egeret al. (2021) have shown that customers might change their shopping habits in the long run. The covid-19 pandemic has affected both online and traditional shopping patterns.

Al-Hattami (2021) analyses the expectation-confirmation model (ECM) combined with the task-technology fit (TTF) model. The purpose of this study is to emerge the main factors that affect customers' intention to continue using online shopping under covid-19.

Chang & Meyerhoefer (2021) examine the e-food purchases in Taiwan. According to their findings, customers who have tasted the online channel for the first time might continue to use this channel. Wieland (2022) confirmed that the retail sector has been considerably influenced since the covid-19. Online shopping challenges traditional physical markets. The finding of this study depicts that age, shopping attitudes and accessibility are of high importance to customer behavior rather than isolation and hygiene measures.

In general, online shopping has expanded during the pandemic, especially during the first wave. However, whether e-commerce will prevail, or not over traditional markets, depends on the long term sociotechnical transitions. Companies had to be flexible and adapt to new management processes and digital technologies, which are predicted to play a significant role in online shopping growth and retention after the pandemic (Mehta, Saxena, & Purohit, 2020).

3. Data and methodology

3.1. Data analysis: In this empirical study panel least squares method is applied in order to examine the interrelation between consumer behavior and e-commerce. For this purpose linear regression model is estimated and some basic diagnostic tests are estimated for their reliability and statistical significance such as normality test.

The regression model has the following general form

$$LINT_t = c_1 + c_2 LECOM_t + c_3 LEBANK_t + u_{1t} \quad (1)$$

where:

INT = internet use

ECOM = e-commerce

EBANK = e-banking

L = logarithmic symbol

t = time trend

u = residuals

c₁ = constant term

c₂, c₃ = estimated coefficients

Following the empirical studies of Eger et al (2021), Guthrie et al (2021), Wieland (2022) we examine the interrelation between **consumer behavior and e-commerce through internet use and access of consumers in e-shop purchases and e-banking operations**. Panel data analysis includes the statistical data of examined variables for 27 European Union countries covering the time period from 2018 to 2020.

The data sample is referred to 27 European Union countries such as Austria, Belgium, Bulgaria, Croatia, Cyprus, Czechia, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxemburg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain and Sweden). In order to achieve better statistical estimations the examined variables are transformed into their logarithmic form.

The statistical data are obtained from statistical database of World Bank (World Development Indicators Statistical database <https://data.worldbank.org>) and Eurostat database (<https://ec.europa.eu/eurostat/web/main/data/database>). The Eviews 10.0 (2017) software package is used to conduct the relative statistical tests.

3.2. Methodology

The estimated regression model is examined for statistical significance based on the statistical diagnostic tests such as normality test. Internet use ($LINT_t$) is regarded as the dependent variable of the estimated model while e-commerce and e-banking as the independent ($LECOM_t$, $EBANK_{t-1}$) one respectively. Panel least squares method is a modern econometric method which is used mainly for the estimation of regression models with panel data analysis. Panel data analysis consist an econometric method with objective to analyze two-dimensional (typically cross sectional and longitudinal) panel data. According to Seddighi et al (2020) a simple panel data regression model has the following general form:

$$Y_{it} = \alpha + b X_{it} + e_{it} \quad (2)$$

where

Y = dependent variable,

X = independent variable,

a, b = coefficients,

t = time trend,

i = index of individual,

e = error term

4. Empirical results

The reliability and the significance of the empirical results are dependent on the variables under estimation. The number of fitted time lags was selected for better estimations results and for the existence of statistical significance in the estimated panel regression model (Table 1). The empirical results of panel least squares method are summarized as follows:

$$LINT_t = 1.43 + 0.18 LECOM_t + 0.49 LEBANK_t + u_{1t} \quad (3)$$

As we can see from the empirical results an increase of e-commerce per 1% causes a relative increase of internet use per 0.18 (Equation 1). Also, examining the panel regression model for statistical significance we can conclude that there aren't any statistical problems

due to the lower probabilities of 5% level of significance. Furthermore, the coefficient of determination is very high (0.84) and is close to unity, so the panel regression model is very well adjusted and statistical reliable.

Table 1 – Panel Least Squares Method

Dependent Variable: LINT
Method: Panel Least Squares
Sample (adjusted): 2020 2021
Periods included: 2
Cross-sections included: 27
Total panel (balanced) observations: 54

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.434839	0.151838	9.449793	0.0000
LECOM	0.187686	0.048534	3.867093	0.0003
LEBANK(-1)	0.497766	0.044949	11.07409	0.0000
R-squared	0.844653	F-statistic		138.6490
Durbin-Watson stat	0.857967	Prob(F-statistic)		0.000000

The empirical results related to the normality test of residuals by estimating Jarque-Bera statistic test indicated that the residuals are normally distributed (Table 2) due to the larger probability value (0.79) than 5% level of significance. The same conclusion is proved by the relative graph of estimated residuals of panel regression model (Figure 6).

Table 2 – Normality test

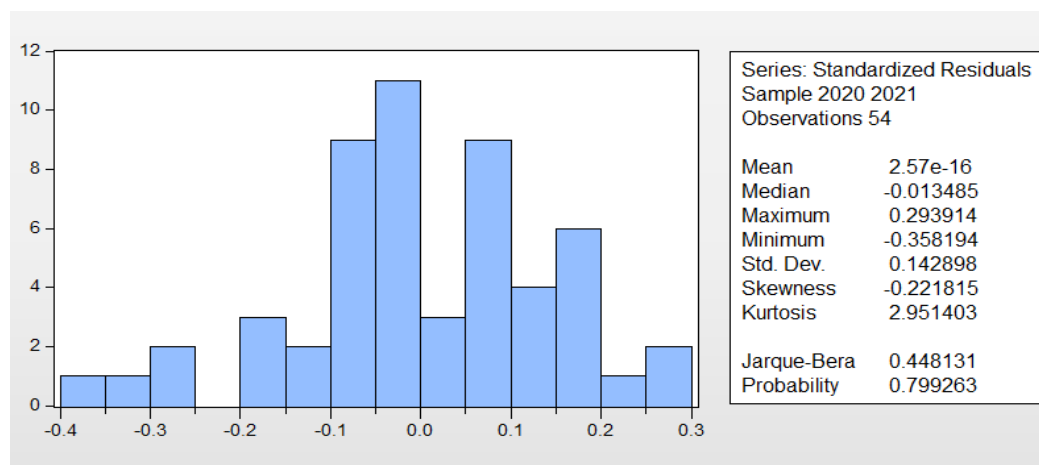
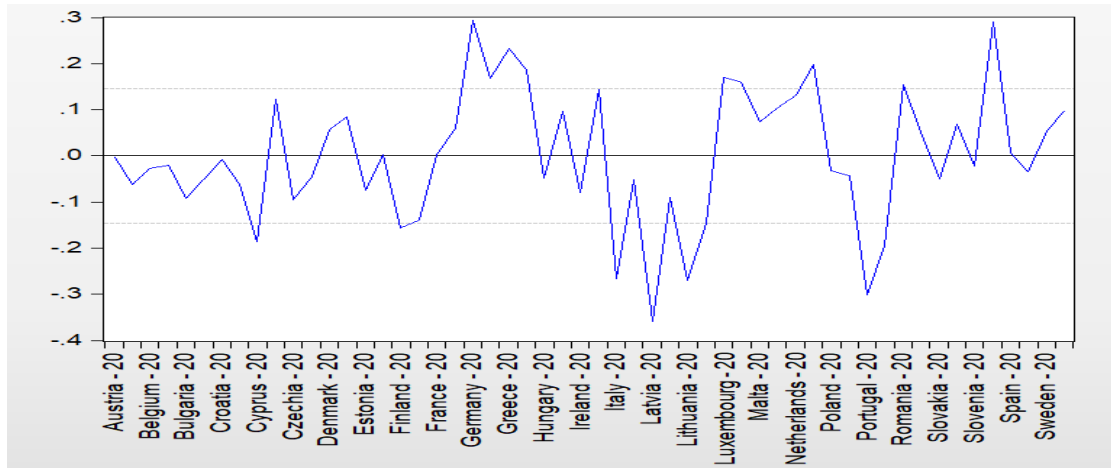


Figure 6 – Graph of estimated residuals



5. CONCLUSIONS

This study examines the relationship between consumer behavior and e-commerce in the pandemic period theoretically and empirically. In the pandemic period a rapid increase of internet purchases was inevitable. E-commerce platforms emerged as window to market prosperity and sales boosting. More specifically, studying the retail e-commerce in 27 European countries during the covid -19 pandemic we observe a high growth rate for internet use for 27 European countries during the period 2002-2020. This can be easily explained by technological and social evolution. Furthermore, internet use in 27 European countries for the year 2018 to 2020 during the pandemic period has rapidly risen. Also, online purchases have a great boost during the pandemic in most countries, while the evolution of total turnover from e-commerce sales is obviously increasing.

Finally, we estimate a linear regression model in order to examine the interrelation between consumer behavior and e-commerce applying a panel data analysis method. The estimated regression model is examined for statistical significance based on the statistical diagnostic tests such as normality test. The empirical results confirmed the rapid evolution of e-commerce through internet access and e-banking in the most European Union member countries while the negative effects of COVID-19 were inevitable in all economies.

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Measuring Student Satisfaction in Professional Education in Greece using Servqual

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Abstract

Education is one of each country's most important institutions not only because it is the basic point of knowledge for children but also, since it is responsible for the knowledge that young adults carry into their work environment. After all, it is well known that over the course of time there has been a shift towards a rather knowledge-based and labor intensive economy. The present study aspires to examine and measure student satisfaction in a private professional education organization using the widely acknowledged SERVQUAL scale. The employment of SERVQUAL can yield a more objective understanding of how students perceive the professional education services they receive within the Greek context and thus results could be more credible and generalizable. The concept of service quality and student satisfaction in professional education in Greece is rather understudied as there are a relatively limited number of extant researches on this scientific field during the last decades. Nevertheless, in the past years higher education organizations are increasingly attracting more attention as far as service quality is concerned, mainly due to a social call for quality evaluation in education. As it was previously mentioned, professional education shares many fundamental qualities and attributes with the service industry in general so, methods such as that of SERVQUAL could be very well transferred in order to measure student satisfaction in higher education, with all the necessary adaptations needed. It is important to note that SERVQUAL presents quite a few problems regarding theoretical and operational concerns, so as previous researches have stated, it is better used as a measuring tool between different groups using the same service. In this way SERVQUAL can be used in a reliable fashion and give accurate results, with which after consideration

the staff of each education can implement changes in order to improve quality. The conclusions of the present study are based on a sample of 115 students that attend classes in a private Greek professional education organization. The analysis of the primary research data revealed several original and noteworthy findings that could considerably contribute to the advancement of knowledge and extant research in the field of student satisfaction.

Key-words: servqual, education, methodological framework, student

Introduction

Education is one of each country's most important institutions not only because it is the basic point of knowledge for children but also, it is responsible for the knowledge that young adults carry into the work institution. After all it is well known that through the ages there has been a shift to a knowledge-based economy, so that makes getting a well-rounded professional education of utmost importance. It is not a secret that Greek educational institutions have faced scrutiny under the years for a plethora of reasons: either that being from the public sector or the private sector. Who more adept, though, at criticizing the Greek professional educational system other than those exact people that are a part of it and depend on its efficiency in order to learn and find work through that exact knowledge that they have acquired through the system? For this exact reason it should be the norm that students get to evaluate the system that they are a part of, using objective means. In this essay we will examine that exact evaluation through a literature review of essays and articles written on the subject: Measuring students' satisfaction in professional education in Greece using SERVQUAL. By using Servqual there can be a more objective understanding of how students find professional education in Greece and thus the results should be more credible.

The Servqual

The SERVQUAL is a system designed to measure service quality as perceived by the customer. Relying on information from focus group interviews, and its innovators Parasuraman, Zeithaml and Berry identified basic dimensions that reflect service attributes used by consumers in evaluating the quality of service provided by service businesses at first in 1985 and over the years they have developed their formulas. The foundation of SERVQUAL is that the customers viewpoint of service quality is of the greatest importance. Basically, this system measures the gap between what customers expect from their service quality (before their interaction with the service), and their actual evaluation of the service provided (after their interaction). In the original publication SERVQUAL consisted of these components: reliability; responsiveness;

competence; access; courtesy; communication; credibility; security; understanding/knowing the customer; tangibles. (Buttle, 1996) (Asubonteng, et al., 1996)

Even though SERVQUAL has faced theoretical and operational criticism (e.g., the term expectation is polysemic; consumers use standards other than expectations to evaluate SQ; and SERVQUAL fails to measure absolute SQ expectations), it is still considered a relatively reliable tool in measuring satisfaction within a group of people that have been provided with a service. (Buttle, 1996) That is why it is of importance to evaluate and present the literature written about students satisfaction using SERVQUAL.

Education and Professional Education in Greece

Before a brief presentation of the educational system in Greece it is important to define what exactly is considered professional education in Greece: “Professional education is a formalized approach to specialized training in a professional school through which participants acquire content knowledge and learn to apply techniques.”(Encyclopedia of Business and Finance, 2nd ed., 2022) By this definition professional education in Greece is mostly known as a third-degree education or as the education that you continue after you have graduated from high school, most likely a college education either from public or private universities. It should be noted that Greek students also have the choice to pursue a professional education while in High School, since Greece has several high schools offering professional education in a number of work fields. In this essay when speaking about professional education we will be referring to that given by a “higher” degree such as that of a university. These schools are charged with planning and executing a full range of educational services that allow knowledge-based learning through the integration of instruction, research, and technology. (Encyclopedia of Business and Finance, 2nd ed., 2022) These universities are not only expected to provide the knowledge needed in order for its students to acquire the knowledge needed in order to practice their profession but, they are also expected to have a high service quality. So, the assessment of this quality is important in order for the staff of these institution’s to upkeep or improve their service quality.

Measuring Students Satisfaction in Professional Education in Greece using SERVQUAL

In their paper Zafiropoulos and Vrana analyze students and staff opinions about quality in higher education in Greece using SERVQUAL, adjusted in the educational concept. It is one of the few studies that look at both perceptions in the educational system: both those of the students and the staff so it gives a valuable insight into the quality of professional education in Greece. The study finds gaps between students and teachers perception concerning the educational system and even though gaps do exist among some students’ attitudes regarding perceived and expected quality, staff presents greater

gaps than students in every SERVQUAL dimension. Despite these differences there is no statistically significant difference regarding the final SERVQUAL scores. Even though the authors report that SERVQUAL presents some flaws, such as the ones mentioned in the previous paragraphs, they conclude that it can be used as a valuable tool for complementary research for assessing service quality and in the educational context it can be used to reveal discrepancies in views of different groups, such as those of students and staff. (Zafiropoulos & Vrana, 2008)

In his article Zafiropoulos presents students' perceptions of education service quality as experienced at a Higher Technological Education Institute based in Greece and measured by the SERVQUAL questionnaire. Not only does he present the SERVQUAL measuring instrument, but also how it can be used in higher education since, as he states: higher education presents a lot of the characteristics that other services offer, such as the differentiation of the groups that participate in it (e.g., students and staff in a parallel to customers and workers). So, it is possible for SERVQUAL to be used as a satisfaction measuring tool in professional education as long as some adaptations are made to the formula. The results of his study suggest that perceived and expected quality are closer to each other for new students, students of newly created departments and students of specific faculties. (Zafiropoulos, 2006)

Conclusion

Service quality in professional education in Greece is relatively new since there have been a few review written on the subject in the last decades. In the past years higher education institutes are increasingly attracting more attention to service quality mainly since there is a social requirement for quality evaluation in education (Zafiropoulos, 2006), especially since it has been one of the public sectors in Greece that faces scrutiny but lacks in objective evaluations. As it was previously mentioned professional education shares basic qualities with the service industry in general so, methods such as that of SERVQUAL can be used to measure satisfaction in higher education if necessary adaptations are made. It is important to note that SERVQUAL presents quiet a few problems regarding theoretical and operational concerns, so as previous researches have stated, it is better used as a measuring tool between different groups using the same service. For, example it can measure the different levels of satisfaction different groups of student have in higher education, depending on their department at the university, their time their etc. In this way SERVQUAL can be used in a reliable fashion and give accurate results, with which after consideration the staff of each education can implement changes in order to improve quality.

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Management, in operation and administration of human resources, applies in profit and non-profit organizations in cultural institutions.

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Abstract

The concept of management has recently begun to occupy non-profit organizations, including cultural institutions, as the application of their various theoretical development frameworks to the production of cultural products and the provision of services to the public is investigated. The purpose of this work is to examine the concept of administration and its functions in general, and its role in the organization and operation of cultural institutions in the planning and management of their human resources. The methodology followed concerns the bibliographic review of the theories concerning the concept of administration, the organization and management of human resources and the management of total quality and examines the way that above concepts apply to cultural institutions.

KEYWORDS

Cultural Economics, Cultural Institutions, Marketing and Management, Administration, Tourism and Development, Human Resource Management

JEL CLASSIFICATION CODES

Z1 Cultural Economics; Economic Sociology; Economic Anthropology

Z10 General

M3 Marketing and Advertising

M31 Marketing

Z3 Tourism Economics

Z30 General

Z32 Tourism and Development

Z33 Marketing and Finance

1. Introduction

The concept of management, as originally defined and applied in the business world, and adopted by public sector bodies later and by cultural organizations recently. This issue makes the subject of research work. The purpose of this paper is to examine the concept of management and its functions in cultural institutions. Specifically, the functions are related to planning, organization, management and how they are applied to cultural institutions.

The methodology concerns studying of various theoretical frameworks related to the concept of management, the content of its functions and their application to profit and non-profit cultural organizations. The concept of Total Quality Management is examined as well as its role in the management of human resources.

Initially, the concept of management and its functions related to the planning of strategic goals, the organization and management of an organization and control over the achievement of goals are analyzed. The concept of Total Quality Management and the way in which the structure of the organization and the management affect the human resources are studied. Consequently, it deals with the implementation of the functions of the administration in cultural organizations (museums, libraries, archives).

2. Literature Review

The definition of the term "Management", according to Batman (2016, p.13) "is the process of working with people and resources to achieve organizational goals." Pride, Hughes & Kapoor (2002, p. 186) define it as the process of coordination and harmonization of economic, human, material, intangible, etc. resources of an organizational scheme, focusing on the efficiency of achieving the goals at the lowest possible cost.

Historically, the concept of management as we use it today was born in the USA and the "manager" first appeared in 1588 to describe someone who manages. However, the "management" with its current meaning (supervision and guidance of the members of an organization) dates to the 20th century (Robbins, Decenzo & Coulter, 2017, p.44). In 1969, the American Management Association defined management as "the activity by which a project is completed through other people."

Recently, this definition was changed to "activity in which one works together and through other people, to accomplish both the goals of the business and the goals of the people who work in it", emphasizing the human factor, the result that should achieve. Specifically, the organization's the goals which unite them with the goals of the members of the organization. Based on the analysis of the second definition, it appears that management is a science but also an art (Tzortzakis & Tzortzaki, 2007). Management and administration are two terms that are often confused. It is often found in the literature

that the term administration is used in place of management. Although its content is broader than that of management's. Both terms are often used interchangeably (Trant, 2009).

Management was initially implemented by profit companies and then adopted by non-profit. The division of organizations into profit and non-profit organizations is that the former have as their primary purpose the creation of profit for the entrepreneur or the shareholders. In contrast, non-profit organizations including cultural organizations (museums, libraries, archives) are not for profit but exist to serve society and contribute to the common good, a goal that can be interpreted in many ways (Moran, Morner & Stueart, 2018). An organization, in order to function efficiently and effectively, must set goals, organize and guide staff to achieve them and control the results. These are the functions of management that apply to all organizations, regardless of whether they are for profit or not.

3. Functioning of the administration and management

The exercise of the functions of planning / organizing, leading or guiding people and controlling, is necessary to achieve the goals through the most efficient utilization of the available resources.

3.1. Design – Plan

The strategic planning drawn up by the senior executives of an organization,

- defines the long-term goals,
- reflects through them their vision,
- sets the basic course of the organization in the future,
- adaptation to a constantly changing environment.

Koontz, O'Donnel & Weihrich (1986) define programming as the function of bridging the gap / distance between where the organization is today and where it wants to be in the future, deciding what to do, how to do it, when it will be done and who will do it.

3.2. Organization

Organization is the function through which the overall work of the organization is divided into individual projects. Specifically, it concerns the utilization of human resources, but also the organizational structure that regulates the service relations between the systems of the organization as well as the relations between superiors and

subordinates and gives shape and structure to the work environment (Mouza-Lazaridi, 2013). The overall task defined in the programming is divided into individual tasks or duties (division of labor, jobs), which are assigned to specific individuals and the relationships between them are formed (departments, hierarchical levels, etc.).

The operation of the organization is supported by the organization chart that depicts:

- The structure of an organization,
- The levels of management:
 - Upper level (Organization of management functions)
 - Middle level (Supervisory responsibilities)
 - Lower level (Executive responsibilities)

At the highest level is the strategic body that aims to oversee and ensure the mission of the organization. The executive body is the basis of the organizational structure, while the executives are at the middle level of the hierarchy (Petridou, 2001). The establishment of the organization chart requires a clear line of management from top to bottom, clarity of levels of management and distribution of power between administrative and executive positions and other departments, because the organizational structure has a decisive influence on its efficiency and effectiveness (Pešić & Čočić, 2010).

3.3. Direction or guidance

Achieving the goals of an organization is linked to the efficiency and effectiveness of human resources, which is made possible through its supervision, influence and guidance. Managers re-evaluate traditional approaches and explore new building plans that better support and make it easier for employees to get the work done. These plans can ensure efficiency and flexibility.

Managers rely primarily on the organizational principles of Henri Fayol and Max Weber, although formulated many decades ago, which continue to provide valuable insights into the effective and efficient design of organizations that includes six key elements:

- professional specialization (work specialization), ie the division of work activities into separate professional tasks (division of labor).
- the segmentation concerning the way of grouping the individual tasks
- the power and responsibility
- the range of control associated with the number of employees that a manager can effectively supervise, and significantly affect the overall organization and segmentation of an organization,
- centralism (degree of decision-making at the highest levels of the organization) versus decentralization (contribution of lower-level managers to decision-making); and

- the standardization related to the definition of jobs in the organization and the degree to which employee behavior is determined by rules and procedures (Robbins, Decenzo & Coulter, 2017).

The success of an organization is directly related to the skills of the manager. The flexibility, the adaptation, the human-centered and object-oriented skills of a manager, significantly influences the bullsh of the organization.

3.4. Control

The bullsh of an organization and the effectiveness of its objectives are not sufficiently understood without the implementation of the Control function. During the control process, the efficiency and effectiveness of the human resources are evaluated, standards for measuring performance and effectiveness in comparison with the objectives are set.

The discrepancies between the objectives and the results are recorded and corrective actions are taken to eliminate the discrepancies (Burandas, 2002). Management is a continuous cyclical process. Management's functions are connected and interacted through feedback, which helps to evaluate and redefine the goals of the organization ensuring its smooth operation.

4. Total Quality Management

Total Quality Management is a new way of organizing a new management philosophy, an important tool for organization's development. According to a general definition, quality is defined as "the way running an organization that affects every activity and every process" (Feiqenbaum, 1983). Although it was implemented in 1949 by the Association of Japanese Scientists, it was implemented in Europe after the 1980s.

It is characterized as "total" because it involves all the factors of an organization, while the term "quality" focuses on respecting the needs of the customer through the quality of products / services. Total Quality Management is a culture, a component of which is the total commitment to quality and a specific mentality with participation of all in the process of continuous improvement of products and services, using innovative scientific methods (Logothetis, 1993: 20).

Its purpose is the satisfaction of customers / users and the simultaneous activation of all potential with the lowest possible cost (Spanos, 1993: 22). The main objectives of the Total Quality Management are:

- the continuous satisfaction of the customer / consumer,
- the improvement of the quality of the product / service
- the improvement of the training / education of the employees.

5. Human Resource Management

The organization, after formulating its strategy and planning its structure, will have to decide on the selection of the appropriate staff. Human resources are widely recognized as the most crucial factor in an organization's total resources. In other words, the difference is made by the people whether they manage or execute. It depends on them whether they will achieve the goals of an organization. Installations, computers, and other factors of production neither think, nor train, nor decide, nor strike or claim.

For this reason, employee management is a difficult, multifaceted task, requires knowledge and art. It is one of the most critical roles of human resources managers in an organization. In human resource management, there are three main activities that represent employment planning: staff selection, recruitment and job reduction through job cuts. Once the right people are selected to staff the organization, they must be provided with help, for example training and support to adapt to the organization (Robbins, Decenzo & Coulter, 2017).

The first thing to remember is that people are different from each other. Apart from the differences of gender, age, origin, race, etc., there is of particular interest to the management focuses on ability, intelligence and personality. A second factor that is of interest when referring to employees is their behavior that is influenced by internal factors: skills, perceptions, expectations, values, personal goals, and by external ones related to the type of work, work climate, organizational education, etc. Behaviors such as frustration, aggression, anxiety, and resistance to change should concern managers so that they can diagnose the causes and reduce the consequences.

The essence of managing human resources in an organization is to acquire capable employees and these different people in terms of skills, knowledge, etc. The goal is to work within such systems and processes in collaboration with other productive resources to achieve specific common goals. Consequently, Human Resource Management means a set of strategic and operational actions that include:

- Human Resource Planning that aims to anticipate staffing needs to cover future jobs.
- The job analysis, specifically the description of the project that the organization is going to perform. The determination of the formal and essential qualifications for attracting the appropriate candidates.
- Attracting and selecting candidates. Identifying potential candidates and selecting them with appropriate methods to fill the specific jobs.

- The training and development of human resources through specific methods and procedures to meet the requirements of the positions that have been hired.
- The remuneration of employees that concerns the determination of the general remuneration policy of each organization.
- The evaluation of the performance of the employees based on specific criteria so that the size of the performance is ascertained and corrective or rewarding actions are taken accordingly.
- Labor relations regarding the settlement of disputes / conflicts, the handling of complaints, to maintain the maximum degree of normalcy.

The role of management is crucial for the organization, guidance and supervision of human resources. However, management should also be able to listen to the needs of employees in matters e.g. improving working conditions. (Chytiris, 2001).

6. Administration of cultural Institutions

Management, which began to be systematized scientifically in the late 19th century with the formulation of basic principles by important representatives of the classical school such as Frederik Taylor and Henri Fayol, was applied early on in non-profit organizations. The field of administration and management in the field of culture began to be studied scientifically in the early 20th century (Lindqvist, 2012). It was first applied in the USA about thirty years ago, due to the need for cultural organizations to survive in a competitive environment.

In Europe, the adoption of management methods and practices by non-profit cultural organizations has been steadily spreading in recent years (Kouri, 2007). Middleton (1994) stressed the need for management of cultural institutions, arguing that in recent years the environment in which cultural organizations operate has changed radically. There is a reduction in government subsidies, while at the same time there is pressure for increased productivity and efficiency. On the other hand, consumers are increasing their demands. For example, in the case of museums, management has come to the fore, as government funding has been reduced and competition has increased. On account of this, special emphasis is now placed on their management and how it will be carried out in the most efficient way

In cultural organizations this need was expressed with the adoption and implementation of practices by the business world and the organizational restructuring of the administrative structures of cultural organizations. The modern form of management, which could be characterized as sustainable, should have as its main concern the ensuring the continuous development of the main resources of the organization and the promotion

of its organizational culture. Equally it should have the maintenance of its competitive characteristics (McKiernan, 1997).

6.1. Programming

Planning the short-term and long-term goals of a cultural organization requires careful planning and goes beyond our good intentions to combine artistic, social and economic goals. (Kouri, 2007).

The organization should draw up a strategic plan and answer the following fundamental questions, before proceeding with it:

- Who are we?
- What are we doing?
- Why are we here?
- What kind of organization are we?
- What kind of organization do we want to become?
- How to define, articulate and communicate the goals of the organization to ensure understanding and commitment to their implementation (Radha 2007);

The answers to these questions will help it to formulate its vision and to formulate its purpose and mission clearly. Cultural organizations seek to develop cultural activity through strategic planning, unlike profit ones. Also they find resources to achieve it and ensure their sustainability. Finally, they manage their social responsibility to public and its expectations (Rentschle & Potter, 1996). Cultural organizations, having as their main goal the internal improvement and further development of man, create a special challenge in management through their strategic goals (Allison & Kaye, 2005).

In order to define and implement its strategic goals, leading to its success, a cultural organization must be aware of its internal strengths and weaknesses, as well as the opportunities and threats as they arise from the external environment. It must perform an S.W.O.T. Analysis (Strengths, Weaknesses, Opportunities, Threats) and the organization's management can react appropriately to implement or redefine its goals, by considering all of the above

6.2. Organizing

The organization is of particular importance for cultural institutions as it enables them to structure organizational structures according to the business model, with the possibility of great flexibility and efficiency. In order to be properly organized, thinking about the competitive environment, cultural organizations' administration should consist of a

group of people who will aim to fulfill the goals of the organization. This process is called cultural management

Culture is associated with creative freedom and individuality. In terms of management, it refers to efficiency, productivity and economic success (Suchy, 2007). The Organization as the second function of the Administration acquires increasing importance for the cultural organizations. The need to operate and survive in a globalized and competitive environment dictates the creation and integration in their organizational charts of departments that we used to meet only in the business world.

Thus, departments of promotion, public relations or legal support are systems of the organizational chart of cultural organizations (Kouri, 2007).

6.3. Management

The cultural manager is based on originality and authenticity. He tries, through the alternative view of various issues, to overcome any conventions which are the driving force of the organization, while he is inspiring the staff with the value of creativity. Human resource guidance is a complex function, which requires manager to have special qualifications and skills such as technical, interpersonal, abstract thinking and overall vision. All the above with the contribution of the other resources (financial, technological, etc.) of the organization, allow the cultural administrator to form the desired expectations and to attract groups of audiences with specific characteristics.

The way in which the manager will communicate with his staff and his audience, is a special part of the management (Sheng & Chen, 2012). Usually, the information starts from the senior executives and ends up targeting specific individuals or parts of the organization. In order to be interaction and feedback between all levels, the information must be diffused in all directions. The information should also go in the opposite direction causing the cultural administrator to welcome new ideas, and practices.

6.4. Control

The control helps the organization to evaluate the results of its actions in quantitative and qualitative terms. After setting the objectives and the structural arrangements, the recruitment and training of the staff should be determined if everything works according to the plan and this can be understood only through the implementation of the Audit function (Robbins, Decenzo & Coulter, 2017). Any significant deviation requires the leadership of the cultural organization to return the situation to the desired course.

Ideally, control should act proactively, identifying possible problems in a timely manner. However, the problems are usually perceived after their appearance, requiring repressive

control. Even worse, after they have created effects and they only allow feedback control with questionable margins of action (Kefis, 2005). In cultural organizations, control is usually nonexistent, or delayed, which does not help prevent failure but leads to setbacks and waste of resources.

Its insufficiency or non-existence is usually due to the lack of sufficient know-how and resources (Kouri, 2007). However, its application is of utmost importance for the highlighting of quantitative data that concern for example the number of cultural activities, visitors, rates, tickets, etc. The quantities that should include are press reviews, public views, social and educational impact of cultural activities.

7. Conclusion

In the theory of management and organization, one of the main topics of discussion, is important that the Human Resources Management Practices must apply to deal with the constant changes that take place in the market. The objective is to remain competitive. Human resource management is one of the ways institutions and organizations can use to increase their competitiveness.

Cultural organizations' need to survive in the competitive conditions of the modern environment makes it necessary to implement administrative functions. There is need to modernize their mode of operation and to manage their resources so that they can meet the challenges of the time. However, the coexistence of culture and administration presupposes the maintenance of a balance between business thinking and the cultural good as a social good. Also, the quality in the administration is the one that will bring significant improvement in the offered services and the satisfaction of the end user.

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The Transition to the New Public Sector Accounting Standards

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ABSTRACT

Purpose

This paper aims to identify and evaluate the transition to the New Accounting Standards of the Public Sector (from PD 315/1999 to PD 54/2018), in the Central Administration, using the case of Greece. From the sectoral accounting plan of the Local Self-Governing Organizations (P.D. 315/99)[1], we are moving 20 years late to the P.D. 54/2018 [2]. The implementation of the P.D. 54/2018[2] starts on 1/1/2019, in the Central Administration. The period of adaptation of the remaining entities (including Social Security institutions, Public Legal Entities, Local Government Organizations and Public Health Units) to the obligation of full implementation of P.D. 54/2018 is 1/1/2023.

Design/methodology/approach

In this paper secondary data will be used. These data will be searched and retrieved through scientific literature and research. Such as government websites, scientific articles and books, research studies and other academic and governmental sources, in order to answer the following question: is it possible to implement the New Public Sector Accounting Framework (PSAF) [5] universally in early 2023 by the administrations of the General Government (GG) [6], with a specific operational plan for implementation.

Findings

P.D. 54/2018 is the New Accounting Framework for the bodies of the DG. 54/2018 is an ambitious project of accounting adaptation to the European System of Accounts (ESA)

and the Government Finance Statistics (GFS) [4] with an extension to the International Public Sector Accounting Standards (IPSAS & EPSAS) [3]. The implementation of Decree 54/2018 aims to implement: a common uniform accounting and reporting plan for the entire General Government, in accordance with ESA standards and complementary to the GFS; and finally, the application of uniform accounting principles across the whole range of General Government entities, which principles will be based on IPSAS. Digital transformation and good planning are key prerequisites for this accounting transition.

Originality/value

The study contributes to the enrichment and improvement of the accounting literature by providing further understanding for a more accurate explanation of the dynamics of the accounting reform that has been taking place in recent years in the Greek public sector. It uses a framework for the study of new accounting criteria and practices. Finally, it is believed that this study contributes to the national and international literature because it highlights new trends in the adoption of IPSAS by developing countries such as Greece.

Keywords: IPSAS, Government Accounting System, Central administration, European System of Accounts, Accounting standardization, accounting harmonization.

JEL classification codes H 83,P41,M84

Public Accounting

Public Accounting is defined as the set of rules that define the way Public money is managed. These rules are defined in the Fiscal Law. Every public organization carries out a fiscal activity and has Public Revenues, while proceeding with Public Expenditures.

Public revenues come mainly from taxation (direct and indirect). For Public Accounting, the Provisions of the legislative decree 496/74 as they were subsequently amended by the last amendment of Law 4270/2014 “Principles of fiscal management and supervision (incorporation of Directive 2011/85/EU) – public accounting and other provisions”. Law 4270/2014 defined the establishment of a “Fiscal Council” which “evaluates the macroeconomic forecasts with a view to their adoption and monitors compliance with the fiscal rules, giving an opinion on it”. Thus, rules are developed that regulate management issues as well as financial management and audit issues [1].

The system traditionally followed by Public Accounting in Greece is the simple one, that is, each accounting transaction is recorded one-dimensionally as “expense” or “income”, which does not allow the recording of additional useful information that would particularly facilitate the exercise of effective financial management. However, in recent years, the use of the double-entry system has been promoted, according to which an economic event is recorded with two accounting transactions, that is, in two accounts (debit and credit). In this way, the recording of financial events is done with great accuracy and the information regarding the exercise of effective management and the control of management become much easier [2].

Regarding the financial reporting followed by the public sector in Greece, it is important to emphasize that public sector entities follow different accounting standards defined by the respective Presidential Decrees, while also following a different accounting plan [3]. Furthermore, in some cases even the accounting basis (cash basis – accrual basis) may differ between the standards of public sector entities. Characteristically, the Local Government Organizations follow the P.D. 315/1999 [4], Public Law Legal Entities follow the P.D. 205/1988 [5], the Public Health Units follow the P.D. 146/2003 [6] (all the above Presidential Decrees follow the accrual basis of accounting) while the Central Administration followed until recently the P.D. 15/2011 [7] (which is based on a modified

cash basis). The result of the above is that there is a fundamental gap in the accounting plans followed by each category of public bodies, both in the accounting process and in their relevant reports [3].

Law 4270

The “flagship” of the public accounting system in Greece is reflected in law 4270 of the year 2014 (law 2014/2014), which in its implementation has received several amendments due to the upcoming reforms. The law in question essentially lists the institutional framework, the accounting principles and rules, as well as the Accounting Plan of all the entities of the General Government, while Presidential Decree 54 of 2018 analyzes the present plan of accounts [8].

The justification report accompanying Law 4270 of 2014 describes the current procedures that have been taken with a view to the upcoming accounting reform whereby the necessary institutional initiatives and development practices have been carried out with a focus on quality assurance of public control and supervision mechanisms as a result of improving the level of transparency, meritocracy and accountability with the implementation of the “Transparenc” program. The use of this Program enabled the bodies of the General Government to obtain reliable and quality information about the procedures for executing the Regular Budget [9].

In addition, the technological and digital sector was strengthened with the upgrade of Integrated Management Information Systems (MIS) with the aim of improving the services provided, which are related to the responsibilities of Public Electronic Government, the control and assurance of valid fiscal results through the “Sizeyksis” (“Coupling”) program. This Program enables immediate, valid, reliable data transfer through the electronic transfer of public documents, the possibility of creating digital signatures and the content evaluation system [1].

Finally, the process of controlling the financial statements and the information provided was improved in accordance with international requirements, the guidelines of the International Accounting Standards Board and the International Financial Reporting Standards Committee [9].

Law 4270 has been established in order to define the accounting framework of the Greek Public Administration. The functional role of the legislative order lays down the guidelines for the proper functioning of the country's accounting system. Therefore, at the heart of this are highlighted the process of forecasting the establishment of consolidated Financial Statements for all bodies of the General Government. Taking this as an example, the objectives of this law include the following [10]:

- maintaining the credibility, transparency, control and accountability both internally and externally surrounding the Greek Government,
- creation of the environment of the economic and administrative classification according to which a hierarchical structure of the bodies of the general government as well as its accounts are foreseen. More specifically, the categories of entities are defined based on the plan of accounts in accordance with the fulfillment of the needs of its accounting display and the management of the State Budget,
- the valuation procedures of the country's Assets are foreseen,
- the way to correctly display the information with the help of a common, uniform accounting framework, in accordance with the provisions of the law.

Introduction to the New Public Accounting Standards (PD 54/2018)

On June 16, 2018, Presidential Decree 54 (P.D. 54/2018) [11] was published, which is the cornerstone for the convergence of the Greek Financial Statements with International

Public Sector Accounting Standards. Therefore, according to this Presidential Decree, the Greek public accounting system applies the following as a whole [12]:

- accrual basis accounting method,
- providing information in accordance with the European Accounting Standards (ESA),
- universal application in all entities of the General Government as well as in its sub-sectors,
- provision for Legal Entities under Private Law according to which they are required to prepare additional Financial Statements (in addition to the statements provided for listed ones) in accordance with this Presidential Decree.

Presidential Decree 54/2018 defines the “content and start time of the implementation of the Accounting Framework of the General Government”. It defines the framework that will govern all bodies of the General Government. According to this, the accounting information will now be recorded using the Accrued Basis of Accounting in accordance with IPSAS and in conjunction with the standards of the European System of Accounts (ESA). Thus, a common plan of accounts for recording accounting events is defined for all State entities [10].

Financial reporting is done with [13]:

1. The financial statements, which are drawn up with the assumption of accruals and going concern:
 - 1.1. Statement of financial position (balance sheet)
 - 1.2. Statement of financial performance (income statement)
 - 1.3. Statement of changes in equity
 - 1.4. Statement of cash flows
 - 1.5. Attachment

2. Consolidated Financial Reports, drawn up under the responsibility of the General Accounting Office of the State:

2.1. Consolidated financial reports of the Central Government

2.2. Consolidated financial reports of local government

2.3. Consolidated financial reports of social security agencies

2.4. Consolidated financial reports of general government

3. Financial report, which shows the financial figures according to the ESA system. Includes:

3.1. the result of the period (surplus / deficit)

3.2. net funding

4. Budget

Financial reports need to have quality characteristics, while the results of their audit are included in the auditors' "Audit Report" submitted to the Ministry of Finance [13].

Sorting of accounts needs to be done in two ways. Mandatory, accounts must follow functional, financial and administrative classification. Optionally, the following classifications can also be followed [12]:

- By program
- By funding source
- Per costing purpose
- By geographic area

Public Sector entities are required to follow an accounting system which [12]:

- To use the diplographic method

- To include the following financial statements:
 - Statement of Financial Position
 - Financial Performance Statement
 - Statement of Changes in Equity
 - Cash Flow Statement
 - Appendix
- To use the accrual accounting method
- To provide consolidated financial statements for the following:
 - The central government
 - The local government
 - The social security agencies
 - The general government
- To record in a specific way, following a specific plan of accounts, the financial activity.
In terms of financial classification, the chart of accounts consists of eight groups:
 - Group 1: Income
 - Group 2: Expenses
 - Group 3: Tangible assets, Intangible assets and Inventories
 - Group 4: Financial assets
 - Group 5: Financial obligations
 - Group 6: Predictions
 - Group 7: Other financial flows
 - Group 8: Equity Accounts

The analysis of the above accounts reaches up to the fifth degree.

- To include the following financial reports:

- Financial Reporting Statement, which includes the period's surplus or deficit as well as the period's net financing. The display of financial figures in this statement is done in accordance with the European System of Accounts (ESA).
- Budget, which follows the same financial classification and needs to provide the following information:
 - Detailed revenue budget (approved)
 - Assured income
 - Collected and uncollected revenue
 - Revenue returns
 - Detailed expense budget (approved)
 - Remaining credits to be made available
 - Obligations based on documents
 - Payments
 - Unpaid liabilities
 - Pending commitments

The first substantial step towards the accounting reform of the Greek Public Administration has been taken and the final date of their adoption has been set as January 1, 2023 [12].

Audit of financial reports

The P.D. 54/2018 defines [13]:

- To check the annual financial reports of the Public Bodies within a period of three months from their approval and to publish them on the website of the body.
- The Report and the Financial Statements of the Central Administration to be sent to the Auditing Conference by the end of June.

- The Parliament to ratify the Report, the Financial Statements and the Report (Demonstration) of the Court of Auditors before the submission of the new year's budget.

Administrative Classification

Administrative classification refers to the organizational and hierarchical structure of public bodies. According to the plan of accounts defined by the P.D. 54/2018 three levels of information are defined, while the relevant coding includes 14 digits. Finally, in the new Public Accounting, as described in the P.D. 54/2018 the basic accounting rules governing account groups are defined in detail [13].

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Comparison of old and new Accounting in terms of information

The new Accounting of the Public Sector, as it is described in the P.D. 54/2018, has been designed with a different philosophy than the previous ones. Now, the implementation of a common accounting framework for all public bodies is proposed. This makes it easier to track and compare. It also includes different financial statements, which provide different information to the stakeholders [12].

The cash basis method of accounting for financial events does not give accurate information about the current financial year, since it records transactions when the payment or collection takes place and not when the event takes place. On the contrary, the diplographic method gives better and more accurate information, so that it leads to better financial management and decision-making. Furthermore, it is easier and more effective to control, which enhances transparency [3].

The need to modernize the Public Sector Accounting system

With the aim of strengthening the effective fiscal management and control of public bodies as well as limiting the existing pathologies and phenomena of mismanagement,

the need to transition, of all Greek public bodies, to a modernized accounting system is deemed imperative, in order to promote the transparency of financial transactions and the direct extraction of accurate data and financial data for liabilities and claims.

The main objective of accounting when applied in the fiscal area is the facilitation of fundamental social functions and control [14] of public sector entities given that public sector entities are not recommended for the purpose of profit but have as their purpose the provision of services and the maximization of social benefit. Although the wide variety of forms of public organizations and services bring accounting problems that may be of a different nature from those of private sector enterprises, the reform of the fiscal legislative framework is required through the preparation of a new unified accounting plan which will be implemented immediately , from the entire public sector and through which the application of uniform accounting principles, methods and procedures for processing financial data will be achieved [3].

The absence of accounting standards of public accounting such as IPSAS, imposes a significant cost on public bodies, implying at the same time the lack of reliable data, decision-making under conditions of incomplete information and the utilization of public resources in the wrong direction, with all that this implies for the entire economy [15].

As a first step for the effective management of public resources and the extraction of information of all kinds to be exploited is the establishment of the double-entry system as well as the application of the principles of accrual accounting in a uniform manner by all bodies of the General Government and the consequent transition to the double-entry system. The fragmentary application and fragmentation of the existing accounting plans and standards by individual sector, as well as the inability of some entities to implement the double-entry system in practice, must be replaced by a new framework for monitoring the financial statements of public entities. It is clear that the new draft of accounts must cover the information needs of the Greek Government and the

administrations of the individual agencies, while at the same time it must be suitable to provide reliable, immediate and in the requested form information to the various organizations such as Eurostat. In addition, the preparation and implementation of a single accounting plan for the entire General Government will strengthen the transparency of the financial management, the improvement of the quality of the data of the financial reports and the overcoming of the fragmentation that characterized the previous regime with the existence of five different accounting plans for the State, insurance funds, hospitals, Local Government Organizations and Public Law Legal Entities[11].

For the above reason, working groups were established in the General Accounting Office and in collaboration with the representatives of International Organizations, the new Unified Accounting Scheme was studied, resulting in the introduction and issuance of PD 54/2018 (Uniform Accounting Scheme for the General Government) [16].

Transition from the Haplographic System of Public Accounting to the Diplographic System: The required changes in Public Accounting, in the context of its adaptation to the requirements and needs of the Diplographic Method

Since accrual accounting fully records the assets and liabilities, as well as the income and expenses of an entity and is therefore the only generally accepted information system that provides a complete and reliable picture of the fiscal and financial situation and performance of a state, it is a necessity for its implementation to transition from the simple-style system of public accounting, where it is applied, to the double-style system. Accrual accounting implies entries not when cash payments are made, but when economic value is created, transformed, or amortized, or when claims and liabilities appear, transform, or are written off [17].

In this direction, it is necessary to carry out actions for the universal application and practical adaptation to the double-entry accounting system of all General Government

bodies (Central Administration, Local Government, Public Law Legal Entities, Public Health Units, Social Security Organizations, etc.), but also of all of the entities that belong to the public sector or are controlled by the State or are under the supervision of the State and are not part of the General Government [18].

The double-entry system on an accrual basis presents many advantages compared to the single-entry system and helps to gather and control and cross-check accounting information, to easily prepare the various Financial Statements and, above all, facilitates finding the financial result of the economic entity [19].

The project of the transition from the simple to the double-graphic system of the State bodies is a multidimensional undertaking which requires the allocation of human and financial resources, coordination and proper planning and organization based on specific implementation schedules. The establishment of a single Chart of Accounts for all bodies of the General Government in conjunction with Law 4308/2014 “Hellenic Accounting Standards, related regulations and other provisions”, will lead to the unification of accounting rules, codifying the accounting standardization introduced by the Hellenic General Accounting Scheme (GAS) in the past and will help to abolish the accounting polynomial, by concentrating all the accounting rules in a legislation structured on the basis of the best accounting practices. The new accounting rules entail reduced operating costs, while at the same time ensuring the ability to carry out essential controls. The financial statements of Public entities with the new legislation will become easier to understand by interested users, due to the alignment achieved with international accounting practices. Similarly, the accounting reform will strengthen accountability both through the introduction of an integrated administrative classification which will clarify the grid of responsibilities related to the management of public resources and through the adoption of accrual accounting rules which will lead to a reliable picture of the

financial management data and will negate the distortions associated with the use of cash accounting [20].

In addition, the establishment in the Greek Accounting Scheme of functional classifications is very closely related to the development of the performance budget. The working groups established at the General Accounting Office of the State in order to legislate a new Accounting Scheme in the Public Sector with application initially to the Central Administration, the various amendments of Law 4270/2014 led to PD 54/2018, to the new Administrative and Financial classification and in the preparation of the State Budget of 2019 with the new arrangements regarding the Central administration. The goal of the General Accounting Office of the State, the International Monetary Fund and the European Union is to address the reforms at all levels of the General Government so that the accounting reform integrates all treasury accounts into the system, developing net treasury accounts for the State and establishing the accrual basis accounting in the State [21].

At the same time, it is deemed necessary to prepare all the computerized support infrastructures of the new accounting system and configure them with the aim of uniformly recording and analyzing all accounting data with speed and reliability. The training of employees in the new system is required to be continuous and consist of theoretical and practical training. Finally, the cooperation of the employees of the financial services both within the body and with other public bodies as well as with the Central Administration is considered particularly important [8, 12].

The advantages of implementing I.P.S.A.S. for Greece

The application of International Public Sector Accounting Standards has brought about a series of advantages for all the states of the world which were mentioned above and are

related to the level of reliability, accountability, validity of financial information, improvement of relations between states, fiscal stability, and more. In the case of the Greek Public Administration, the advantages remain the same and additional benefits are added, which are related to the peculiarities of the Greek environment, such as [3, 8, 10, 12]:

- providing optimal quality of the information provided,
- more correct making of government decisions,
- optimal allocation of production and financial resources,
- reduction of the operating costs of the Public Sector,
- improvement of international relations with the eurozone countries,
- easier conclusion of transnational agreements,
- strengthening the level of credibility of the country,
- development of the export activity,
- reduction of the Greek debt (57%) according to the European Central Bank,
- recording the actual debt of the country after the application of International Public Sector Accounting Standards,
- exit of the country to the International Markets,
- release of liquidity,
- easier conclusion of loan agreements with the European Central Bank,
- strengthening the accountability and credibility of the rulers and the wider Public Sector,
- improving the internal environment of the Greek Public Administration through valid and timely, reliable information,
- correct drafting of the country's financial statements,
- possibility of comparing the Financial Statements of the states,

- strengthening the management of the country's Cash Available, strengthening the country's credibility with international assessment bodies,
- attracting foreign investment.

In conclusion, the adoption of International Public Sector Accounting Standards offers a series of benefits for the Greek state, which reflect not only the content of the Public Sector but also the interior of the country, as the creation of more than 400 thousand jobs is expected in two years after the implementation of the Standards. The strengthening of the level of employment is expected to provide social robustness, economic growth and stability, voter confidence in government decisions, as well as a universal feeling of security and reliability for the course of the country [22].

The required adoption procedures of I.P.S.A.S.

The adoption of International Public Sector Accounting Standards requires at least a preparation of a three-year basis for accounting systems that did not follow the accrual basis accounting method until then. The long period of time foreseen for the harmonization of the National Financial Statements is due to the modification of the content of the entity and not only to the fiscal system it follows. In the case of the Greek Public Sector, that is, the adoption and implementation of I.P.S.A.S. it presupposes the overall modification of the content of the bodies of the General Government in combination with the modification of their accounting system as well as the imposition of a common fiscal practice in accordance with the requirements of the accrual [23].

Next, the necessary conditions in order to adopt the International Public Sector Accounting Standards that Greece must take into account are the following [3, 8, 10, 12]:

- the translation of International Public Sector Accounting Standards into Greek,

- the staffing of the Services with appropriate personnel adapted to the requirements of the International Accounting Standards,
- the common acceptance of the effectiveness of these Standards by the executives of the Public Sector,
- the transmission of knowledge about the D.L.P. Public Sector between employees,
- the training of all financial executives of the Public Administration, as well as government personnel,
- the start of the inventory process of all the Assets of the Greek state,
- the creation of a Register of Fixed Assets with the foreseen control of Fixed Assets and Liabilities,
- the integration of Internal Control Systems regarding the Preparation of Financial Statements,
- the control of the National Financial Statements by External Auditors,
- the integration of Modern Information Systems integrated with each other throughout the spectrum of Public Administration,
- the search for additional Financial Support from International Agencies and through the Public Investment Program to provide support in order to support co-financed programs,
- the proper and effective management of the required available resources in order to achieve the adoption of the I.A.S. of Public Sector.

The Adoption Procedures of IAS by the Greek Public Administration

The smooth process of adopting the Public Sector Accounting Standards is long and the steps that should be taken are quite complex. In this case, the simultaneous implementation of Presidential Decree 54 of 2018, in combination with the implementation of the Greek public accounting plan as provided by law 4270 of 2014.

The transition to the real environment of I.P.S.A.S. may not be able to be achieved on the scheduled date, due to a series of factors, and procedures which have not yet been initiated by the Greek Public Administration. More specifically, the procedures for harmonizing the Financial Statements must have been completed in a smooth manner, detailed planning, already one year ago in accordance with the requirements of this Presidential Decree. In other words, the adoption of the Public Sector Accounting Standards on January 1, 2023 presupposed the preparation of the Financial Statements of the Greek Public Sector in accordance with the procedures provided for in Presidential Decree 54, already at the end of the previous year (31/12). The fact that this was not possible in the year 2022 primarily renders the implementation of this Presidential Decree incompetent. Subsequently, the accounting reform in question brings about a series of measures that must be taken in order to carry out said adoption [3].

The reforms concerned [3, 8, 10, 12]:

- making governmental decisions,
- the form of government policy,
- the institutional changes regarding the uniform adoption of presidential decree 54 in all bodies of the General Government,
- strong political will,
- continuous training of Public Sector employees of all branches (and not only finance),
- recruitment of specialized personnel related to I.A.S.,
- as well as an increase in the budget related to the upcoming accounting reform,
- development of the Information Systems plan and their integration in all Public Sector bodies,
- following the integration of the Integrated Management Information Systems (MIS) in order to provide immediate, reliable, timely and valid information,

- recruitment of personnel related to the management and support of Information Systems,
- coverage of the total cost of implementing the above process of adopting International Accounting Standards,

as well as the uniform and imperative need to apply an accrual basis to the entire Public Sector. The above are the most basic amendments that should be taken by the Government, the Public Administration and are related only to the current Greek environment and not to the exclusive adoption procedures of I.P.S.A.S., which are published by I.P.S.A.S.B. and I.F.A.C.

Conclusions

According to the results of this research, the implementation of an Accounting System of internationally recognized Standards with the approval of the European Central Bank and the World Accountants Community is deemed necessary for economic development, stability, accountability, reliability, the possibility of international collaborations, the disbursement loans and the improvement of the country's international relations.

Nevertheless, the Greek Public Administration appeared unprepared for the upcoming procedures, as the reforms it has carried out are actually at an early stage and further development of their procedures is required. More specifically, the institutional reforms that the Greek Public Sector has taken in order to develop its Financial Statements procedures are characterized by stagnation and a lack of preparation in relation to the actions taken for the adoption, but also the implementation of I.P.S.A.S. in the United States of America, in Australia, and even in several of the Eurozone countries, but even in some developing countries in Africa, Asia, Central and South America [24].

The Greek Public Sector shows a difference in its accounting system as its agencies are governed by five different accounting systems. At this point, the issuance of Presidential Decree 54 (P.D. 54, 2018) and Law 4270 (law 4270, 2014) were institutional reforms of decisive importance, giving “breath” to Accounting Standardization in the country. However, their implementation proved to be a difficult task and the delay of the upcoming reforms, which are related to the evolution of the Public Technology Sector, the training of the staff and the change of the overall mentality for I.P.S.A.S. effectively making their adoption in early 2023 infeasible [8].

In conclusion, a first approximation of the International Accounting Standards could possibly be carried out from January 1, 2026 according to the instructions of the International Accounting Standards Board, on the condition of their wide acceptance by all the executives of the Public Administration and the Governors and with the completion of the valuation process of the assets of the Greek state.

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Perceptions and attitudes in the period of the pandemic by the vine growers of the Region of Western Macedonia

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Covid-19 has evoked memories similar to the financial crisis of 2008, causing dire consequences at a global level. The reduction of jobs in the food service and trade sectors and the decline in income are some of the effects it has brought about. The negative conditions did not take long to emerge in Greece, where government policies to support liquidity for businesses and households were aimed at economic growth. At the same time, the Region of Western Macedonia, relying on the primary sector, is increasingly evolving in the cultivation of vines and in wine production in order to improve the living standards of the region. Agriculture, wineries and wine tourism played a leading role at local level and have created new jobs during the pandemic period. The aim of this study is to explore the perceptions and attitudes of vine growers in the Region of Western Macedonia regarding the impact of the recent health crisis on their business activity. An appropriately structured questionnaire was developed for the needs of the research. The questionnaires were completed using the personal interview method by a total of 107 vine growers. The statistical program SPSS (Statistical Package for Social Sciences) was used for the statistical processing of the survey data. According to the findings of the survey, most vine producers in the Region of Western Macedonia claim that they would not change their farming profession and that grape production is a profitable activity in the region. Also, as their income decreases, farmers are forced to invest in existing crops to make them more profitable. Finally, about half of the respondents agreed that more opportunities for viticulture have emerged and helped them to cope with difficult conditions and enhance the viability of their farms.

KEYWORDS: Farmers' attitudes, Vine growers, Covid-19, Region of Western Macedonia

1. Introduction:

Covid-19 has brought to the forefront dire consequences worldwide similar to those brought about by the financial crisis of 2008. Due to its outbreak in February 2020, human lives were put at risk and it caused economic, social and political costs. Jobs were reduced since presence in the workplace was not necessary, supply chain issues were created and consumption patterns changed. The problems during the health crisis also appeared in Greece and the agricultural sector was not unaffected. The storage of food by citizens, the increase in demand for basic goods, while other products remained unsold, as well as the closure of some hotels, catering and bars led to situations that were not easily dealt with (Lioutas & Charatsari, 2020).

The pandemic restricted the movement of people, goods and services but farmers and ranchers could move more easily in the prolonged lockdowns it imposed. However, Covid-19 affected the food supply chain and resulted in a reduction in food production capacity. There was a need to mitigate the problem in the agri-food sector and maintain food security so that such crises and disruptions could be addressed (Hakim Achmad, et al., 2021).

Many states made an effort so as to preserve agriculture, goods and markets. Short-term lock down can have long-term effects on producers. It was therefore necessary to limit the impact of the health crisis on the food supply system and strengthen its resilience (Roubik, et al., 2022). In Australia and New Zealand, the agri-food system was resilient. In particular, success was achieved in industries that had high technology, networking, experience and logistical infrastructure (Snow, et al., 2020).

According to a research report conducted in Washington State, at the time of the pandemic, digital transformation of farmers was essential. The use of Information and Communication Technology was useful so that they could connect to the internet and sell their products. In some cases some workers could not cope and follow this kind of transformation. A positive surprise was the strategic role of young people in agriculture where they used ICT to adapt and successfully manage the health crisis (Centeno & Garrido, 2022).

Also, many new digital platforms have increased in number and use. In particular, in Melbourne, Australia, research was conducted to investigate whether entrepreneurial farmers understand and use digital platforms (digital entrepreneurship). Findings

reported that, the use of the digital platform led farmers to communicate with their supply chain network about any inventory or new processes that could be added. Also, rural farm entrepreneurs would be considered digitally literate and could engage with urban entrepreneurs more easily especially in times of similar situations (Ratten, 2022).

Consumers turned to basic products which farmers and livestock farmers sold either directly to final consumers or to businesses, or online, without the intervention of brokers. Also, a study conducted in California found that farmers who belonged to online farmer networks and were relatively younger (under 55 years old) were more resilient to the impact of the health crisis. On the other hand, small, medium and socially disadvantaged producers were unable to reap any benefits during the pandemic (Durant, et al., 2022).

In addition, producers were faced with a shortage of land workers, the need to balance supply and demand of products, changes in the marketing points of goods and other operational issues. However, there were farmers who were not digitally aware (online store, online communication and social media) in trying to achieve sustainability of their farming business as they were at a disadvantage (Schreiber, et al., 2022).

The health crisis has increasingly demonstrated the useful role of producers in food supply. Some issues that have negatively affected them are the lack of cooperation between traders and producers, low productivity and product quality, lack of technical support and human resources. From the traders' point of view, the crisis had a negative impact and was characterised by a lack of communication between farmers and a lack of need for change, for digitalisation, on the part of farmers (Stojcheska, et al., 2021). A study in India revealed that during the pandemic the share of exports in agricultural gross value added increased while the share of agricultural imports decreased. Also, what would help the food chain to grow are improved infrastructure, trained human resources and supporting facilities. These have resulted in achieving production efficiencies so that prices increase and products become more competitive in the international market (Kumar, 2021). Positive changes have taken place in Uzbekistan in recent years, such as the creation of various clusters and the development of traditional branches of agriculture. In the period 2021-2022, the government focused on improving logistics so that exports would also increase (Sirojiddinov & Sirojiddinov, 2021)

In addition, the value of migrant labour has been recognised and valued. In particular, migrants due to the prolonged lock down returned home. Because of this phenomenon, various sectors of the economy were affected. The agricultural sector seems to have been mostly affected. In order to reduce the labour shortage, the governments of various

countries have proposed solutions either by providing support packages to businesses or by encouraging seasonal work, starting with a more flexible procedure for migrants to enter the various countries to work (Ramakumar , 2020).

As far as particular products are concerned, fresh fruit is beneficial to human health. But some fruits have a short shelf life. During the pandemic the virus could remain on the surfaces of fruit and vegetables for some time, so the use of environmentally friendly antimicrobial edible coatings became necessary to deal with similar situations. (Ghosh & Singh, 2021). In addition, agricultural products such as milk, vegetables, fruit, meat and fish were not unaffected during the pandemic due to their specific storage and preservation characteristics. In order to address all of the above, the Food and Agriculture Organization of the United Nations (FAO) proposed at that time the active packaging of fresh foodstuffs, which had the effect of preserving and improving their condition (Pascuta & Vodnar, 2022).

Still, the emphasis on food during the pandemic and its use by people as a stress reduction and coping mechanism led to research into food advertising in America. The emphasis that food advertisements placed on family and friend relationships showed the importance of these products during the prolonged lock down (Danowski, 2022). The changes in consumption patterns that affected the agricultural sector and the management of Covid-19 by government policies in Burkina Faso, Colombia and France did not ultimately mitigate climate change. The supply and demand of some agricultural products has been modified, but the opportunity for more sustainable and resilient agricultural systems, under environmentally friendly conditions, have been missed (Andrieu, et al., 2021).

Impact of the pandemic on Greece and producers

The pandemic has once again brought about a global economic crisis. Its impact on unemployment (including among young people) is a negative feature. Also, the tourism sector was one of the sectors most affected during it. In particular, the total number of nights spent in tourist accommodation in the EU fell by 50.5% between 2019 and 2020 and the 5.9% contraction of value added in Europe in terms of output in 2020 created the need for policy makers to design an action plan (Eurostat regional Yearbook , 2022).

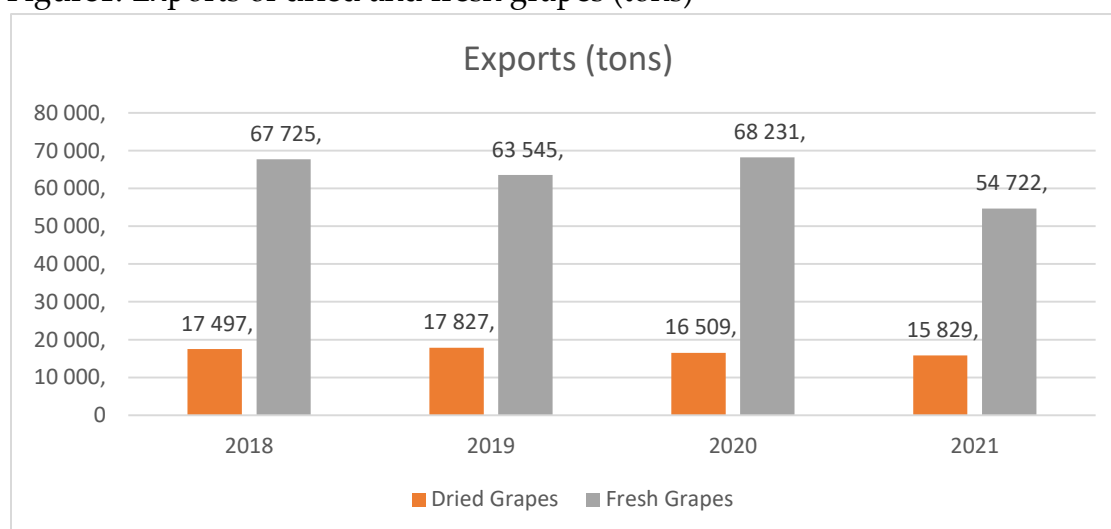
In Greece, GDP per capita in 2020 was less than 50% of the EU average, in six of the regions. Also, the decrease in value added in 2020 was recorded in the South Aegean region (22.2%) and the Ionian Islands (20.5%). In 2019 there were regions in Greece where gross value added from agriculture accounted for at least 60% of total economic

performance, namely Thessaly (12.4%), Peloponnese (11.4%), Western Greece (8.7%) and Western Macedonia (8.4%) (Eurostat regional Yearbook , 2022).

The pandemic disrupted the vine market throughout the European Union. In particular, supply chains and points of sale of products in the market and in the catering sector such as bars, restaurants and hotels were disrupted. In addition, the lack of human resources and the difficulty of harvesting grapes are some of the issues that had to be addressed because they resulted in financial difficulties and liquidity problems for producers. Government policies with aid helped farmers to cope with the excessive difficulties. Producer organisations can also use operational programmes for the vine sector to reduce difficulties and increase its resilience (Official Journal of the Union, 2020).

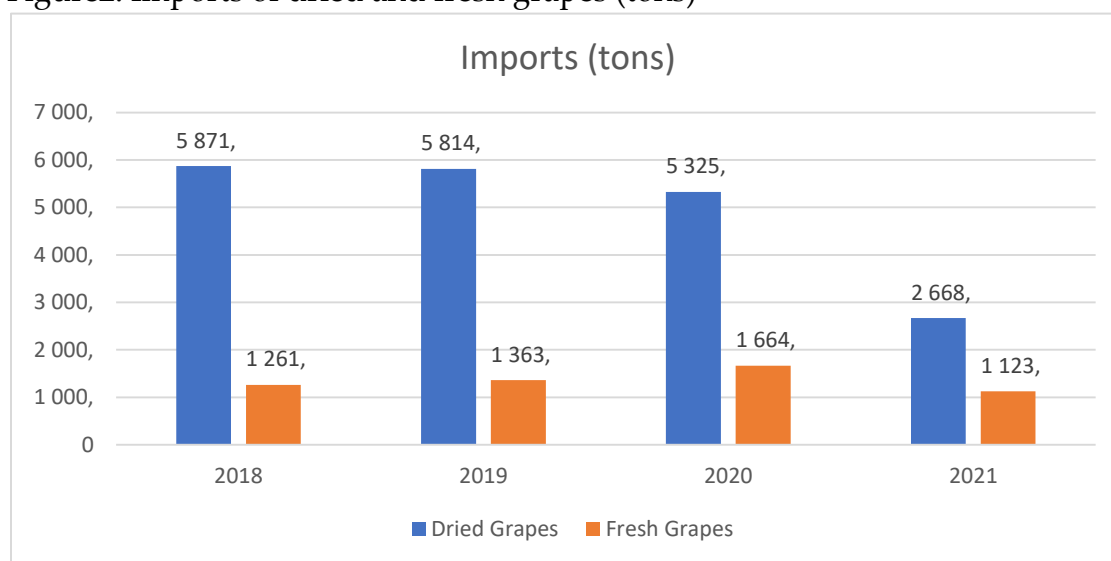
Figures 1 and 2 analyse the exports and imports of dried and fresh grapes over the last four years from 2018 to 2021 in Greece. Specifically, according to the International Organisation of Vine and Wine, exports of fresh grapes and dried grapes in 2021 compared to 2018 decreased by 13,003 tons and 1,668 tons respectively whereas, imports of fresh grapes in 2020 increased by 403 tons compared to 2018. (International Organisation of Vine and Wine, 2022).

Figure1: Exports of dried and fresh grapes (tons)



Source: International Organization of vine and wine

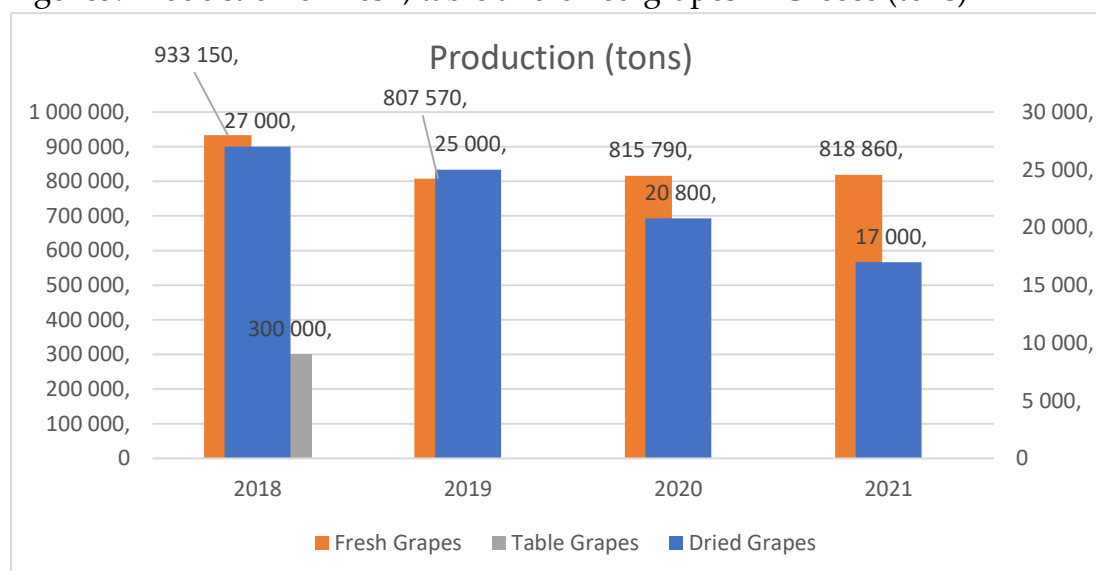
Figure2: Imports of dried and fresh grapes (tons)



Source: International Organization of vine and wine

In addition, Figure 3 analyses the production in tons of fresh, table and dry grapes in Greece for the years 2018-2021. The production of fresh grapes in 2021 compared to 2018 shows a decrease of 114,290 tons (12.24%), while the production of dried grapes in 2021 shows a decrease of 10,000 tons (37.04%) compared to the same years (International Organisation of Vine and Wine, 2022).

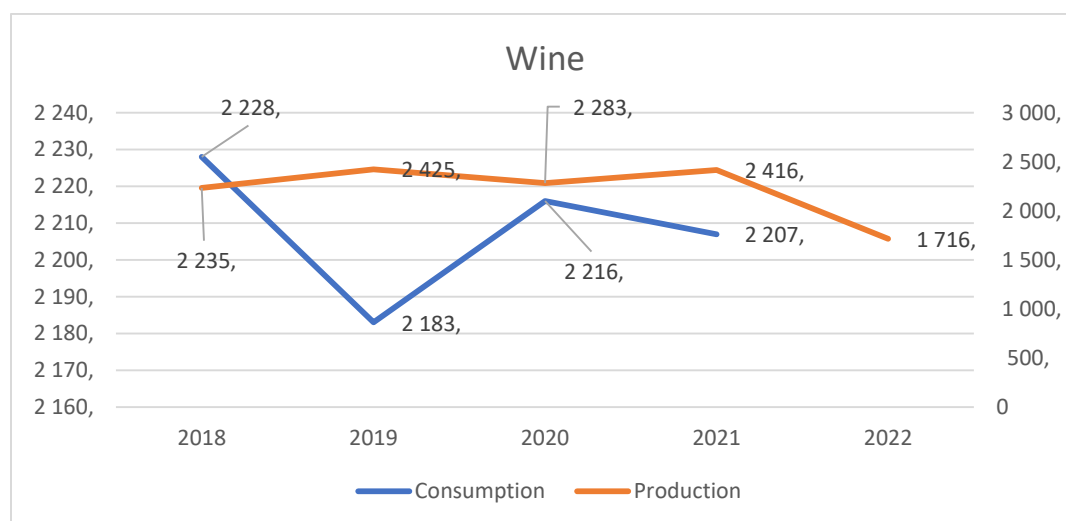
Figure3: Production of fresh, table and dried grapes in Greece (tons)



Source: International Organization of vine and wine

Figure 4 below describes the consumption and production of wine in Greece in the years 2018-2022. These years were chosen to understand the impact of COVID-19 on the wine sector. More specifically, comparing wine consumption in the pandemic period, i.e. in the years 2019-2020, increased by 33000 hl while production in the same years decreased by 142000 hl. This may be due to the fact that the restriction on travel brought about an increase in wine consumption since people were able to consume wine at home (International Organisation of Vine and Wine, 2022).

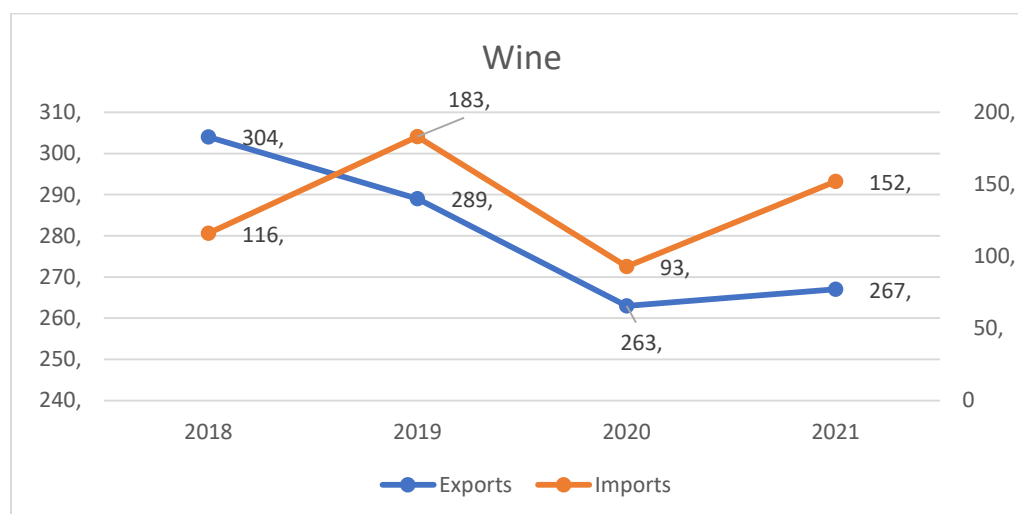
Figure 4: Wine consumption and production 2018-2022 in 1000 hl



Source: International Organization of vine and wine

On the other hand, Figure 5 shows the wine imports and exports for the years 2018-2021 in Greece. It is evident that in the year 2019 compared to the year 2018, pre COVID-19 in Greece, exports decrease by 15000 hl while imports increase by 67000 hl. After the year 2019, exports and imports follow the same course. That is, there is a decrease in the year 2020 compared to 2019 and then they increase without reaching the levels of 2018 yet (International Organisation of Vine and Wine, 2022).

Figure 5: Wine exports and imports 2018-2021



Source: International Organization of vine and wine

The vineyards of Greece are small in size and fragmented. For some growers, vines are not their main crop and usually come from inheritance. Greece is the 17th largest vine-producing country in the world. Florina and especially the Amyndeon plateau is the coldest vine-growing zone in the country. The dominant variety in this area is xinomavro and produces PDO rosé and sparkling wines, important for the sector (Wines of Greece, 2022).

The production of grapes for wine in tons in the Regional Units of Kozani, Grevena and Kastoria has been decreasing lately. While, in the Regional Unit of Florina, the production in tons of grapes for wine increased by 1.176 tons in 2019, compared to the year 2011 (Sapardani, et al., n.d.).

3. Research methodology

An appropriate structured questionnaire was prepared for the needs of the survey. The questionnaire consists of three parts. The first part records the demographic data and the second and third parts record the responses of the vine growers to questions about the health crisis. In particular, the second part includes the impact of the pandemic on viticulture in the region of Western Macedonia and the third part includes the reaction of the producers to the pandemic.

The questionnaires were completed using the face-to-face interview method among the vine growers of the region. In total, 107 questionnaires were collected and the Statistical Package for the Social Sciences (SPSS) software was used for statistical processing of the survey data.

The study involved 107 vine growers, of which 93.75% were men and 6.25% women. The educational level of the respondents consisted of 39.25% secondary school graduates and 40.19% high school students. 14.02% of the sample has a university education while 6.54% also hold a postgraduate degree.

The largest percentage of the sample (62.50%) belongs to the age group 36-55 years old, followed by the age group 56 years old and above with 31.25% and finally the age group 18-35 years old with 6.25% of the respondents. Regarding the years of employment in the agricultural sector, 37.5% have been employed for 11 to 20 years and 25% of the sample has been employed for up to 10 years. 18.75% of the respondents are employed from 21 to 30 years in the agricultural sector and the same percentage appears in the employment group of 31 years and above.

According to table 1 below, a large percentage of the sample 60.7% agree that more and more young people are practicing farming as a result of the pandemic and 67.3% agree

that they will continue growing grapes. In addition, about half of the sample respondents seem to be hesitant about the view that viticulture was more affected than other production sectors. This may be due to the fact that while the pandemic had a negative impact on the food supply chain on the other hand people did not stop consuming wine during the pandemic. Still, 55.1% of the sample considers viticulture to be a profitable production. This is justified because of the many wineries in the area. Local vine growers could sell their production to them without the elderly or digitally illiterate having to use the internet.

Table 1: Degree of agreement with the following questions

Degree of agreement with the following questions (1= Agree, 2=Neither agree nor disagree, 3= Disagree)						
	1		2		3	
	Frequen cy	%	Frequen cy	%	Frequen cy	%
Income reduction due to pandemic	69	64,5	26	24,3	12	11,2
More young people practicing agricultural profession due to pandemic	65	60,7	34	31,8	8	7,5
Agriculture affected more than other production sectors due to pandemic	37	34,6	49	45,8	21	19,6
Vine farming is profitable production despite the pandemic	59	55,1	40	37,4	8	7,5
More opportunities occurred for viticulture due to the pandemic	53	49,5	39	36,4	15	14

Continuation of vineyards due to pandemic	72	67,3	33	30,8	2	1,9
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Furthermore, in response to the pandemic, 57.9% of the sample disagreed with the view of changing occupation to a non-agricultural occupation. Meanwhile, about 1/3 of the respondents would not reduce the area of vineyard or other crops to cope with the difficult conditions brought about by the pandemic. Also, about 43.9% of the sample considers that one way of handling the crisis is to join a cooperative or producer group.

Table 2: Degree of agreement with the following questions

Degree of agreement with the following questions (1= Agree, 2=Neither agree nor disagree, 3= Disagree)						
	1		2		3	
	Frequency	%	Frequency	%	Frequency	%
Reduction of acreage of vine cultivation to address pandemic	33	30,8	37	34,6	37	34,6
Reduction of acreage of other crops to address pandemic	39	36,4	33	30,8	35	37,7
Investments in other crops due to the pandemic	66	61,7	31	29	10	9,3
Change of production direction due to the pandemic	24	22,4	41	38,3	42	39,3
Chose non – agricultural	20	18,7	25	23,4	62	57,9

occupation due to the pandemic						
Participation in a cooperative or group of producers due to the pandemic	47	43,9	40	37,4	20	18,7

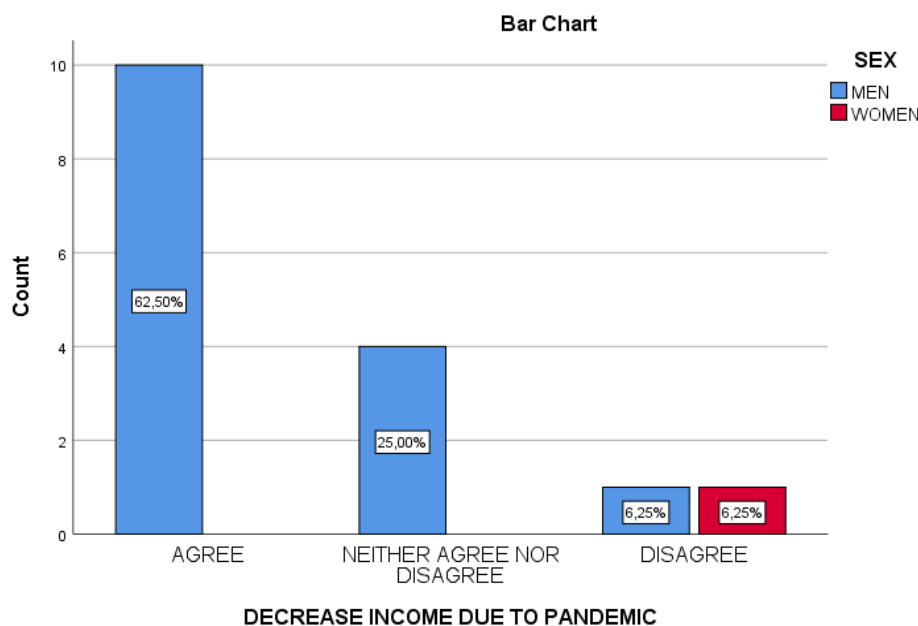
4. Results - Discussion

This section presents the results of the survey with various statistical tests. According to the Chi-squared statistical test, about 2/3 of the men in the sample agree that their income has decreased due to the health crisis. While, all the women interviewed disagree with this opinion. Their disagreement probably stems from the fact that their main professional activity is other than growing vines or other crops.

Table 3: Decreasing income due to the pandemic

Chi-Square Tests	Sex		
Decreasing income due to the pandemic	Men	Women	Total
Agree	62,5%	-	62,5%
Neither agree nor disagree	25%	-	25%
Disagree	6,25%	6,25%	12,5%
Total	93,8%	6,25%	100%
$\chi^2=7,467^a$, df=2, Sig.=0.024			

Figure6: Decreasing income due to the pandemic

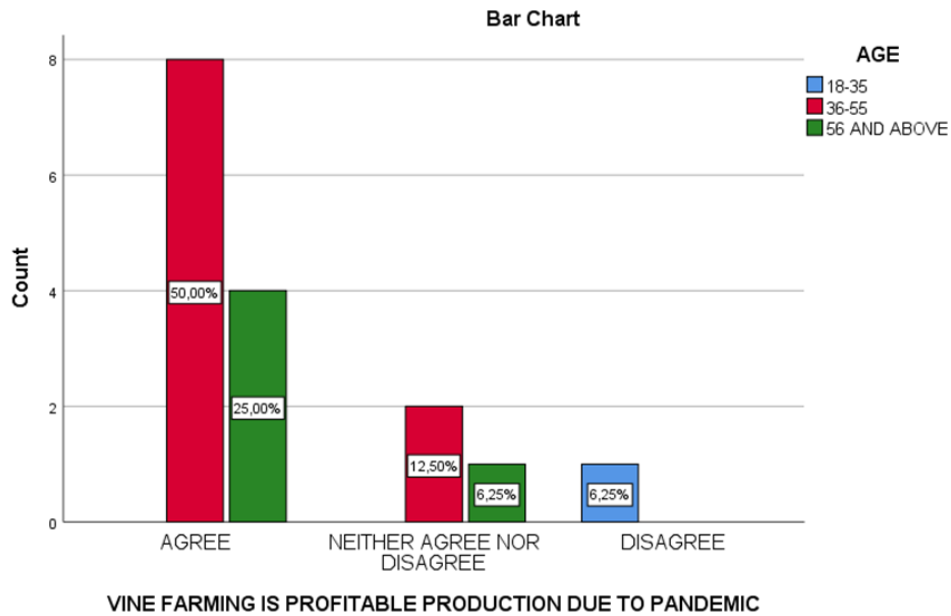


The question of whether viticulture is a profitable production was then addressed, with respondents' answers varying according to their age. 75% of the sample agreed with the view that viticulture is a profitable production during the pandemic and their age range was 36 years and above, in contrast to the younger age range of 18 to 35 years who disagreed. This may be because the younger people, due to their young age, had not faced similar situations and did not understand the opportunity creation that the crisis sometimes brings.

Table 4: Vine farming a profitable production

Chi-Square Tests	Age			
Vine farming is a profitable production	18-35	36-55	56 and above	Total
Agree	-	50%	25%	75%
Neither agree nor disagree	-	12,5%	6,3%	18,8%
Disagree	6,3%	-	-	6,3%
Total	6,3%	62,5%	31,3%	100%
$\chi^2=16,000^a$, df=4, Sig.=0.003				

Figure7: Vine farming is profitable production due to the pandemic

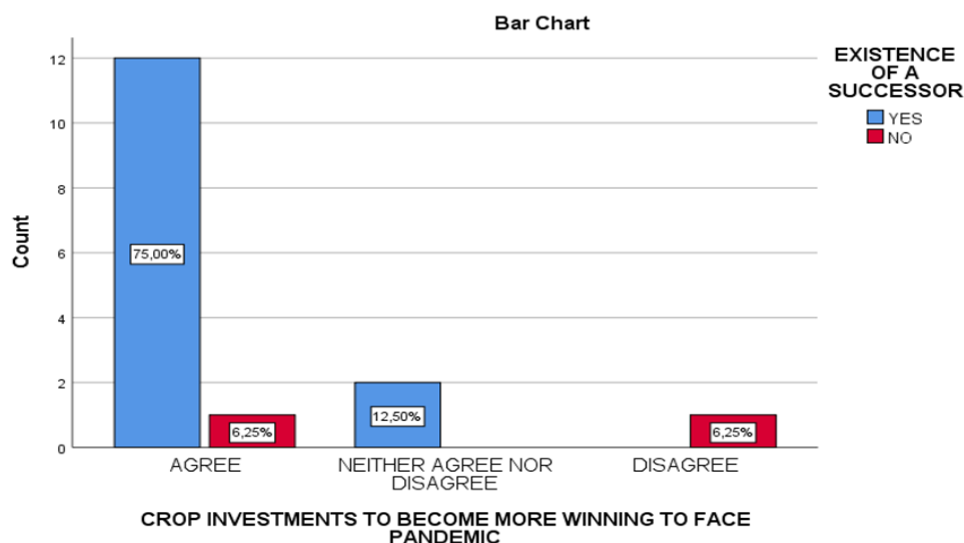


Then, it was examined whether winegrowers' responses regarding possible investments in other crops to become more profitable farms differed depending on the existence of a successor. 81.3% of respondents agree to invest in crops to address the economic problems brought about by the health crisis. While, the 6.3% who disagree with investments are people who have no descendants to succeed them on their farms hence, they show a lack of desire for new investments.

Table 5: Investments in other crops with existence of a successor

Chi-Square Tests	Existence of a successor		
Crop investments to become more profitable to face pandemic	Yes	No	Total
Agree	75%	6,25%	81,25%
Neither agree nor disagree	12,5%	-	12,5%
Disagree	-	6,25%	6,25%
Total	87,5%	12,5%	100%
$\chi^2=7,560^a$, df=2, Sig.=0.023			

Figure 8: Crop investments to become more profitable to face pandemic



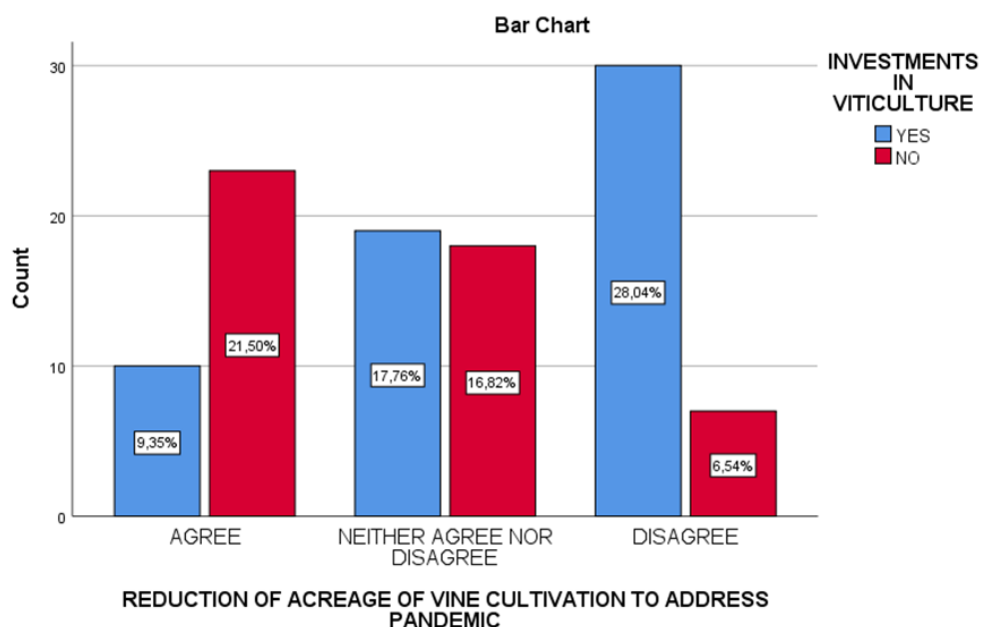
This is followed by the non-parametric Mann Whitney U -Test, where using ordinal degrees instead of equality of means, homogeneity is tested. That is, Table 6 formulates the statistically significant difference in the following variables according to the Mann Whitney U- Test.

Table 6: Investments in viticulture - Mann Whitney U- Test

Independent Samples Mann Whitney U -Test		
Group: Investments in viticulture		
Vine farming is profitable production due to pandemic	0,001	Reject the null hypothesis
Continuation of vineyards due to pandemic	0,000	Reject the null hypothesis
Reduction of acreage of vine cultivation to address pandemic	0,000	Reject the null hypothesis
Reduction of acreage of other crops to address pandemic	0,033	Reject the null hypothesis
Crop investments to become more winning to face pandemic	0,000	Reject the null hypothesis
Participation in cooperative or group of producers to address pandemic	0,000	Reject the null hypothesis

In particular, when producers were asked if they wished to reduce the area of vineyards in response to the pandemic, 28.04% of the sample disagreed, having made investments in this crop. It appears that viticulture in this region is a strong and promising industry and producers recognise this by investing in it.

Figure 9: Reduction of acreage of vine cultivation to address pandemic



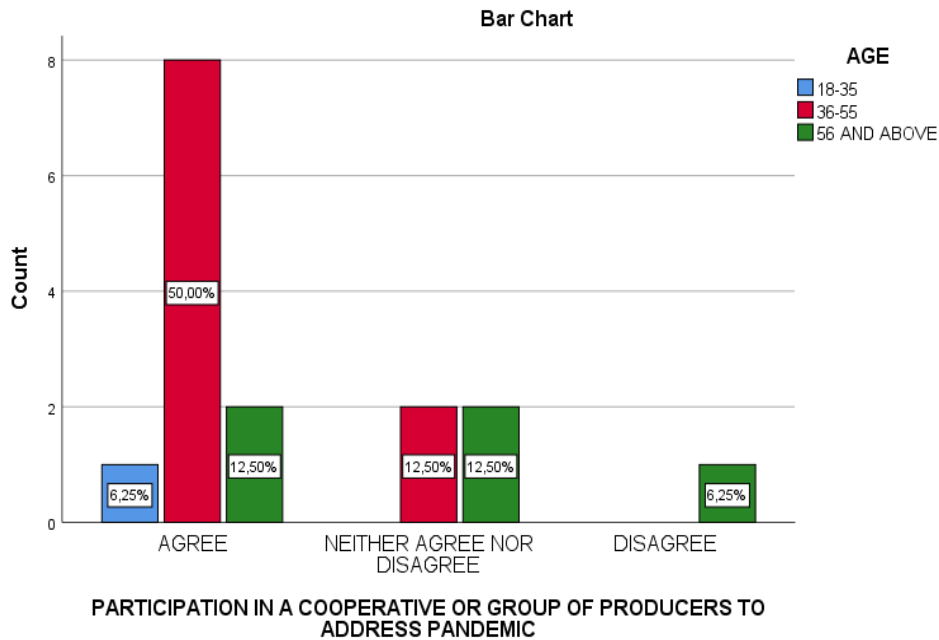
The results according to the Kruskal-Wallis statistical test show that there is a statistically significant difference between age and membership of a cooperative or producer group in response to the pandemic. Specifically, most in the sample 68.8% agree to join a producer group regardless of age group. While, very importantly, in the 18 to 35 age group all (6.25%) agree to participate in a collective business form such as a cooperative organization.

Table 7: Kruskal-Wallis Test

Independent Samples Kruskal-Wallis Test		
Group: Age		
Effects of excessive use of pesticides	0,001	Reject the null hypothesis
Multiple compliance should have been less stringent	0,032	Reject the null hypothesis
Continuation of the profession on their ancestors	0,012	Reject the null hypothesis
Likes to move to a city because of the quality of life it offers	0,035	Reject the null hypothesis

Participation in a cooperative or group of producers to address pandemic	0,026	Reject the null hypothesis
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Figure 10: Participation in a cooperative or group of producers to address pandemic



There is also a statistically significant difference according to the Kruskal-Wallis test with respect to the variables "reduction of acres of other crops to address the health crisis" and "educational level". As shown in Figure 11, about one third of respondents believe that reducing acres of other crops can help them address the negative economic impact of the pandemic. The highest percentage (19.63%) of respondents who believe this is high school graduates.

Table 8: Kruskal-Wallis Test with education level

Independent Samples Kruskal-Wallis Test		
Group: Education Level		
Reduction of acreage of other crops to address pandemic	0,042	Reject the null hypothesis

Figure 11: Reduction or acreage of other crops to address pandemic

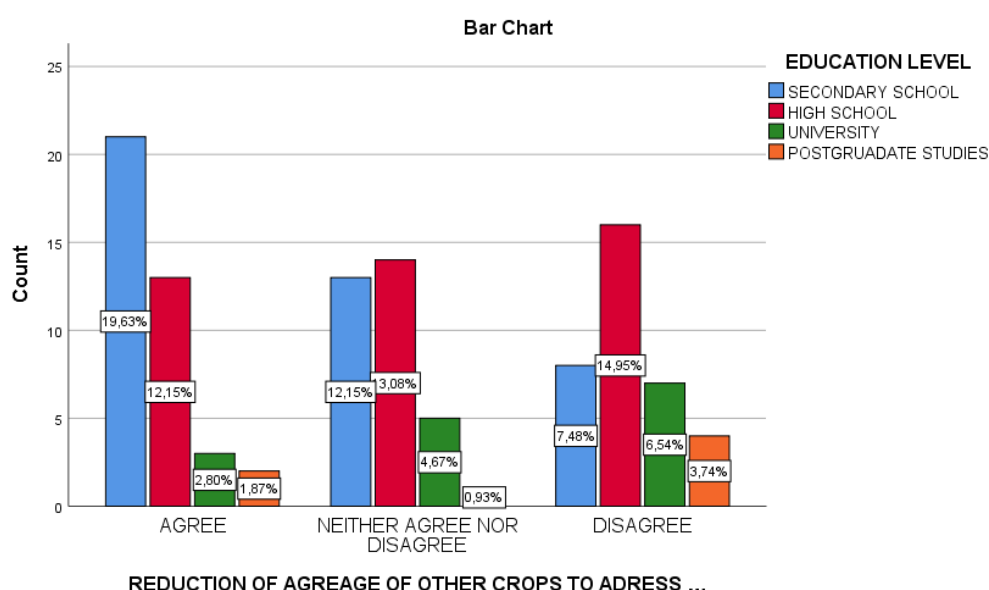


Table 9: Spearman's Correlation Coefficient

	Reduction of acreage of other crops to address pandemic
Reduction of acreage of vine cultivation to address pandemic	0,658**
	Sig 0,001

For the variables, reduction of acres of other crops and reduction of acres of vineyard to deal with the pandemic, the correlation coefficient is highly positive. According to the results of the Spearman correlation coefficient, when acres of other crops are reduced in response to the economic pressure caused by the pandemic, the acres of vineyards are also reduced.

4. Conclusions

This study explored the perceptions and attitudes of vine growers in the Region of Western Macedonia regarding the impact of the recent health crisis on their agricultural activity. The findings of the survey show that most vine growers in the Region of Western Macedonia would not change their occupation due to the problems caused by the pandemic and that grape production remains a profitable crop. However, in response to the health crisis, farmers are investing in existing crops to make them more profitable. For a period during the Covid-19 pandemic, trade was brought to a standstill. The food supply chain has been negatively affected due to transport difficulties (Swanson & Santamaria, 2021). It seems that the health crisis has influenced the views expressed by wine growers. In particular, the de-lignification of the region of Western Macedonia brought unpleasant consequences both locally and nationally. Businesses and households are trying to survive and emerge from this unfavourable climate. A return to social cooperative enterprises may be a viable solution (Sapardani, et al., 2022). While, as far as supply chain problems are concerned, the sale of grapes from local producers to wineries in the region helped vine growers to cope with the negative effects of the pandemic.

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Size and compositional effects of restrictive immigration policies

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1. Introduction

Vehement calls to restrict immigration and asylum policies are currently commonplace in many advanced economic countries (Danewid, 2021). However, it is not a new phenomenon since it started for instance in Europe in the early 1970s when large-scale labour immigration of the post-war's reconstruction period give rise to permanent settlement leading governments to adopt more stringent policies (Geddes and Scholten, 2016). In recent decades, immigration affairs gain more saliency as evidenced by the strong popularity of far-right parties and the avoidance of traditional parties to appear lenient towards immigration even if they were previously more favourable to it. For example, the traditional attachment of the US democrats did not prevent Hillary Clinton to explain in 2018 during a trip to Europe that the centre-left and Europeans need to adopt a tougher approach towards migration to stop Brexiters and Trump's momentum (Wintour, 2018)¹. This is so because of the enlarging gap between policy goals and outcomes regarding immigration which gives room to large public hostility towards immigrants and put pressure on policymakers to implement more restrictive policies (Hollifield and al., 2014; Ulceluse and Kahanec, 2019). The anti-immigrant media and elites also play an important role in this process by convincing voters that the presence of immigrants and refugees has detrimental effects on their social life and act as a burden on public resources (Helbling and Leblang, 2019; Ivarsflaten, 2005). Despite this apparent willingness to restrict entry and residence conditions mainly for low-skilled immigrants and asylum seekers, migrant-recipient countries have highly liberalised their policies towards high-skilled immigrants in recent decades (Cohen and Razin, 2008; Czaika and de Haas, 2017; de Haas and al., 2016). States enact specific measures aiming to attract them and they are highly desired in the labour market (Chiswick and al., 2011; Peri and al., 2015). In 2017, 44% of the 176 United Nations member states declared to set policies aiming to raise their current level of high-skilled immigrant workers (UN, 2017). This share has doubled compared to 2005 when only 22% had sought to increase it (UN, 2013). Nevertheless, since migration policies are made by "mixed bags" of measures, there is a considerable risk of over-generalisation of all immigrants (Akkerman, 2015; Czaika and de Haas, n.d.; de Haas and al., 2016). In addition, unlike selective policies, restrictions aim

¹<https://www.theguardian.com/world/2018/nov/22/hillary-clinton-europe-must-curb-immigration-stop-populists-trump-brexit>

to reduce the whole immigration whichever the skill type. Therefore, the effect of restrictive measures may expand beyond the unskilled immigrants affecting the same time skilled immigrants (Torche and Sirois, 2019). By impacting factors such as returns to skills in the host and the sending country and wealth constraints that determine migration decisions, restrictions may change the immigrants' skill composition (Bianchi, 2013). Even if targeted to a particular group of migrants, restrictions effects may spread to other categories of migration flows through four substitution effects identified by de Haas (2011) namely the "*spatial substitution*" redirecting migration flows to other countries with fewer restrictions, the "*categorical substitution*" occurring when migrants change channels through they enter in the receiving country, the "*inter-temporal substitution*" or "*now or never migration*" happens when migrants anticipate future restrictions of migration policies and the "*reverse flow substitution*" arises when restrictions deter return migration flows. Examining whether laws and decrees tightening immigrant's entries and residence come both at the cost of a reduction of the size flows and the skill content of immigration are the questions that motivate this essay. For years, several authors have investigated the impact of restrictive immigration policies and have resulted in mixed conclusions. While some authors (Beine and al., 2011; Czaika and de Haas, 2017; Mayda, 2010; Ortega and Peri, 2013) argue that restrictions significantly deter immigration flows, others (Helbling and Leblang, 2019) demonstrate that this effect occurs only when the unemployment is high in the destination country. In contrast to these studies, recent evidence (Czaika and Hobolth, 2016; McKay and Wright, 2008; Ulceluse and Kahanec, 2019) suggest that rather than reducing migration flows, tightened regulations lead potential migrants to deflect into irregular status or to change channels through which they get access into the host country. On the other hand, the empirical literature related to the skill composition effect of restrictions is scarce. To our knowledge, except for the theoretical contributions of Bellettini and Ceroni (2007), Bianchi (2013) and Canto and Udwadia (1986), only one study by Chen (2015) investigates empirically the impact of restrictive immigration policies on the skill composition of immigration flows. Using Difference-in-Difference (DID) techniques over the period 1860-1930, she finds that the skill-based restrictions enacted by the US government in 1882 namely the *Chinese Exclusion Act* give room to a decline in the aggregate skill of Chinese immigrants in comparison to the periods before restrictions were implemented. Furthermore, the occupational outcomes of restricted immigrants have also worsened. Our study presents key differences from these previous ones not only in data but also in the empirical strategy employed. We use bilateral data covering 20 OECD destination countries and 195 origin countries spanning from 1990 to 2010 at five-year intervals. This study provides one of the first empirical investigations into how restrictions affect the skill composition of immigration. The distinction we made between policy dimensions (external or internal regulations) and fields (family reunification, labour migration and asylum and refugees) is important for our increased understanding of how important the

effects of restrictions in regard to socioeconomic factors that may prevent immigrants from coming or attract them (Helbling and Römer, 2013). In addition, for a thorough analysis, we differentiate policy's effects by taking into account the origin of immigrants, the level of development of their origin country and whether the receiving country has or not a point-based system. Finally, unlike previous analyses, it controls for two sources of endogeneity bias namely the initial condition problems and the lack of independence between random intercept and covariates which lead to biased results especially in short panels by using a joint modelling approach proposed by Skrondal and Rabe-Hesketh (2014).

Using Poisson Pseudo-Maximum Likelihood (PPML) and instrumental variable estimation, the findings show that more restrictive immigration policies significantly reduce bilateral migration flows. But this effect holds only for destination countries without a point-based system and for migrants coming from low- and middle-income countries. Furthermore, government restrictions on internal and external regulations as well as those on policy fields of family reunification, labour migration and asylum are negatively associated with immigration flows. An estimation of a joint modelling approach with Stata's *-gllamm-* command reveals that restrictions favour the positive selection of immigrants especially when they are from low- and middle-income countries. The restriction of external regulations (financial requirements, language skills, quotas asylum, Application fee, age limits, etc.) tends to reduce it, while internal regulations (renewal of residence permit, free movement, work permit, etc.) improve the quality of immigration. For policy fields such as family reunion, labour migration and asylum, findings suggest that restriction's effects are not straightforward and may be different from one policy to another. The paper will follow the ongoing structure. In section 1 we present the estimation and the identification strategy. Section 2 describes the data and sources. In section 3, we interpret the results of the estimation while presenting the heterogeneity and robustness checks, and section 4 concludes.

2. Model and data

2.1 The size effect of restrictive immigration policies

To evaluate the size and the compositional effect of restrictive immigration policy, we estimate the following equation based on the gravity model:

$$\begin{aligned} \text{bilateral flows}_{odt} = & \beta_0 + \beta_1 \text{PolRestr}_{dt} + \beta_2 \log(\text{PopOri})_{ot} + \beta_3 \log(\text{GdppcDest})_{dt-1} + \\ & \beta_4 \log(\text{GdppcOri})_{ot-1} + \delta_1 \text{Contiguty}_{do} + \delta_2 \log(\text{Dist})_{do} + \delta_3 \text{ComLang}_{do} + \delta_4 \text{ColRel}_{do} \\ & + FE_o + FE_d + FE_t + FE_{ot} + \varepsilon_{odt} \end{aligned} \quad (1)$$

where the dependent variable is the bilateral migration flows (*Bilflows_{dot}*). The subscript *o* (*o*=1, 2,...,78) refers to the country of origin, *d* (*d*=1, 2, ..., 20) the destination country and

t ($t=1990, \dots, 2010$) the time. $PolRestr_{at}$ captures the degree of restrictiveness of the immigration policy of the destination country. We use the one lag of the *GDP per capita* as a proxy of the level of development both for the origin and the destination country. For the origin country, a high level of GDP per capita may act as a deterring effect for emigration by improving people's well-being or livelihood in their country. It could also be viewed as increasing the opportunity of moving since emigrants become more likely to support financial migration costs. The level of GDP per capita of the destination country may act as a pull factor, as well as the fact of sharing the same border (*contiguity*), sharing a common language (*ComLang*), having colonial ties (*ColRel*) and the geographical distance between a pair of the country (*Dist*). The introduction of the one lag of the GDP per capita of the host country is for instance consistent with the result of d'Albis and al., (2016). They show that a 1 per cent increase in the GDP per capita in France increases the immigration rate by 0,1993 per cent at the end of one year. Moreover, we introduce the population of the origin country as a control variable. Finally, our model includes a set of fixed effects capturing time-invariant (FE_o, FE_d) and time-variant (FE_t) characteristics. The second set of fixed effects combines year fixed effects with origin fixed effects (FE_{ot}) to control for factors that could stimulate migration flows such as drought, economic crisis, wars, and so on (Fitzgerald and al., 2014).

Poisson Pseudo-Maximum Likelihood model

A specificity of bilateral data is the high presence of zeros. They may be due to the absence of migration flows between a pair of countries, missing data (Robertson and Robitaille, 2017) or the fact that the number of migrants is quite weak to be counted. Under these conditions, considering the logarithm of bilateral migration flows could lead to important losses of information that could affect the quality of our estimation. Furthermore, Silva and Tenreyro (2011) have shown that, in these conditions, the use of the Ordinary Least Squares or Tobit models generates a large bias that tends to persist even when the sample size increases. Thus, they propose the use of the Poisson Pseudo Maximum Likelihood (PPML) estimation to overcome the bias; which, moreover is more robust in the presence of heteroscedasticity (Czaika and De Haas, 2013). Another way to handle the high presence of zero on bilateral data consist of adding one to the annual migration flows to avoid losing information from the zero migration pairs (Ortega and Peri, 2013). We use it as robustness checks to verify if results are sensitive to the change in the measure of annual migration flows.

Instrumental variable estimation

The estimations of the size effect of restrictive immigration policies are not immune to endogeneity problems mainly to simultaneity bias. Actually, a less or more restrictive immigration policy can have significant effects on migration flows. Alike, an important

number of migration flows could be an incentive for destination country's policymakers to toughen immigration policy. Rather than substituting the suspected explanatory variable by its lagged values to avoid simultaneity problems which is an inconsistent and widespread practice (see Reed, 2015), we tackle this econometric issue by resorting to an instrumental variable approach. We choose two variables as instruments namely the one-year lagged restrictive immigration policy index and the type of electoral system of the destination country rather. To be valid, the two instruments should be consistent with relevance and exogeneity criteria. The first condition implies a strong correlation between the immigration policy index and the two instruments. While the second refers to an absence of correlation between instruments and the error term or the dependant variable. Two reasons justify the use of the lagged immigration policy as an instrument. Firstly, since we use five-year interval data, the one-year lag implies that the immigration policy of five years ago directly affects the current immigration policy but does not have a direct effect on the contemporary immigration flows. Actually, the saliency of the immigration issue during the recent decades in most developed countries mainly fuelled by politicians, media and anti-immigrant parties, five years are quite enough so that a shift happen at least in one component (family reunification, labour migration or asylum/refugees) of our immigration policy index. Thus, the policy index is different from year to year and this is verified in all destination countries of our sample except in Ireland and Sweden where policy has not changed respectively between 1990 and 1995, and between 1995 and 2000. This means the current immigration flows are directly affected by the actual immigration policy and not by the five years ago immigration policy which has changed to some extent meantime. Secondly, Reed (2015) shows both theoretically and empirically that when the endogeneity bias relates to simultaneity problems, using the lagged values of the suspected explanatory variable as an instrument produces consistent estimates on the condition that it does not belong themselves in the respective estimating equation. Our second instrument is the electoral system variable. It comes from the Comparative Political Data Set and is coded 1 if the destination country has a proportional representation system and 0 otherwise. Immigration to some extent contributes to enlarging the fiscal base in the destination country, but it also produces winners and losers. To be supported by nationals, the gains from immigration should be used to compensate losers (Rodrik, 2011). The latter may take the form of public goods or monetary transfers and its extent varies depending on the type of electoral system prevailing in the host country (Russo and Salsano, 2019). Several theoretical and empirical studies, for instance (Austen-Smith, 2000; Breunig and Busemeyer, 2012; Chang, 2008; Gagliarducci and al., 2011; Iversen and Soskice, 2006; Morelli and Negri, 2017; Persson and Tabellini, 2004, 2005) suggest that proportional representation² in

² In a proportional representation system (Luxembourg, Denmark, Czech Republic, Germany, etc.), the number of seats assigned to each political party is proportional to its vote share.

comparison to other systems redistribute and spend more in public goods. In light of these findings, we argue that compensations are more likely to be significant under proportional rules and this is not without consequence for immigration policy as shown by Russo and Salsano (2019). They state that in plurality systems³, compensations are only targeted in a few decisive districts that allow the policymaker to win the election or look like pork-barrel spending. Conversely, in a proportional representation system (PR), compensations are not geographically biased and cover a wide range of beneficiaries including immigrants who cannot be excluded based on their nationality. Thus, the policymaker reaps small net benefits after compensation in a proportional system, in comparison to a plural system. This leads policymakers to favour a tough immigration policy as immigration per se is not advantageous for him electorally and economically (Russo and Salsano, 2019). Furthermore, in an analysis of the interplay between the electoral system, taxation and immigration policies, Morelli and Negri (2017) find a strong relationship between countries with proportional representation and their immigration policies. But to the best of our knowledge, no study establishes a direct link between the electoral system and bilateral migration flows. Even though the results of the first-stage regression satisfy the exogeneity and relevance criteria for these two instruments, findings need to be interpreted with caution.

2.1 The skill composition effect of a restrictive immigration policy

To identify the effect of restrictive immigration policy on the positive selection of immigrants, we employ the following specification:

$$y_{it}^* = \alpha_i + \beta X_{it} + \theta_t + \delta B_{od} + \mu_{it} \quad (2)$$

where y_{it}^* is the latent variable equal to 1 if the ratio of high to low-skilled migrants is higher or equal to 1 (positive selection) and 0 otherwise; X_{it} is a vector of time-varying variables related to the origin and destination country such as the per capita GDP, restrictive immigration policy index, and the population size. θ_t is a year fixed effect. B_{od} is a vector of time-invariant bilateral covariates such as the distance between the origin (o) and the destination (d) country, having colonial ties, and sharing a common language or a border. μ_{it} corresponds to the error term. These variables have been chosen referring to the existing literature. For instance, Grogger and Hanson (2011) show that contiguity and colonial links reduce the skills of emigrants; while sharing a common language tends to increase it. Likewise, Belot and Hatton (2012) argue that colonial legacies, distance and cultural similarities determine more the educational selectivity of emigrants than selective immigration policy or wages. The two studies are about the OECD countries.

³ In a plurality system (Canada, United Kingdom, United States, etc.), the member of parliament of a single district is elected following a winner take all rule.

2.1.1 Correlated random effect model

The equation might be estimated using a random-effects approach. This situation assumes an absence of correlation between explanatory variables X_{it} and time-invariant unobserved effects α_i . This assumption is implausible in most cases (Sander, 2007) since it is unlikely that a country's immigration policy or GDP per capita may not be linked to unobserved effects related to the labour market or economy in general. Second, when the number of the period (T) is small, using a random-effects or unconditional fixed effect estimator, as well as ignoring heterogeneity (α_i) leads to persistent biased which tends to reduce with T (Greene, 2004). Alike, the use of the logit fixed-effects does not allow the introduction of time-constant variables such as distance between countries or the fact of sharing a common language (Wooldridge, 2019). Accordingly, we opt for a *Correlated Random Effect model* of Mundlak (CRE) which allows the correlation between the unobserved heterogeneity (α_i) and the explanatory variables by introducing the within-means of the independent variables as determinants so that

$$\alpha_i = \rho \bar{X}_i + \omega_i \quad (3)$$

where \bar{X}_i is the average of the explanatory variables over time and ω_i is the true random effect non-correlated with covariates. Therefore, the equation to be estimated is

$$y_{it}^* = \beta X_{it} + \theta_t + \delta B_{od} + \rho \bar{X}_i + \omega_i + \mu_{it} \quad (4)$$

This approach allows for the introduction of time-constant variables (contiguity, colonial relationship, distance, common language, etc.) and is a synthesis of the fixed and random effects approach (Wooldridge, 2019).

Solving the initial conditions problem and endogeneity bias

The estimation technique described above does not take into account the endogeneity of the initial conditions (Heckman, 1981) which derives from the lack of independence between the first observed value of the dependent variable and unobserved individual effects or its previous observations. As Grotti and Cutuli (2018) state: "*the initial condition problem refers to the fact that the initial period y_{i0} that the researcher observes might not (and realistically does not) correspond to the beginning of the stochastic process leading to the experience of the outcome. More precisely, while the researcher observes the values in the response variable for the period $s = 0, \dots, T$; the stochastic process starts at period $s < 0$.*" For example, it means that being positively selected for an immigrant in 1990 is independent of unobserved motivation, talent or ability. Wooldridge (2005) argues that this assumption of independence is strong and results in inconsistent estimates. We fix this problem by estimating a dynamic random effect probit model developed initially by Wooldridge (2005) and improved by Rabe-Hesketh and Skrondal (2013). Indeed, the Wooldridge foundational's solution consisted of using as regressors the initial dependent variable and the time-varying explanatory variables (Lee, 2016). Rabe-Hesketh and Skrondal (2013) argue that this method gives room to severe bias and propose an alternative one

consisting of including as additional regressors the initial period value and within-means of time-variant explanatory variables, as well as the initial period value of the dependent variable (Grotti and Cutuli, 2018). Lastly, another problem related to models with latent responses is the endogenous bias arising from the correlation between explanatory variables and the random intercept or the joined effect of omitted time-constant covariates (level 2 endogeneity). This leads to inconsistent estimates particularly in the short panels as in the case here. We use the *joint working approach* developed by Skrondal and Rabe-Hesketh (2014) to handle this problem. They propose an auxiliary model which consists of regressing the random intercept and therefore omitted time-constant covariates on the mean of the time-varying covariates. This allows the correlation between the random intercept and time-varying covariates to be constant over time. In that way, the approach results in consistent estimates for the coefficient of the time-varying covariates and the lagged response variable even if there is a level 2 endogeneity (Skrondal and Rabe-Hesketh, 2014). This is our favourite estimation as it fixes simultaneously initial condition and endogenous covariates problems. This method is all the more useful because it makes it possible to take into account time-invariant covariates other than bilateral regressors (distance between countries, the colonial relationship, common language, contiguity) that are likely to affect migration flows.

3. Data

3.1. Data sources and variables

In this work, we combine data from several sources and build a panel data set covering 78 origin countries and 20 OECD destination countries spanning from 1990 to 2010 at five-year intervals. The included OECD countries are Austria, France, Germany, United States, Australia, United Kingdom, Canada, Denmark, Finland, Sweden, Spain, Italy, Portugal, Switzerland, Greece, Ireland, Luxembourg, Netherlands, Norway and New Zealand. The availability of immigration flow data, mainly by educational attainment level into a long period and a wide range of origin and destination countries dictate the selection of the country sample.

3.1.1 Dependent variables

To measure bilateral migration flows, we use the global matrix of bilateral international migration flows provided by Abel and Cohen (2019); which is, to our knowledge, the only existing one. Data are available for pairs of 200 countries for five-year periods between 1990 and 2015. Bilateral flows are estimated from annual migrant stock data provided by United Nations by applying the Pseudo-Bayesian method (Azose and Raftery, 2019) which is the most appropriate estimation technique among over five other analysed by

the authors⁴. Regarding the skill composition of migration flows, we employ the IAB (Institute for Employment Research) database built by Brücker and al., (2013). They compute the total number of foreign-born individuals aged 25 years and older classified between low- and high-skilled immigrants living in each of 20 OECD destinations countries in five-year intervals from 1980 to 2010. To our knowledge, there is no database documenting international migration flows disaggregated by skill level. Though, many government ministries record entries distinguishing, *inter alia*, occupation, origin and education level attainment, data are unavailable due to issues of privacy (Czaika and Parsons, 2016). Accordingly, we follow Beine and Parsons (2015), Bertoli and Fernández-Huertas Moraga (2015) and Lanati and Thiele (2021) by proxying migration flows by taking the difference in these stocks. This technique gives room to negative values due to returns and deaths of migrants which are practically difficult to test if not impossible in the absence of suitable data (Beine and Parsons, 2015). We drop them from the analysis since immigration flows can not be negative as such. Certainly, these data are not perfect but are enough precise to derive reasonable estimations (Beine and al., 2011). Thereafter, we define the skill content of immigration flows by the ratio of high to low-skilled migrants (see Bianchi, 2013). Thus, migrants are considered to be positively selected when the ratio is higher or equal to 1 and 0 otherwise.

Independent variables

We derive the measure of immigration policy restrictiveness from the newly Immigration Policies in Comparison (IMPIC) database (Helbling and al., 2017). It covers 33 OECD countries for the 1990-2010 period. The IMPIC dataset has the advantage to distinguish between regulations related to family reunification, labour immigration, refugee and asylum policies, and co-ethnics⁵. For each of these fields, it disentangles external to internal regulations which can be subdivided respectively between eligibility requirements and conditions on the one hand; and security of the status and rights associated on the other (see Appendix, **Table 9**). Thus, it enables analysing of within and between-country differences (Bjerre and al., 2016). Eligibility requirements and conditions refer to different criteria an immigrant must fulfil to enter legally into the destination country. While the security of the status and rights associated relate to, *inter alia*, rules governing the obtaining of a residence permit, its duration, access to citizenship and the rights the latter grant regarding welfare benefits and the labour market for instance. Since admission for co-ethnics reasons is few or unusual, we follow Helbling and al. (2020) by building a restrictive policy index considering only three policy fields namely family reunification, labour migration and asylum and refugees which are the

⁴The other five estimation methods are: demographic account minimisation closed, demographic account minimisation open, migration rates, stock difference drop negative and stock difference reverse negative.

⁵Co-ethnics concern immigrant groups who are entitled to immigrate or access to citizenship for a given country due to colonial, historical or cultural ties.

main reasons for which states admit immigrants. Thus, to compute the restrictiveness of the immigration policy, we use an additive aggregation with values ranging between 0 (open) and 1 (restrictive) (see Bjerre et al., 2016)⁶. In addition to information on the policy variable, bilateral migration flows and skill composition of migration flows, we introduce standard gravity variables such as colonial relationship after 1945, common language, contiguity and distance. Data are from the CEPII (Centre d'Etudes Prospectives et d'Informations Internationales) database (Mayer and Zignago, 2011). Out of these variables, the GDP per capita of the origin and destination country as well the population of the origin country are also considered. They are all taken from Penn World Table Version 7.1.

Table 1: Variables and sources

Variable	Description	Source
DEPENDENT VARIABLE		
<i>bilFlows</i>	Bilateral flows	Abel and Cohen (2019)
<i>skillComp</i>	1 if immigrants are positively selected, 0 otherwise	IAB database
INDEPENDENT VARIABLE		
<i>policy restrictions</i>	Restrictive immigration policy index	IMPIC
<i>log(Pop_Origin)</i>	log of origin population	Penn World Table
<i>log(Gdppc_Destination)</i>	log of GDP per capita of the destination country (lagged)	Penn World Table
<i>log(Gdppc_Origin)</i>	log of GDP per capita of the origin country (lagged)	Penn World Table
<i>contiguity</i>	1 if two countries are contiguous, 0 otherwise	CEPII Geodist
<i>log(distance)</i>	log of the distance between the biggest cities in two countries	CEPII Geodist
<i>common language</i>	1 if a language is spoken by at least 9% of the population in both countries, 0 otherwise	CEPII Geodist

⁶ The resulting policy variables are highly right skewed as shown in **Figure 2**. This indicates a more liberal-oriented immigration policy in most countries of the sample during the 1980-2010 period. Thus, to deal with these extreme outlying values, each policy variable is transformed by reversing its scale, squaring it and reversing it again (Helbling and al., 2020).

<i>colonial relationship</i>	1 if two countries have a colonial relationship after 1945, 0 otherwise	CEPII Geodist
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4. Results

4.1. Effects of a restrictive immigration policy on bilateral flows

Table 2 gives estimates of the effects of a restrictive immigration policy on bilateral flows for 20 OECD countries and 178 origin countries between 1990 and 2010. Columns 1 to 4 present results including successively year, origin, origin-year, and destination fixed effects. Generally, we find a significant negative effect of restrictions on migration flows whatever the combination of fixed effects. For example, a 1 per cent increase in policy restrictions is associated with a 0,76 decrease in migration flows from each origin country.

Table 0: Effects of restrictive immigration policy on bilateral flows

VARIABLES	(1) PPML bilflows	(2) PPML bilflows	(3) PPML bilflows	(4) PPML bilflows	(5) IV-GMM log(1+bilflows)
Policy Restrictiveness	-0.90*** [0.19]	-0.98*** [0.19]	-0.80*** [0.20]	-0.76** [0.38]	-0.66*** [0.19]
log(Pop_Origin)	0.59*** [0.03]	1.78*** [0.33]	1.98*** [0.32]	0.66*** [0.02]	1.99*** [0.10]
log(Gdppc_Destination) (lag)	0.94*** [0.29]	0.79*** [0.22]	-1.47*** [0.31]	-1.35** [0.59]	-0.54*** [0.08]
log(Gdppc_Origin) (lag)	0.19*** [0.05]	0.50*** [0.11]	0.53*** [0.11]	0.14*** [0.03]	0.23*** [0.04]
log(distance)	-0.08 [0.19]	-0.19* [0.11]	-0.74*** [0.09]	-0.69*** [0.06]	
contiguity	1.20 [0.87]	0.99*** [0.34]	0.24 [0.19]	0.53** [0.23]	
common Language	1.67*** [0.15]	2.11*** [0.16]	1.11*** [0.14]	0.88*** [0.08]	
colonial relationship	1.18*** [0.25]	1.32*** [0.21]	1.22*** [0.17]	1.34*** [0.08]	
Constant	-7.61* [4.13]	18.94*** [4.27]	7.43* [4.42]	21.23*** [6.05]	
Observations	13,760	13,760	13,760	13,760	13,820
R-squared	0.17	0.61	0.81	0.60	0.06

Number of country pair					3,520
Kleibergen-Paap rk LM statistic					0.0000
F statistic first stage					437.53
Hansen J Statistic P-value					0.8741
Fixed effects					Yes
Year	Yes	Yes	Yes	Yes	
Origin	No	Yes	Yes	No	
Origin-year	No	No	No	Yes	
Destination	No	No	Yes	Yes	

Notes: The dependent variable is the bilateral migration flows for columns 1 to 4. Column 5 shows the results of the fixed effects instrumental variable approach with $\log(1+\text{bilflows})$ as a dependent variable. Robust standard errors in brackets. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

The population and the GDP per capita of the source country significantly and positively affect bilateral migration flows. A 10 per cent increase of the two variables fuels bilateral flows respectively by 6,6 per cent and 1,4 per cent. These results are robust to the introduction of a set of fixed effects. This substantiates previous findings in the literature (see Ortega and Peri, 2013). However, the effect of the GDP per capita of the destination country, though significant, is ambiguous; sign depending on the introduction or not of the destination country's fixed effect. Sharing a common language, a common border and the existence of a colonial relationship between countries are factors that stimulate bilateral flows. The semi-elasticity of distance with respect to migration flows is statistically significant and negative.

To handle the simultaneity bias, we estimate a fixed effect instrumental variable model with Stata's command *xtivreg2* (Schaffer, 2010). Random effect specification is not suitable since the Hausman test rejects the null hypothesis of independence between regressors and unique errors. Results are shown in column 5. We use robust option to correct heteroscedasticity. The policy restriction variable is instrumented by its one-year lagged values and the proportional representation variable. In the first-stage regression (see Appendix, **Table 10**), their coefficients are positive, as expected, and highly statistically significant. The *F statistic* of 437,53 is considerably larger than the rule of thumb value of 10. This strongly suggests weak instruments are not a problem. The probability associated with the *Kleibergen-Paap LM statistic* is lower than 5 per cent confirming the rejection of the under-identification hypothesis. Lastly, the p-value related to the *Hansen J statistic* is high than 5 per cent giving us greater confidence that our instrument set is exogenous or appropriate. If we now turn to the effect of restrictive policy, its coefficient remains highly significant and negative even if the magnitude of impact is slightly

smaller. Thus, findings are robust to the change in measurement of the dependent variable. Thereafter, we distinguish between several subdimensions of the restrictive immigration policy index; more specifically between external and internal regulations on the one hand, and between policy areas (family reunification, labour migration and asylum and refugees), on the other. Results are presented in **Table 3**. For all dimensions of regulation, restrictions in OECD countries significantly and negatively affect bilateral migration flows. Contrary to expectations, an increase in the GDP per capita of the destination country tends to reduce migration flows. Even if wealthy countries logically offer migrants more opportunities to improve their standard of living, we assume that this greater attractiveness and larger flows it generates lead policymakers to toughen immigration policy up. Which in turn reduces migration flows. The negative effect of the per-country GDP of the source countries substantiates the neoclassical prediction that income differences between the origin and destination countries are a core determinant of emigration decisions (Lanati and Thiele, 2021).

Table 3: Effects of the subdimensions of restrictive immigration policy index

VARIABLES	(1) PPML bilflows	(2) PPML bilflows	(3) PPML bilflows	(4) PPML bilflows	(5) PPML bilflows
log(Pop_Origin)	2.14*** [0.29]	2.00*** [0.29]	2.06*** [0.29]	2.06*** [0.29]	2.02*** [0.29]
log(Gdppc_Destination) (lag)	-1.02*** [0.29]	-1.17*** [0.30]	-1.11*** [0.29]	-1.29*** [0.29]	-0.95*** [0.29]
log(Gdppc_Origin) (lag)	0.55*** [0.10]	0.48*** [0.10]	0.51*** [0.10]	0.50*** [0.10]	0.49*** [0.10]
Log(distance)	-0.74*** [0.09]	-0.74*** [0.09]	-0.74*** [0.09]	-0.74*** [0.09]	-0.74*** [0.09]
contiguity	0.24 [0.19]	0.24 [0.19]	0.24 [0.19]	0.24 [0.19]	0.24 [0.19]
common language	1.11*** [0.14]	1.11*** [0.14]	1.11*** [0.14]	1.11*** [0.14]	1.11*** [0.14]
colonial relationship	1.22*** [0.17]	1.22*** [0.17]	1.22*** [0.17]	1.22*** [0.17]	1.22*** [0.17]
Restrictive external policies	-1.23*** [0.23]				
Restrictive internal policies		-0.53***			

Restrictive family reunification policies	[0.18]				
	-0.30**				
	[0.14]				
Restrictive labour migration policies	-0.95***				
	[0.27]				
Restrictive asylum policies	-0.92***				
	[0.20]				
Constant	1.42	4.38	2.98	5.31	1.80
	[3.63]	[3.68]	[3.60]	[3.56]	[3.61]
Observations	13,760	13,760	13,760	13,760	13,760
R-squared	0.81	0.81	0.81	0.80	0.81

Notes: The dependent variable is the bilateral migration flows. All regressions include origin and destination country fixed effects. Robust standard errors in brackets. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

To check for the heterogeneity of our results, we also verify if the effects of restrictions vary depending on whether the destination country has a point-based immigration system (Henceforth PBS) or not. This system has the specificity of conditioning admissions of non-nationals by meeting a set of requirements in terms of education, age, work experience, salary, language fluency, professional skills and so on (Aboubacar and Zhu, 2014; Antecol and al., 2003; Zhu and Batisse, 2016). Hence, the main objective of this policy is to attract a great number of skilled workers. This is to oppose with “demand-driven system” mostly applied in Europe in which the key objective is to integrate both socially and economically migrants (Czaika and Parsons, 2017). However, in recent decades, the two systems cohabit in some countries with point-based immigration regulations (Czaika and Parsons, 2017). Meaning there can be within these countries other pathways for immigration, such as refugees and family reunification, that are not subjected to a threshold number of points. Restrictions in the latter countries are either less likely to be stringent or are enforced differently compared to other countries. Accordingly, effects on migration flows may also be distinct.

Table 4: Effects of restrictions in non-PBS vs PBS countries

VARIABLES	(1) PPML bilflows	(3) PPML bilflows	(2) PPML bilflows
Policy Restrictiveness	-0.95*** [0.20]	-0.85*** [0.21]	-0.94 [1.79]

log(Pop_Origin)	1.90*** [0.31]	2.36*** [0.27]	3.01*** [0.39]
log(Gdppc-Destination) (lag)	-1.23*** [0.32]	-0.84*** [0.22]	-0.59* [0.32]
log(Gdppc_Origin) (lag)	0.51*** [0.12]	0.39*** [0.09]	0.36* [0.19]
Log(distance)	-0.86*** [0.09]	-1.17*** [0.20]	-0.56** [0.25]
contiguity	0.35* [0.18]	0.10 [0.20]	0.18 [0.52]
common language	0.88*** [0.15]	1.04*** [0.15]	0.98** [0.38]
colonial relationship	1.42*** [0.19]	1.68*** [0.16]	1.47* [0.83]
constant	4.68 [3.88]	-0.28 [2.75]	-12.37*** [3.74]
Observations	11,696	11,008	2,064
R-squared	0.84	0.61	0.77
Fixed effects			
Origin	Yes	Yes	Yes
Destination	Yes	Yes	Yes
Sample	Non-PBS Countries	Non-PBS without USA	PBS Countries

Notes: The dependent variable is the bilateral migration flows. Robust standard errors in brackets. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Our findings appear to substantiate well this hypothesis as shown in **Table 4**. Policy restrictions are only effective in countries without PBS. This result holds even if we exclude the United States from the sample given the specificity of its immigration policy mostly based on family reunification and visa quotas (Real, 2011). As for PBS countries (Canada, Australia, UK and New Zealand), the effect of restrictions is not statistically significant.

Table 5: Effects of restrictions according to the development level of the source country

	(1) IV-GMM Ln(1+ bilflows)	(2) IV-GMM Ln(1+ bilflows)
VARIABLES		
Policy Restrictiveness	-0.70*** [0.24]	-0.39 [0.28]

log(Pop_Origin)	2.40*** [0.12]	1.05*** [0.20]
log(Gdppc_Destination) (lag)	-0.82*** [0.10]	-0.62*** [0.14]
log(Gdppc_Origin) (lag)	0.14*** [0.04]	0.96*** [0.11]
Observations	9,540	4,280
Number of country pair	2,440	1,080
Kleibergen-Paap rk LM statistic	0.000	0.0000
F statistic first stage	296.98	140.97
Hansen J Statistic P-value	0.4681	0.6310
Fixed effect	Yes	Yes
Sample	Developing origin countries	Developed origin countries

Notes: The dependent variable is the log of annual migration flows plus one. All regressions include fixed effects. Robust standard errors in brackets. Significance levels: *** p<0.01, ** p<0.05, * p<0.1.

Lastly, we split the sample between developed and developing countries with respect to the country of origin to test whether restrictions' effects vary according to the level of development of the source country. Based on the World Bank Classification (2021), we define low and medium-income countries as developing countries, and high-income countries as developed countries. We also use the alternative measure of the dependent variable which is the log of annual migration flows plus one to handle the high presence of zero on bilateral data. **Table 5** reports the instrumental variable estimate of Equation 1. The results indicate that restrictions are more likely to be effective in reducing migration flows from developing countries. A 10 per cent increase in restrictions statistically decreases flows by 7 per cent, while the effect for developed origin countries is non-significant. A possible explanation for this might be that restrictions to a large extent are mostly directed and motivated by immigration from poor countries for which natives and policymakers express particularly more concerns. Thus, migrants from developing countries face more financial and non-financial constraints than others in coming to developed countries. Beyond restrictions, these constraints may also be caused by factors related to the origin countries such as poverty or geographical distance.

4.1. Effects of restrictive immigration policies on the skill composition

The results obtained from the preliminary analysis of the skill composition effect of restrictive immigration policies are set out in **Table 6**. We run a correlated random-effects

probit model and find that a 1 per cent increase in restrictions reduces the probability of immigrants being positively selected by 0,829 per cent. The increase in income per capita of the destination and the origin country population are factors improving the positive selection of immigration. These findings may be biased since the correlated random effect approach (CRE) does not take into account the “*initial condition problem*” as we previously mentioned in the methodological party. Rabe-Hesketh and Skrondal (2013) and Wooldridge (2005) argue that the dynamic random effect probit model is the best estimation strategy for handling the initial condition problem.

Table 6: Results of the correlated random effect probit model

VARIABLES	Correlated Random Effect probit model
Policy Restrictiveness	-0.829*** (0.236)
log(Pop_Origin)	0.718*** (0.270)
log(Gdppc_Destination) (lag)	1.582*** (0.283)
log(Gdppc_Origin) (lag)	0.048 (0.121)
log(distance)	-0.063 (0.044)
contiguity	-0.084 (0.308)
common language	0.049 (0.116)
colonial relationship	0.418 (0.332)
constant	-15.344*** (1.054)
Observations	7,741
Number of country pair	2,791
Year fixed effects	yes
q (rho)	0.358

Notes: The dependent variable equals 1 if immigrants are positively selected and 0 otherwise. Regarding the Correlated Random-Effects model (or Mundlak model), we have removed the within-mean of the explanatory variables from the table for the sake of simplicity. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

To this end, we introduce as an independent variable the initial period of the response

variable, the initial period of the time-varying explanatory variables and the within-means of the time-explanatory variables. All these regressors allow for controlling unobserved heterogeneity (Grotti and Cutuli, 2018). The lagged value of the response variable is also introduced to capture the genuine state dependence. The latter determines whether being positively selected in the past period affects the probability to be positively selected in the current period. The related findings can be seen in the table below.

Table 7: Results of the dynamic random effect probit model

VARIABLES	Dynamic random effect probit
Lag of skill composition	0.032* (0.018)
Policy Restrictiveness	-0.531*** (0.090)
log(Pop_Origin)	0.127 (0.087)
log(Gdppc_Destination) (lag)	0.782*** (0.126)
log(Gdppc_Origin) (lag)	-0.021 (0.039)
log(distance)	-0.019** (0.009)
contiguity	-0.072 (0.081)
common language	0.155*** (0.017)
colonial relationship	0.309*** (0.064)
1.Skill composition_0	0.288*** (0.018)
Policy restrictiveness_0	-0.398*** (0.056)
PopOri_0	-0.002 (0.071)
GdppcDest_0	0.350*** (0.096)
GdppcOri_0	0.030

	(0.032)
Policy Restrictiveness (within-mean)	1.186*** (0.136)
Pop_Origin (within-mean)	-0.110 (0.132)
Gdppc_Destination (within-mean)	-0.873*** (0.186)
Gdppc_Origin (within-mean)	0.037 (0.058)
Number of country pair	2598
Year fixed effects	Yes
Log pseudolikelihood	-3810.3321

Notes: The dependent variable equals 1 if immigrants are positively selected and 0 otherwise. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

We find that the coefficient of the lagged outcome variable is positive and significant at the level of 10 per cent but is much lower than one. This means that skilled migration stimulates the immigration of the more educated in the subsequent periods. This finding was also reported by Beine and al., (2008). They demonstrate that doubling the emigration rate of the highly skilled not only increases by 5 per cent the human capital formation of the subsequent emigrants but also those of non-migrants in a cross-section of 127 countries. Furthermore, our results confirm that failing to control for the endogeneity of the initial problem leads to serious overestimation bias. Indeed, for all explanatory variables, coefficients related to the dynamic random effect probit model (**Table 7**) are lower than those of the correlated random effects probit approach (**Table 6**). Concerning observed characteristics, a 10 per cent increase in policy restrictions significantly reduces the probability of an immigrant being positively selected by 5.31 per cent contrary to the 8.29 per cent found previously. The coefficient of the GDP per capita of the destination country is still positive at the 1 per cent statistical level. Sharing a common language and having a colonial relationship are also factors favouring a positive selection of immigrants. The opposite is observed for the distance between countries. Finally, the coefficient of variables that capture unobserved heterogeneity namely the initial period of the positive selection (*1.Skillcomposition_0*), the initial period of the per capita GDP of the destination country (*GdppcDest_0*) and the within-mean of the policy restrictions (*Policy Restrictiveness (within-mean)*) are positive and highly significant at a level of 1 per cent. This means that these variables are correlated with unobserved individual-specific factors that raise the probability of a positive selection. Beyond the endogeneity bias arising from the lack of independence between the random intercept

and the initial conditions (endogeneity of initial problem), another endogeneity issue might exist because of the lack of independence between the independent variables and omitted time-constant covariates. Though our estimations already integrate dyad-specific factors such as distance, linguistic proximity and border, other omitted factors specific to the origin country might affect positive selection such as the geographic location (Beine and Parsons, 2015).

Table 8: Estimates with Skrandal and Rabe-Hesketh (2014) method

VARIABLES	(1) Total sample	(2) Non- developed origin countries	(3) Developed origin countries
Lag of Skill composition	0.173* (0.091)	0.458*** (0.116)	-0.480*** (0.172)
Policy Restrictiveness	0.434* (0.245)	0.717** (0.292)	-0.104 (0.452)
log(Pop_Origin)	0.097 (0.243)	0.278 (0.286)	0.051 (0.575)
log(Gdppc_Destination) (lag)	1.801*** (0.316)	1.486*** (0.408)	2.551*** (0.596)
log(Gdppc_Origin) (lag)	-0.022 (0.124)	0.081 (0.124)	-0.601 (0.378)
log(distance)	-0.056 (0.048)	0.002 (0.058)	-0.219** (0.087)
contiguity	-0.553 (0.464)	-0.893 (0.586)	-0.238 (0.760)
common language	1.242*** (0.101)	1.329*** (0.114)	0.935*** (0.215)
colonial relationship	2.074*** (0.375)	2.047*** (0.474)	2.528*** (0.691)
δ policy restrictiveness (mean)	0.717** (0.287)	0.306 (0.341)	1.662*** (0.565)
δ log(Gdppc_Destination)	-0.096	0.001	-0.196

(mean)	(0.336)	(0.428)	(0.635)
$\delta \log(\text{Gdppc_Origin})$			
(mean)	0.281**	0.101	0.946**
	(0.129)	(0.132)	(0.398)
$\delta \log(\text{Pop_Origin})$			
(mean)	0.023	-0.169	0.102
	(0.243)	(0.289)	(0.572)
Constant	21.691***	-19.280***	-27.879***
	(1.621)	(1.853)	(3.803)
ω (random-intercept variance)	1.25	0.88	2.22
Number of country pair	2974	2033	914
Log-likelihood value	6092.0689	-4137.0719	-1875.3744
ICC (Intraclass correlation)	0.2753	0.2110	0.4029

Notes: The dependent variable equals 1 if immigrants are positively selected and 0 otherwise. The method is estimated using Stata's *gllamm* command which employs adaptive quadrature methods. In this approach, only coefficients of the lagged response variable and time-varying explanatory variables are consistently estimated. Significant coefficients of the mean of time-varying covariates indicate the presence of level 2 endogeneity which does not challenges the consistency of the other variable. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

To control for these factors, we use the *joint modelling approach* developed by Skrondal and Rabe-Hesketh (2014). This method has two main advantages. Firstly, estimates are consistent even with a small number of periods (T). Secondly, it fixes the initial condition problem as well as allows for endogeneity. However, in that condition, only coefficients related to the lagged response variable and time-varying explanatory variables are estimated consistently. **Table 8** (column 1) illustrates the main findings. We use Stata's *gllamm*- command for the estimation which uses adaptive quadrature methods (Rabe-Hesketh et al., 2002). Surprisingly, when the two sources of bias are taken into consideration, the coefficient associated with policy restrictions becomes positive at the significant level of 10 per cent as shown in column 1. The fact that the coefficient of mean time-varying covariates ($\delta \text{ policy restrictiveness}$, $\delta \log(\text{Gdppc_Origin})$) are significant at the level of 1 per cent suggests the existence of endogeneity and lends support to the use of the *joint modelling approach*. Thereafter, we split the sample between developed and non-developed origin countries. **Table 8** reports the results (columns 2 and 3). Interestingly,

the capacity of policy restrictions to impact positive selection is effective only for migrants from developing countries. The estimated coefficient of *Policy restrictiveness* corresponds to an odds ratio of $\exp(0.717) = 2.0482791$. It means that one unit increase in policy restrictions raises the odds of positive selection by an estimated 105% [$105\% = 100\% * (2.0482791 - 1)$] for migrants from developing countries, keeping the restrictions of other countries constant. This result contrasts with the negative selection hypothesis of Borjas (1987) according to which in sending countries with high return to skill and high-income inequality, the less educated are more likely to emigrate to developed countries. Nevertheless, it substantiates evidence that people migrating from developing countries are not randomly selected and tend to be the most educated (Vargas-Silva, 2012). A restriction of immigration policy refers to an increase in non-monetary and monetary migration costs that immigrants have to cover to enter or live in the receiving country. For instance, to reduce family immigration and to increase skilled-labour immigration in 2003, the French government (as in many other OECD countries) restricts the family immigration policy by imposing more income and residency requirements as well as integration criteria (d'Albis and al., 2016). Even if costs are common to all emigrants regardless of their skill level, they do not affect all potential migrants in the same way (Bianchi, 2013). Chiquiar and Hanson (2005, p.243) have identified several reasons why migration costs decrease with the level of education. Although their analysis is within the framework of Mexico-US migration, it can be generalised to other migration corridors.

First, emigrants must achieve important administrative procedures involving extensive paperwork and repeated interactions with the authorities of the host countries. The latter is more likely to be completed by the more educated. Secondly, migrants and particularly those from Mexico to the United States often need support from migration specialists or lawyers to meet the U.S. admissions process. Given high-income inequalities and a high rate of return to skill in developing countries (Borjas, 2019), the more skilled are more likely to support these costs that might arise from policy restrictions. In the case where costs are non-monetary notably language skills requirements, they seem all the more privileged, all else being equal. These rationales do not necessarily mean that only the brightest minds migrate. Thirdly, if migration costs are funded through credit, the less educated individuals who are likely to perceive low wages, borrow at higher costs because of a high likelihood of credit risk. Concerning more educated migrants, they face less uncertainty about wages at the destination and therefore bear less migration-related costs (Chiquiar and Hanson, 2005). The positive effect of restrictions on high-skilled migrants from developing countries is also in agreement with Grogger and Hanson's (2011) findings which showed that the larger the skill-related difference in earnings between the destination and the origin country, the more educated emigrants in comparison with the non-migrants. In addition, in most receiving countries, even if restrictions become more stringent, there are some

components of the immigration policy devoted to improving the country's attractiveness vis-à-vis skilled migrants from developing countries (d'Albis and al., 2016). This is evident in our sample from which 70 per cent of countries report having policies targeting high-skilled workers (IMPIC database). These adjustments may take the form of reducing financial requirements, application fees or removing some job contingency requirements as is the case in the new UK immigration system. These measures are liable to favour the migration of the more educated from developing countries. Docquier and Rapoport (2007) demonstrate that there is an inverse U-shaped relationship between the optimal rate of skilled migration and the level of development in developing countries. This means that skilled workers are more likely to migrate from low-income countries than from high-income countries. This result lends support to the positive effect of restrictions on the positive selection of migrants from developing countries. Regarding skilled immigrants from developed origin countries, they are less sensitive to the implications of these restrictive measures due to almost comparable levels of development, job opportunities as well as public amenities. This does not mean they do not immigrate but they are less likely to emigrate when restrictions are highly stringent. Because they undergo a weak opportunity cost of staying in the country than unskilled within the same country; particularly when return to human capital is high and almost equivalent between the two countries. In other words, they have less of an incentive to move. The intraclass correlation (ICC) at the bottom of **Table 8** illustrates this homogeneity in the development level between pairs of countries. The higher the intraclass correlation, the more homogenous pair of countries (Steenbergen and Jones, 2002). The latter is more important when the source country is a developed country (0.4029) than when it is a developing country (0.2110).

Consistent with other studies, we find that sharing a common language between a source-destination pair is positively associated with the educational selectivity of emigrants. This finding puts forward the fact that it is more beneficial for more educated emigrants to immigrate to destination countries in which they already speak the language. The evidence we found points to the social stratification of migrants by the receiving country indicated by Beauchemin (2018, p.6). Indeed, in an analysis of migration between Europe and Africa, he argues that former colonial countries such as France, Belgium and the UK receive more students and skilled workers from their former colonies respectively Senegalese, Congolese and Ghanaians. Among factors explaining this tendency, there are the recognition of qualifications and skills at the destination and the fact of sharing a common language. While the less educated in these countries tend to migrate to new destinations among which Spain, Italy and Netherlands (Beauchemin, 2018). Likewise, colonial links between two countries favour the emigration of the more skilled. This result is in contradiction with Belot and Hatton's (2012) study which is about 20 OECD countries in the year 2000/2001. They argue that OECD countries imposed a

lower barrier to immigration from former colonies during the post-independence period which triggered a high inflow of low-skilled migrants. However, the shift in immigration policies over years (de Haas and al., 2016b; Schultz and al., 2021) has challenged this evidence. They become more stringent in some aspects and more skill-oriented (Boubtane and al., 2016). This certainly explains why the inflows of migrants to OECD countries during recent periods are more skilled than natives (Boubtane, 2019; Zhu and Batisse, 2016). However, due care must be paid to the interpretation of the results. Indeed, the effects of a restrictive immigration policy on the receiving country are non-monotone as demonstrated theoretically by Bianchi (2013). Indeed, if restrictions are highly stringent so that only a little number of individuals can migrate, thus size effect dominates the composition effect. This indicates the existence of a threshold effect in the interplay between restrictions and the likelihood of a positive selection. We tried to test this hypothesis by integrating the square of the restrictive immigration policy index as an explanatory variable. It turns out that the related coefficient is negative and highly significant at the level of 1 per cent (see Appendix, **Table 11**) suggesting an inverse U-shaped relationship between restrictions and positive selection. The square of the restrictions index has an estimated odds ratio of $\exp(-4.236) = 0.014$. Thus, there is some evidence of a *perverse effect* of high restrictions. When restrictions are so important, there are made at the expense of a less positive selection. Moreover, the coefficient of the restrictive index also remains highly positive and significant at the 1 per cent level with an estimated odds ratio of $\exp(3.249) = 25.765$. Accordingly, there is a diminishing marginal effect of restrictions.

Another possible explanation of the positive effect of restrictions on the likelihood of positive selection might be that restricting immigration policy sometimes goes hand in hand with implementing a selective immigration policy from the destination country to attract more skilled migrants (de Haas and al., 2016). This situation is currently observed in many developed countries and implies that results should be interpreted with caution since our restrictive policy index does not allow controlling for this aspect of the immigration policy. Lastly, we analysed the effects of the restriction of different sub-dimensions of the immigration policy. The results are presented in **Table 12** of the Appendix. Restricting the external regulations (conditions and eligibility requirements) significantly reduces the likelihood of a positive selection while internal regulations (security of the status and rights associated) tend to increase it. A likely explanation is that high-skilled immigrants are less affected by internal restrictions namely the access to long-term settlement, the duration of work and residence permits and their renewal, the way migrants are monitored once in the destination country and the rights they receive about access to employment (Bjerre and al., 2016). This is true especially as they are more likely to find a job in developed countries given their high skill level, and therefore to fit the required conditions to renew the residence permit often subjected to the obligation of

being at least employed. Moreover, many of the post-entry regulations in OECD countries are increasingly fine-tuned to attract and retain high-skilled immigrants, especially in the context of global competition for talents (Czaika and Parsons, 2016; OECD, 2008). Among them, Czaika and Parsons (2016) have identified the prospect of permanent residence, granting immediate rights for family reunification and social security, the recognition of qualifications and skills of immigrants earned abroad, tax exemptions, permission to change jobs without a need to apply for a new temporary work permit and the European Blue Card. These skill-biased measures persist next to more stringent ones mostly directed at unskilled, so that restrictions if not extremely high, affect to a less extent the skilled immigrants. Hence the positive effect of internal restrictions. Regarding the per capita GDP of the destination country, sharing a common language and a border significantly and positively affects the likelihood of a positive selection no matter the policy dimensions (labour market, family reunification and asylum and refugees).

5. Conclusion

Immigration is one of the main preoccupations in developed countries where it sparks intense controversies among those who denounce the laxity of rules that frame it and those who emphasise the moral obligation of welcoming foreign-born people. Its saliency in the public debate has been fuelled by the breakthrough of right-wing political parties and the politically motivated decisions of policymakers to avoid appearing lenient toward it. Accordingly, over the recent decades, several governments of the industrialised countries have undertaken to restrict immigration policy for family reunification, irregular flows, border control and exit policy; while integration and entry regulations have become less stringent (de Haas and al., 2016). Likewise, more restrictions have been imposed on low-skilled immigrants when high-skilled immigration is increasingly liberalised (Czaika and Parsons, 2016). This chapter set out to investigate the size and compositional effects of these restrictions in 20 OECD countries using bilateral data spanning from 1990 to 2010 at five-year intervals. We find that restrictive immigration policy significantly reduces the size of bilateral migration flows. Thereafter, we split our sample according to the level of development of the source country. Interestingly, the negative effect of restrictions holds only when migrants are from developing countries and becomes non-significant when the source country is developed. A possible explanation for this might be the fact that restrictions are more targeted at immigrants coming from developing countries from which natives and therefore policymakers display more concerns (Beauchemin, 2018). Also, we divide the sample between countries applying a point-based immigration system (Australia, Canada, New Zealand and the UK) and those which do not. Surprisingly, we find that restrictions deter only bilateral flows from countries without a point-based system. This result may be explained by the fact that countries applying a point-based system aim to

attract mainly high-skilled workers through specific characteristics (education attainment, work experience, salary, language proficiency, etc.) while having at the same time other pathways for immigration not subjected to these criteria among which family reunification and refugees. This hybrid system is so that restrictions are less likely to be stringent in comparison to countries like Europe which adopted a “demand-driven system” whose objective is to integrate both socially and economically immigrants.

Concerning the skill composition of immigration, there was a significant positive effect of restrictions on the likelihood of positive selection only when the migrant comes from a developing origin country. Since restrictions increase financial and non-financial costs of immigration, we argue that high-skilled migrants from those countries are more likely to incur these charges than unskilled within the same country, particularly when several exemption measures (reduction of financial requirements, removing job contingency, etc.) from the government of the OECD countries are set over years to attract them. Therefore, it becomes easier for them to migrate in the context of increasing restrictions. Next, we also find that there is an inverse U-shaped relationship between restrictions and the likelihood of positive selection suggesting a reduction of the positive selection when restrictions are extremely high. Finally, restricting internal regulations raise the probability of a positive selection while external regulations (conditions and eligibility requirements) tend to reduce it. One of the main reasons States implement these restrictions is to respond to one of the concerns of their citizens regarding immigration which is the net fiscal position of immigrants, particularly the low-skilled ones (Boeri, 2010). For instance, 88 per cent of Swedish encourage high-skilled workers to move and work in their country, 85 per cent for the British people, 81 per cent for Germans and 67 per cent for French (Wike and al., 2019). The rationale behind the preference for high-skilled immigrants is the fact that they are economically and socially more beneficial for the host countries (Cohen and al., 2009; Kolbe and Kayran, 2019). Therefore, there are less likely to rely on social assistance. Under these circumstances, natives’ preferences over redistribution might be related to the skill content of immigration.

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Appendices

Table 9: Selection of items

Regulations			Policy areas			
			Family reunification	Labor migration	Asylum and refugees	Co-ethnics
Regulations	External	Eligibility	Residence requirements	Targeting	Existence of Subsidiary/ humanitarian protection	Reasons for co-ethnicity
			Family members	Quotas labor	Nationality	Language skills
			Age limits	Age limits	Quotas asylum	Converts
			Quotas family reunification	Young age beneficial	Safe third country	Ancestry
		Conditions			Safe countries of origin	Country of residence
					Resettlement agreements	Quotas co-ethnics
			Financial requirements	Specific income per month	Place of application	Place of application
			Accommodation requirements	Specific financial funds		Date of birth
	Internal	Security of status	Language skills	Language skills		
			Application fees	Application fee		
				Job offer		
				Equal work conditions		
		Rights associated	Residence permit validity	Work permit validity	Permit validity	Access to citizenship
			Autonomous residence permit	Renewal of permit	Permit renewal	Duration of residence permit

Source: Bjerre and al. (2016)

Table 10: First-stage regression of the instrumental variable method

Variable	First-stage estimation
L.Policy Restrictiveness	0.365*** (29.37)
proportional representation	0.0167***

log(Pop_Origin)	(4.54) 0.0529***
log(Gdppc_Destination) (lag)	(4.34) -0.0594***
log(Gdppc_Origin) (lag)	(-5.64) 0.0104*
	(2.14)
Number of observations	13820

Notes: the dependent variable is bilateral migration flows. Significance levels: ***
p<0.01, ** p<0.05, * p<0.1.

Table 11: The threshold effect of restrictions

VARIABLES	(1) Total sample
Lag of Skill composition	0.252*** (0.095)
Policy Restrictiveness	3.249*** (0.743)
Policy Restrictiveness ²	-4.236*** (0.910)
log(Pop_Origin)	0.088 (0.239)
log(Gdppc_Destination) (lag)	1.779*** (0.314)
log(Gdppc_Origin) (lag)	-0.068 (0.123)
log(distance)	-0.032 (0.048)
contiguity	-0.475 (0.467)
common language	1.225*** (0.099)
colonial relationship	2.275*** (0.379)
δ policy restrictiveness (mean)	-7.337*** (0.863)
δ policy restrictiveness2 (mean)	9.874*** (0.991)
δ log(Gdppc_Destination) (mean)	0.086 (0.328)

$\delta \log(\text{Gdppc_Origin})$ (mean)	0.318** (0.129)
$\delta \log(\text{Pop_Origin})$ (mean)	0.027 (0.240)
Constant	-22.700*** (1.634)
random-intercept variance	1.092
Observations	10,684
Number of country pair	2974
Log-likelihood value	-6043.1151
ICC (Intraclass correlation)	0.249

Notes: The dependent variable equals 1 if immigrants are positively selected and 0 otherwise. The method is estimated using Stata's *gllamm* command which employs adaptive quadrature methods. In this approach, only coefficients of the lagged response variable and time-varying explanatory variables are consistently estimated. Significant coefficients of the mean of time-varying covariates indicate the presence of level 2 endogeneity which does not challenges the consistency of the other variable. Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

Table 12: Effects of the restriction of the different sub-dimensions of the immigration policy

VARIABLES	External Immigration policy	Internal immigration policy	Family reunification policy	Labor migration policy	Asylum policy
lag of Skill composition	0.100 (0.090)	0.154* (0.088)	0.148 (0.090)	0.135 (0.091)	0.126 (0.096)
Policy Restrictiveness	-1.586*** (0.399)	1.983*** (0.285)	0.633*** (0.179)	-0.043 (0.276)	-1.326*** (0.352)
$\log(\text{Pop_Origin})$	-0.003 (0.290)	0.451* (0.247)	0.078 (0.246)	0.135 (0.247)	0.060 (0.256)
$\log(\text{Gdppc_Destination})$ (lag)	2.185*** (0.366)	1.832*** (0.329)	1.883*** (0.323)	1.858*** (0.332)	2.046*** (0.330)
$\log(\text{Gdppc_Origin})$ (lag)	-0.101 (0.142)	0.095 (0.119)	-0.043 (0.124)	-0.034 (0.126)	-0.017 (0.129)
$\log(\text{distance})$	-0.009 (0.051)	-0.126*** (0.048)	-0.052 (0.049)	-0.065 (0.048)	-0.065 (0.048)
contiguity	-0.463 (0.474)	-0.663 (0.463)	-0.553 (0.467)	-0.520 (0.461)	-0.494 (0.470)
common language	1.195*** (0.104)	1.198*** (0.101)	1.239*** (0.102)	1.164*** (0.103)	1.200*** (0.109)

colonial relationship	1.965*** (0.385)	2.040*** (0.372)	2.100*** (0.377)	2.126*** (0.373)	2.211*** (0.383)
δ policy restrictiveness (mean)	4.562*** (0.506)	-2.321*** (0.355)	0.482** (0.208)	0.896*** (0.334)	0.973** (0.434)
δ log(Gdppc_Destination) (mean)	-0.684* (0.397)	-0.135 (0.351)	-0.069 (0.343)	-0.142 (0.351)	-0.250 (0.369)
δ log(Gdppc_Origin) (mean)	0.362** (0.146)	0.189 (0.124)	0.305** (0.129)	0.305** (0.132)	0.293** (0.134)
δ log(Pop_Origin) (mean))	0.119 (0.291)	-0.313 (0.247)	0.043 (0.246)	-0.005 (0.248)	0.074 (0.257)
Constant	-20.776*** (1.637)	-20.902*** (1.662)	-22.959*** (1.667)	-21.932*** (1.634)	22.398*** (1.738)
ω (random-intercept variance)	1.49	1.34	1.29	1.37	1.40
Number of country pairs	2974	2974	2974	2974	2974
Log-likelihood	-6003.4509	-6077.7283	-6078.1471	6099.7959	6092.3773
ICC (Intraclass correlation)	0.3117	0.2894	0.2817	0.294	0.2985

Notes: The dependent variable equals 1 if immigrants are positively selected and 0 otherwise. The method is estimated using Stata's *gllamm* command which employs adaptive quadrature methods. In this approach, only coefficients of the lagged response variable and time-varying explanatory variables are consistently estimated. Significant coefficients of the mean of time-varying covariates indicate the presence of level 2 endogeneity which does not challenges the consistency of the other variable.

Significance levels: *** $p < 0.01$, ** $p < 0.05$, * $p < 0.1$.

How does inflation affect the stock markets? A case study for the Athens Stock Exchange

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Summary

The topic that will be developed in this paper is inflation, how it affects the stock markets. The year 2022, contributed decisively to a general change of trend in the Stock Markets around the globe, after they had recovered from the onslaught of covid-19. The problem of the energy crisis brought about by the war between Russia and Ukraine was only the beginning to rekindle the inflationary phenomenon. In the face of this phenomenon, the World Banks considered it necessary to raise interest rates in order to avoid the depreciation of the value of money as the dollar weakens the euro. This is a factor in the stock market sliding as we have learned in the past under other financial crises. Of course, in terms of the literature on inflationary shocks, views are either on the side of Fischer (1930) or Fama (1980), where one considers inflation to be a good omen for a long-term investor and the other does not consider it representative. In general, we observe that, especially in industrial countries, equity returns are or are considered a good hedge in the long run, in line with the short run. The reason is that many companies incorporate the cost of inflation into their prices, so that this works to increase the profits of each company and investors are encouraged to invest. In line with this proposition, Bekaert and Engstrom (2009), in a study of the US financial market, show that high expected inflation tends to coincide with periods of increased uncertainty about real economic growth, as well as high risk aversion, with the consequence that these two increase stock returns. Conversely, in a mix of developing economies the results may be mixed (Spyrou, 2004). That is, some economies have a positive relationship as opposed to others. We, from our position, are looking at the impact of inflation on the Greek stock market. Our study period takes as a starting point the introduction of our country into the euro by June 2022 by relating the stock market to inflation with monthly returns through simple linear regression.

1. Introduction

Financial markets are constantly adjusted over time, depending on the state of the global economy, as well as the economic situation of each country. In this context, the performance of financial markets is either growing or contracting. It has been largely observed that, in addition to general conditions, some events restrain the performance of the stock market, with the appearance of a sharp fluctuation in the short term. We have seen such examples many times in the past, with the debt crisis in emerging or developing economies (European South), the coronavirus crisis with its frequent mutations, ending today with the energy crisis and the sharp rise in inflation. But the question that arises is what was going to happen with the coexistence of inflation in terms of stock market performance. In this article we analyze the impact of inflation on financial markets, looking only at the case of Greece.

From economic theory, two views are raised about stock returns and inflation. The first was Fisher's (1930), who considered that stocks follow or else create the expected rate of return which is the actual return plus an expected rate of inflation. On the other hand, Fama's (1981) proposal argued that stock returns are negatively related to inflation. The reason for this is that stock returns are positively related to real activity, but real activity is negatively related to changes in price levels. So, looking at the literature, we find both views to exist in the behavior of financial market returns around the world.

Literature Review

Looking at the convergence criteria provided for in the Maastricht Treaty, which was signed on 7 February 1992 and ratified by all members on 1 November 1993 (Sklias & Maris, 2014), we see that the countries of the European Union after 30 years have been faced with an inflationary shock. Inflation, like other macroeconomic variables based on the European average, varies enormously from country to country, leading to problems of living standards and well-being as well as productivity (Issing, 2010). In general, inflation is defined as the increase in the average price level for all goods and services over a given period of time, and can also be defined as a permanent increase in the overall price level that implies a decrease in purchasing power and an increase in the cost of living (Mousa, Al Safi, Hasonah and Abo-Orabi, 2012). In this problem, the sharp rise in inflation has marked a mix of different effects on financial market returns over time, with a review of the literature.

As mentioned in the introduction, Fischer's (1930) proposal considers that shares represent claims against the real assets of the firm in question, with the consequence that in times of inflation this acts as a hedging instrument. This in itself implies the existence of a positive relationship between two variables (inflation and stock prices). Also, Fischer's view in many studies has been used as the "Fischer Effect" on what the reaction of stock returns is during periods of inflation. The "Fischer Effect" model was the starting point of the first studies in which Jaffe and Mandelker (1976), Nelson (1976) and Bodie (1976) tried to explain the effect of inflation on financial market returns. These researchers analyzed the complications of stocks with a horizon of ten years or more under inflation. More specifically, Jaffe and Mandelker (1976) examined the relationship between inflation and stock market returns by conducting an empirical investigation based on the "Fisher Effect" for risky assets across all securities listed on the New York Stock Exchange. They used monthly data between 1953 and 1971, in their study they applied linear regressions to estimate the relationship, to measure the market return with the help of Lawrence Fisher index. The experts, through their study, concluded a negative relationship between yields and inflation for two decades, but after using a longer time horizon, the study found that there is a positive relationship between the variables. A contrasting view for the same period was taken by US common stock returns, which were negatively correlated with the expected inflation rate as well as unexpected inflation (Fama & Schwert, 1977).

In addition, Jaffe and Mandelker (1976) find a negative relationship between common stock returns and inflation for short periods as mentioned, which reverses to a positive relationship when they examined the period from 1875 to 1970. The same view is confirmed by Boudoukh and Richardson (1993), who study the relationship between stock returns and the inflation rate in the US and UK stock markets over the period 1802-1990, concluding a positive relationship. On the other side of the Fama hypothesis, however, by examining daily returns for the period 1953-1978 of a typical composite portfolio, it was analyzed how stock prices behave in response to new information on inflation. By using regression for the two variables, the results showed that stock markets react negatively to the announcement of unexpected inflation (Schwert, 1981). Similar views were expressed in the study by Adams et. Al (1999), regarding how a stock market responds to news about inflation. Specifically, he found by measuring the response by relating the frequency of trades per minute to stock portfolios. Through this, it was observed that there was a negative relationship for large portfolios as opposed to small portfolios. So based on these results, he considered that the market response to macroeconomic news depends on two factors from the type of announcement, as well as

the size of the portfolio. In the same vein, according to Alagidede and Panagiotidis (2006) studying previous research such as Bodie (1976), Nelson (1976) and Fama and Schwert (1977), where they were awakened by the increasing pace of the 1970s in the U.S. In particular, the researchers observed that these studies compared the inflation hedging properties of common stocks, with those of other financial and real variables for the United States, concluding that common stocks are not appropriate for hedging unexpected or unanticipated inflation.

Opposing views were held by Caporale and Jung (1997), examining the effect of expected and unexpected inflation on real stock prices by testing a causal relation, where they found a positive relation between the two variables. Also, four high inflation Latin American countries (Argentina, Chile, Mexico and Venezuela) found a positive relation between stock returns and inflation, concluding that stock returns act as a hedge against inflation (Choudhry, 1998). Ioannides (2005) reasons that the positive relation between stock market and inflation stock prices in nominal terms should fully reflect the expected inflation and the relation between them should be positively correlated ex ante, so that this is positively counted by investors.

Anari and Kolari (2001) examined monthly data on inflation and stock returns for six industrial countries (United States, United Kingdom, France, Germany and Japan) from 1953 to 1988. Using the VAR model, the researchers also showed a negative relationship in the short term that turned positive in the long term. Akmal (2007), using ADRL (autoregressive lag) and ECM (error correction model) for a period from 1971 to 2006 for Pakistan's money market, argued that equities are inflation hedges for the long run rather than short run. A positive relationship between inflation and stock returns was also found for the countries of Jordan, Saudi Arabia, Kuwait and Morocco, looking at the period 2000-2009. This study using the Unrestricted Vector Autoregressive (UVAR) model, came in agreement with Fischer's hypothesis of a positive relationship between inflation and stock returns (Al-Zoubi and Al-Sharkas, 2010). Of course, in addition to all those mentioned in terms of inflationary shocks in different economies, another phenomenon where it has been observed is that a high percentage of companies seem to not respond significantly to changes in an expected inflation due to their strong financial position and remain unaffected (Tessaromatis, 2003).

At the European level, Spyrou (2001) analyses the relationship between Greek stock returns and the inflation rate, using monthly data from January 1990 to June 2000. Dividing this period into two periods, a significantly negative relationship is observed for the first period from 1990 to 1995, while for the second period from 1995 to 2000 the

results show a negative but insignificant relationship. A mixed view on this is taken by Floros (2004) who examined the period from October 1988 to December 2002. The scientist, using the Ols model, concludes a positive relationship between stock returns and inflation, while using Granger Causality he assures us of the absence of causality for both variables. Finally, he concludes that there is no relationship between current returns and past stock returns, so that he considers stock returns and inflation to be independent factors for Greece. Apergis and Eleftheriou (2002), looking at the period 1988-1999, observe using linear regression that inflation, if it has a continuous decline, will contribute substantially to the increase in stock prices. They also agree that their results are on a similar scale to Blanchard's (1993) study of US stock prices.

Taking all the above into account, the purpose of this study is to examine the impact of inflation on the Greek Stock Exchange. In the second half of our year, Greece, with an inflation rate of 5.5%, seems to be close to the average of the 27 EU member states. Subsequently, since last March of the same year, a strong volatility has been observed in the Capital Markets without leaving the Greek Stock Exchange unaffected. So, we thought it necessary to study the relationship between stock returns and inflation from the introduction of the euro until the second quarter of 2022

Methodology & Results

The empirical analysis is carried out using monthly data on the stock returns (S) of the Greek stock market index since the country's entry into the European currency, as well as the level of inflation in Greece, or the Harmonized Index of Consumer Prices (CPI). In more detail, the survey variables are discussed in more detail below...

Stock Market Index: is a collection of the shares of the largest companies in the economy (Strong, 2005). According to Rafique et al. (2013), stock market performance is measured through the movement of the index. The variation of the index is influenced by macroeconomic, social, political, international variables as well as some specific business variables.

Inflation: McConnell et al (2012) defined inflation as the increase in the general price level. When inflation occurs, purchasing power decreases, as each unit of income can buy fewer goods and services. They argued that the Consumer Price Index (CPI) is the main measure of inflation. Talla (2013) used the consumer price index as a proxy for inflation. He argued that inflation can affect the stock market either positively or negatively. He

added that unexpected and expected inflation determines the direction of the relationship between the stock market and inflation.

At this point, we should note that we divide our study sample into three sub-periods, the reason why we do this is to examine whether there is a stability over time or else whether Greek stock market shares are a good investment hedge against inflation. Specifically, the first period is from January 2002 to Q2 2008, we continue with the second period from Q3 2008 to Q2 2019, while we conclude our analysis from Q1 2020 to Q2 2022.

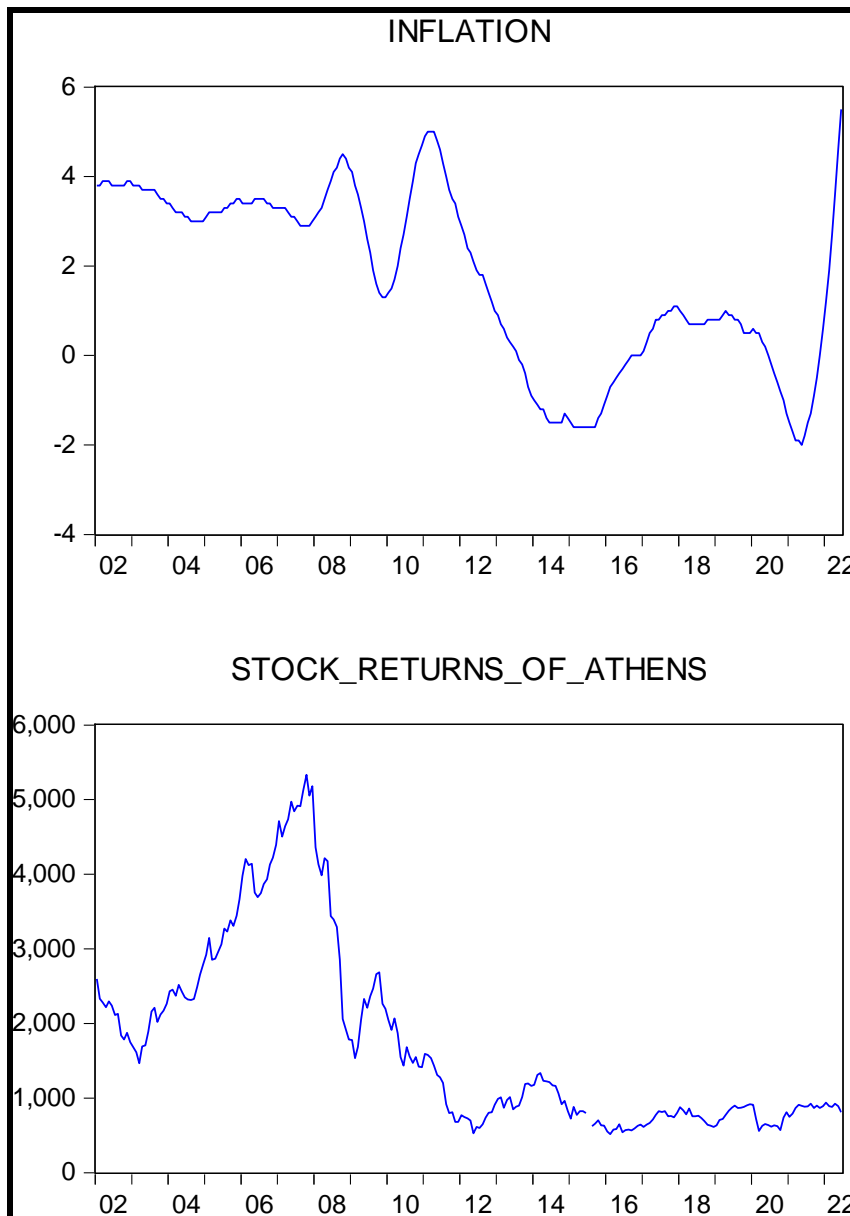
Accordingly, our entire analysis was based on the model $\Delta P_{i,t} = a_0 + a_1 \Delta CPI_t$ (1) where, $\Delta P_{i,t}$ are the returns of the four categories, i = banks, insurance, financial services and non-financial services and the percentage of ΔCPI_t which is the change in CPI. Also, for each period with respect to our dependent variable, we apply the use of logarithm. The use of logarithm, helps to smooth the values or otherwise the log transformation is often used to obtain a more homogeneous variance of a time series. However, we should note that in terms of the predictive ability of a variable, a nonlinear transformation such as logarithm may not result in optimal prediction of the transformed variable (Granger and Newbold, 1976). In conclusion, we stress that in order to make the prediction we use the dummy variable in our model, contributing to the distribution of the time period before and after the financial crisis, by setting 0 and 1 respectively.

Table 1: "Development of the Descriptive Data of our Econometric Model"

	STOCK_RETURNS_OF_ATHENS	INFLATION
Mean	1729.089	1.741633
Median	1176.920	1.900000
Maximum	5334.500	5.500000
Minimum	516.7100	-2.000000
Std. Dev.	1250.165	1.966664
Skewness	1.186730	-0.269576
Kurtosis	3.371660	1.794627
Jarque-Bera	58.91685	17.79935
Probability	0.000000	0.000136
Sum	423626.9	426.7000
Sum Sq. Dev.	3.81E+08	943.7353

Looking at the above figure, one notices that the results of both macroeconomic variables are not related, but if we take each variable separately, the first observation is that they do not follow a normal distribution. This is the conclusion we reach, if one judges the statistical function of kurtosis, and then if we compare the median with the mean we see that in the variable of the Greek stock market the distribution is right convex and with wide tails, while from the other position the variable of inflation is left convex.

Figure 1: "Schematic representation of inflation and stock market performance"



Following the two figures above, we see that inflation before the financial crash of 2008 has a negative relationship with the Greek stock market index and afterwards until 2010. That is, we observe that inflation is bi-directional before the financial crisis with respect to stock market performance and inversely bi-directional for the first two years of the crisis, while for the subsequent period. Below, we see a positive relationship between inflation and yield to date, although we are under the risk of an energy crisis and inflation. Of course, we should note that inflation relative to the stock market return for the year 2022 was moving higher. Of course, to get a better picture we need to test our model using simple regression where we develop through table 2.

Table 2: "Simple Linear Regression"

Dependent Variable: STOCK_RETURNS_OF_ATHENS				
Method: Least Squares				
Date: 10/19/22 Time: 22:11				
Sample: 2002M01 2022M06				
Included observations: 245				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1091.148	87.45277	12.47700	0.0000
INFLATION	366.2893	33.32831	10.99034	0.0000
R-squared	0.332028	Mean dependent var		1729.089
Adjusted R-squared	0.329279	S.D. dependent var		1250.165
S.E. of regression	1023.855	Akaike info criterion		16.70867
Sum squared resid	2.55E+08	Schwarz criterion		16.73725
Log likelihood	-2044.812	Hannan-Quinn criter.		16.72018
F-statistic	120.7875	Durbin-Watson stat		0.029892
Prob(F-statistic)	0.000000			

The demonstration of simple linear regression through table 2 is presented mathematically as follows:

$Stock\ Returns\ of\ Athens_t = 1091.148 + 366.2893\ Inflation_t$, looking at the results in more detail we notice the absence of interpretation of the model due to the fact that R-squared is quite low, while there is also the existence of positive autocorrelation in the residuals of our model. The lack of interpretation of the model may have been caused by the absence of other independent variables in the model. At this point, we should note that the research of Floro (2004) is also in the same vein, only that it examines a different time period. This follows because the relationship is positive but not statistically significant, if you look at the effect of inflation. One observation here is that Graham (1996) considers inflation to be positively caused by the entry of cash into an economy rather than by real activity.

At the same pace as our analysis above is the development of the second linear regression through the use of logarithm. We stress, at this point that using the Log we have the possibility to place the inflation in log form $\left(\frac{CPI_t}{CPI_{t-1}}\right)$ which depicts the monthly change, as well as for the time lag of the stock market or otherwise log (Stock Returns_of_Athens $_{t-1}$). However, because of the fact that we have only two variables under consideration, we only logarithmize the stock market variable, as stock markets are known to trade in a log-normalized distribution, as follows at the given time:

Table 3: "Use of Logarithm in the Model"

Dependent Variable: LOG(STOCK_RETURNS_OF_ATHENS)				
Method: Least Squares				
Date: 10/19/22 Time: 23:48				
Sample: 2002M01 2022M06				
Included observations: 245				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.837578	0.043162	158.4178	0.0000
INFLATION	0.221727	0.016449	13.47968	0.0000
R-squared	0.427834	Mean dependent var		7.223744
Adjusted R-squared	0.425479	S.D. dependent var		0.666669
S.E. of regression	0.505316	Akaike info criterion		1.480865
Sum squared resid	62.04869	Schwarz criterion		1.509447
Log likelihood	-179.4059	Hannan-Quinn criter.		1.492375
F-statistic	181.7019	Durbin-Watson stat		0.039507
Prob(F-statistic)	0.000000			

Table 3, using a logarithm in our dependent variable results in the form: $\text{Log}(\text{Stock Returns of Athens}_t) = 6.837578 + 0.221727 \text{ Inflation}_t$. The valuable contribution of the logarithm can be seen directly because the coefficient of determination has increased compared to the first regression, i.e., this model has an interpretation degree of 42.80%, while from the other position we see that the existence of positivity in the residuals still remains.

Since we have presented an analysis for the whole period of our country's time in the single currency, we move on to the first period of analysis, which covers the period from January 2002 to before the financial crisis. The regression equation will be no different from Table 3 only at the level of temporal analysis. Specifically, $\text{Log}(\text{Stock Returns of Athens}_t) = 10.34176 - 0.687179 \text{ Inflation}_t$.

Table 4: "Use of Logarithm in the Model of the first analysis period"

Dependent Variable: LOG(STOCK_RETURNS_OF_ATHENS)				
Method: Least Squares				
Date: 10/20/22 Time: 00:10				
Sample: 2002M01 2008M06				
Included observations: 78				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.34176	0.374864	27.58801	0.0000
INFLATION	-0.687179	0.109670	-6.265907	0.0000
R-squared	0.340630	Mean dependent var		8.001828
Adjusted R-squared	0.331954	S.D. dependent var		0.352916
S.E. of regression	0.288453	Akaike info criterion		0.376736
Sum squared resid	6.323578	Schwarz criterion		0.437164
Log likelihood	-12.69269	Hannan-Quinn criter.		0.400926
F-statistic	39.26160	Durbin-Watson stat		0.065327
Prob(F-statistic)	0.000000			

Fitting table 4, where is the relation between inflation and stock market index returns, we observe that there is a negative relation. The possible reason, perhaps, is the growth of the economy, with the consequence that this involves a rise in the economy and a simultaneous decrease in inflation, plus the excessive borrowing with low interest rates leading to a depreciation of the value of money. Of course, what is of importance here is whether this continued into the following period.

Table 5: "Use of Logarithm in the Model of the second period of analysis"

Dependent Variable: LOG(STOCK_RETURNS_OF_ATHENS)				
Method: Least Squares				
Date: 10/20/22 Time: 21:58				
Sample: 2008M07 2019M12				
Included observations: 137				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.763518	0.038877	173.9729	0.0000
INFLATION	0.120646	0.017593	6.857735	0.0000
R-squared	0.258358	Mean dependent var		6.902833
Adjusted R-squared	0.252864	S.D. dependent var		0.448851
S.E. of regression	0.387973	Akaike info criterion		0.958729
Sum squared resid	20.32061	Schwarz criterion		1.001356
Log likelihood	-63.67294	Hannan-Quinn criter.		0.976052
F-statistic	47.02852	Durbin-Watson stat		0.064305
Prob(F-statistic)	0.000000			

The results of the second period of analysis, from the entrance of the financial crisis onwards, we observe a positive relationship between inflation and stock returns as described in the form of the equation $\text{Log}(\text{Stock Returns of Athens}_t) = 6.783518 + 0.120646 \text{ Inflation}_t$. A question that arises here, however, is why this exists. As we know, Greece had entered the era of memorandums, the contraction of the financial system and the fact that it had lost to a great extent the investment grade, so it is certain that inflation and equity returns are in line. At the same time, we should note that for the second period our findings fail to a significant degree of interpretation. Specifically, the model is interpreted at a rate of 25.83%, while the existence of positivity in the residuals remains.

Beyond that, however, the positive relationship tends to exist and persist but at a very low level in the third period as we will see below.

Table 6: "Use of Logarithm in the Model for the third period of analysis"

Dependent Variable:

LOG(STOCK_RETURNS_OF_ATHENS)

Method: Least Squares

Date: 10/20/22 Time: 00:27

Sample: 2020M01 2022M06

Included observations: 30

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.665260	0.030686	217.2104	0.0000
INFLATION	0.009939	0.016282	0.610406	0.5465
Mean dependent				6.66622
R-squared	0.013132	var		1
Adjusted R-squared	-0.022113	S.D. dependent		0.16602
var				6
Akaike info				0.66713
S.E. of regression	0.167851	criterion		4
Sum squared				0.57372
resid	0.788875	Schwarz criterion		1
Hannan-Quinn				0.63725
Log likelihood	12.00702	criter.		1
Durbin-Watson				0.34420
F-statistic	0.372596	stat		9
Prob(F-statistic)	0.546516			

The last period of our analysis, where is the entry of covid-19 and subsequently the energy crisis, we observe a slight positive relationship between inflation and stock returns in the short run over a 2.5-year period. Beyond this, however, what we want to

point out is that this particular model $\text{Log}(\text{Stock Returns of Athens}_t) = 6.665260 + 0.013132 \text{ Inflation}_t$, is characterized by a marked absence of interpretation. This absence may be due to the fact that the time horizon is quite short, while on the other hand it is significant compared to the other models in the positivity of the residuals. In this particular case, the Greek stock market in the face of the phenomenon of unexpected inflation is moving against the other financial markets. More specifically, as other literatures report, the Greek stock market is opposed to a negative relationship in the short run or reversed in the long run in the event of unexpected inflation (Bodie, 1976).

At the same time, since we are at the point in time where inflation is a very critical factor of the economy, we proceed our analysis by forecasting the movement of inflation and the financial market until the end of 2022⁷. We note that for our calculation we have used the third period of analysis which includes the inflationary shock, and then we present the stock market forecast. Also, another reason why we stand more in the pandemic and energy crisis period is that if we control for the Akaike and Schwarz criteria from all regressions, the lowest results from the last period are representative. Gutierrez et al. (2009) stated that AIC performs better than other criteria in model selection. Table 7o, then, contains all the mathematical estimates used for the relationship between inflation and stock markets. That is:

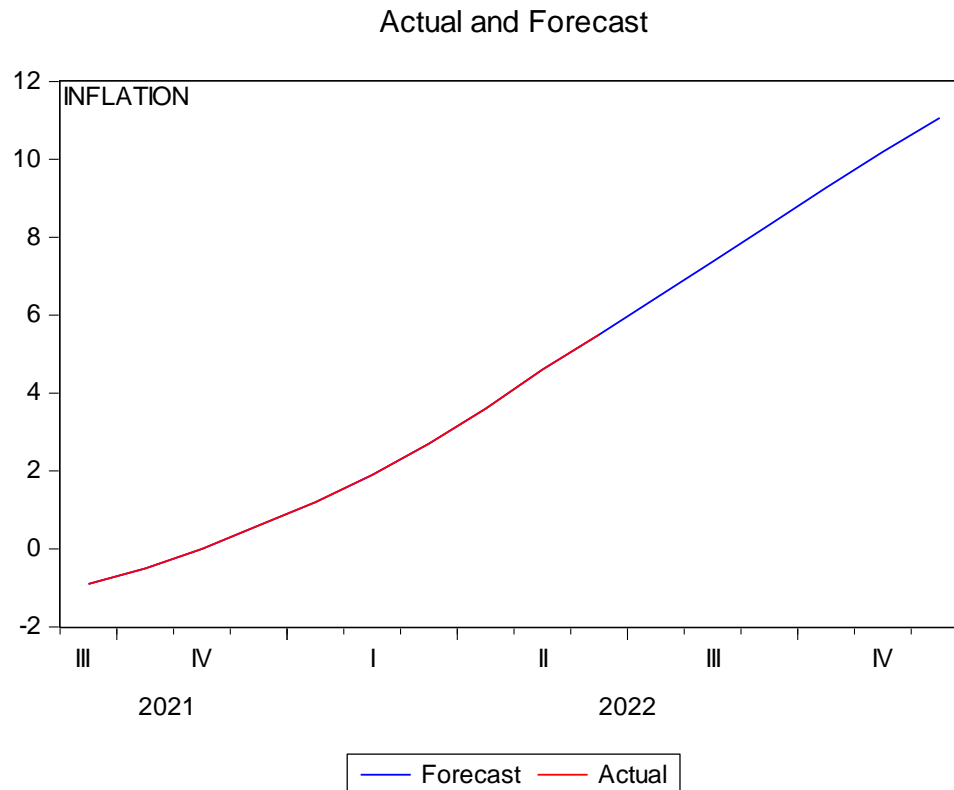
Table 7: "Presentation of Results of the Akaike & Schwartz Criteria"

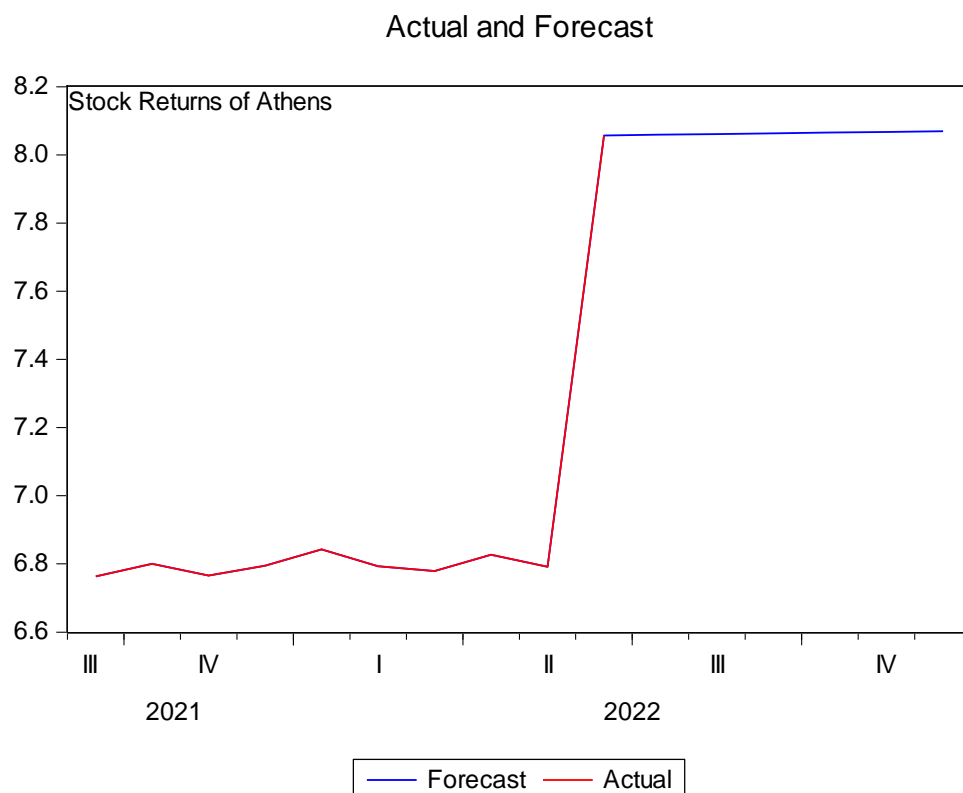
<u>Time Period</u>	<u>Mathematical Assessment</u>	<u>Akaike Criterion</u>	<u>Schwartz Criterion</u>
2002M01-2022M06	1 st Assessment	16.70867	16.73725
2002M01-2022M06 (Log Use)	2 nd Assessment	1.480865	1.509447
2002M01-2008M06	3 rd Assessment	0.376736	0.437164
2008M07-2019M12	4 th Assessment	0.958729	1.001356
2020M01-2022M06	5 th Assessment	-0.667134	-0.573721

⁷ We use until the end of 2022, because our effort is to check in the short term what the reaction of the stock market is from inflation.

Interpreting the results in terms of theory, it highlights that the 5th model as the most suitable for predictive ability. With this in mind, we proceed to predict our two variables.

Figure 2: "Schematic representation of inflation forecast and stock market performance"





Looking at the two figures above, while estimating our last regression, we conclude that an inflationary shock expresses a positive relationship with stock market performance. At the same time, we should note that in terms of forecasting, we see inflation on a steady upward path while the stock market is on a horizontal path with a slight upward slope, which was confirmed by the regression result. So, what we understand is that inflation will prevail in the next six months at high levels in our country, while the stock market performance shows a slight correction in the general index.

Another point, which may help us even more at this point is Granger causality. Stern (2011), considers that Granger causality means that a variable in the past can help predict another variable. For example, if it were to be established that variable X causes variable Y in Granger, this means that the historical data of X can be used to predict Y. This relationship can be bidirectional, which means that Y can also cause X in Granger, using lag 2 because of the fact that we chose AIC.

Table 8: «The results of pairwise granger causality tests for Athens»

Pairwise Granger Causality Tests

Date: 12/09/22 Time: 00:37

Sample: 2002M01 2022M06

Lags: 2

				F-
Null Hypothesis:				Obs Statistic Prob.
STOCK_RETURNS_OF_ATHENS does not Granger				
Cause INFLATION				241 1.428780.2417
INFLATION	does	not	Granger	Cause
STOCK_RETURNS_OF_ATHENS				1.955480.1438

Using a time lag of 2, we observe from Table 8 that one variable cannot influence the other, or else refuses to predict.

Conclusions

Analyzing, in this article, the effects of inflation in general on stock markets, it was observed that opinions are generally divided in the literature. Through simple linear regression, we saw that looking at the period, the relationship between inflation and the stock market was sometimes positive and sometimes negative. This phenomenon mainly stems from the general macroeconomic situation of an economy, as well as from external factors. As far as Greece is concerned, which as an economy is a developing country, inflation for twenty years leaves a positive correlation with the Greek stock market. Another conclusion, is that with the onset of the severe inflationary shock that has been caused in general on the planet, is that our country has also taken the hit but the stock market is following a positive relationship if you control for the last period.

Also, in terms of forecasting, we see that the stock market is following the rise in inflation but in a more moderate form. In conclusion, what is useful for further study is that when

we want to look at an inflation spike, it is useful to look at the level of the lending rate as well as the deposit rate, another was to look at the behavior of similar financial markets when there is inflation, an example is the PIIGS countries.

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Covid-19 Pandemic and its effects on the Greek economy. Case study: The case of the companies HELLENIC PETROLEUM S.A. and PAPOUTSANIS S.A.

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Abstract

This paper examines the impact of the Covid-19 pandemic on the Greek economy and specifically how it affected the financial situation of the companies Hellenic Petroleum S.A. and Papoutsanis S.A. These companies are leaders in the industry to which they belong, and in particular in the field of energy and in the field of production soaps and liquid cosmetics products. In order to examine the impact of the Covid-19 pandemic on the financial position of the above companies, an analysis of their financial statements is performed with the use of financial ratios. We analysed and interpreted five key financial ratios, those of liquidity, profitability, leverage, debt service and investor ratios. The period of the analysis extends from the year 2018 to the year 2021, to compare their results and financial position during the period before and during the Covid-19 crisis and how they responded.

This study shows that the Covid-19 pandemic had a different impact on the financial situation of the companies under study. Hellenic Petroleum SA's revenue and profit fall significantly due to the restrictive measures taken by the Greek Government to prevent the spread of the Covid-19 coronavirus. More specifically, its sales decreased from 8.967 million euros in 2018 to 8.425 million euros in 2021, with 2020 reaching 5.114 million euros. Respectively, the profit decreased from 523 million euros in 2018 to 229 million euros in 2021, with a loss of 338 million euros in 2020. Papoutsanis SA's financials showed improvement due to the fact that during the pandemic period the company was engaged in the production of products that had high demand this period. Specifically, its sales

increased from 24.240 million euros in 2018 to 54.768 million euros in 2021. Respectively, its profits increased from 1.105 million euros in 2018 to 4.925 million euros in 2021.

The paper is completed by presenting conclusions of the study and suggestions for further study.

Introduction

In 2019, the global health crisis of the coronavirus, Covid-19, whose transmission was particularly rapid and reached Greece at the beginning of 2020, began in China. The Covid-19 virus that first appeared in the city of Wuhan, China in end of 2019 and became known to the World Health Organization (WHO) on December 31, 2019 (Wiki, 2020) spread throughout the planet, affecting Greece as well. The World Health Organization classified Covid-19 as a pandemic on 11/3/2020 and by that time 118.000 cases had been recorded in 114 countries of the world with 4.291 victims (WHO, 2020). The outbreak of the Covid-19 coronavirus pandemic found Greece having just recovered from the disastrous consequences of the 2009 economic crisis and faced a new economic crisis, probably more difficult than the one in 2009.

The purpose of this study is to report on the impact of the Covid-19 pandemic on the economy. There will also be a financial analysis of two companies listed on the Athens Stock Exchange; Hellenic Petroleum S.A. and Papoutsanis S.A. which are at the top of the top 10 companies in their sector in terms of turnover.

These companies were chosen for study because they belong to completely different sectors; in the energy sector, because according to a study by PwC (2020) during the period of Covid-19 the demand for electricity decreased significantly at a global level, and in the sanitary ware production sector to which, according to a study by Statista (2020) online sales of hand sanitizers and wipes increased during the Covid-19 period by approximately 5.678% and of liquid hand soaps by 170% compared to the previous year in America.

Covid-19 pandemic and economy

The Covid-19 pandemic found all countries unprepared to face the difficult situation that arose and led all economies to an unprecedented recession with the consequence of increasing extreme poverty worldwide. It caused a shock to both the social and organizational system and put pressure on businesses, in addition to their finances, to their culture, values, the way they treat employees and their corporate reputation and image (Kyriakidou, 2020). The pandemic revealed that: a) we live in a "connected global society" and b) health crises are no longer natural phenomena, but self-inflicted events that destabilize society (Tsekeris and Zeri, 2020). In 2020, a research study was carried out by Padhan & Prabheesh on the effects of the Covid-19 pandemic on the global economy, entitled "The Economics of COVID-19 pandemic: A survey", which showed that there is a great need for coordination at the national and international level in order to deal with the negative consequences of the pandemic on the economies of countries (Padhan and Prabheesh 2020). The pandemic led to an unprecedented recession due to the violent suspension of economic activity worldwide in 2020. The recession led to an increase in both extreme poverty worldwide and debt (Giakoulas et al., 2021). It affected both the demand and the supply of products and services and brought changes in consumer trends and habits. The pandemic has caused massive global economic and social devastation. It is estimated that the global GDP decreased compared to that of 2019 by 4,5%, and according to a study by ILO Monitor (International Labor Organization), 114 million jobs were lost worldwide. Global debt (public and private) is estimated to have increased by 24 trillion dollars, according to a 2021 study (Global Debt Monitor of the Institut of International Finance) reaching at the end of 2020 the amount of 281 trillion dollars (Papadimitriou, et al., 2021). The pandemic tested the endurance of countries, regions, cities and societies of the European Union and the whole world in general. Due to the Covid-19 pandemic, the GDP of the EU-27 Member States is projected to shrink by 7,4% in the year 2020, and no EU Member State will maintain its deficit below 3% of GDP.

The European Court of Auditors (ECA) on 10/12/2020 published the overview with no. 6/2020 in which it is established that the measures taken by the EU and the Member States during the first phase of the Covid-19 pandemic contributed to saving jobs and businesses, but it is pointed out that they will lead to an increase in the fiscal deficits of the Member States as well as that the risk of widening the economic gap between member states is evident (Kanellos, 2020).

Greek economy and Covid-19

European capitalism was hit hard by the crash of 2008. The global crisis of 2008 also affected Greece. Thus, the public debt in 2009 amounted to 126,8% of GDP and the deficit to 15,4% of GDP (Varoufakis et al., 2011). For the Greek economy, 2020 was a "strong recessionary year" with the GDP decreasing by 9,6%, marking the biggest recession in the European Union after that of Spain (Giakoulas et al., 2021). In Greece, according to EL.STAT., the fiscal deficit of 2020 is estimated at 16,1 billion euros and the amount of public debt in 2020 is estimated at 341 billion euros. In February 2021, turnover in retail trade showed a drop of 11,3% in contrast to retail sales through online orders which showed an annual increase of 45,8% (Papadimitriou et al., 2021).

The transformation of the Greek economy in the period of Covid-19

The term "digital transformation" of a business does not mean its need to purchase additional computers and other PC programs (software). It is the movement of businesses from using analog methods to the digital world where data is stored digitally (Lambrianidis, 2020). The international consulting company Deloitte prepared a study on the "Digital and technological maturity of the economy and business" in June 2020. According to this study, Greece ranks low among the member states, occupying the 28th position (Deloitte, 2020). Panagiotis Papazoglou (2020), managing director of Ernst & Young Global Limited (EY) Greece in an interview referred to the results of the EY Global

Risk Survey conducted in 2020 in which board members of the sample companies took part. The results showed that 79% of board members considered that their businesses are not adequately prepared to deal with crisis situations and emergencies that arise after conditions such as those of Covid-19. In September 2020, a survey was carried out by Krataion Consulting on Retail in the Covid-19 era on a sample of 1000 consumers aged 18 to 54 and on 50 retailers. The survey found that 77% of consumers shop online more, 16% shopped online for the first time when the pandemic began, and 60% say they will continue to shop online. On the retail side, 87% have seen an increase in mobile shopping, with 65% of respondents saying they have adopted digital tools to a large or very large extent. (Krataion Consulting, 2020). In September 2020, the E-Business Research Center of the Athens University of Economics and Business conducted a survey on "The Digital Readiness of Small- and Medium-size Enterprises in Greece - The impact of Covid-19". The results of the survey showed that 8 out of 10 small and medium-sized businesses in Greece were forced to make significant changes in the way of operating during the pandemic (online stores, digital advertising, telecommuting, etc.) (ELTRUN, 2020).

The reactions of Greek businesses to the Covid-19 pandemic

The effects of the Covid-19 pandemic on markets and economies in general, and more particularly businesses, are enormous and the biggest they have experienced globally since World War II. The year 2021 is expected to be completely different from all the previous ones where business executives must prepare and make important decisions (Shames et Cline, 2020). The outbreak of the pandemic found the Greek economy having completed its Economic Adjustment Programme after the financial crisis of 2009. Greece reacted immediately to the pandemic and modernized both the state and businesses. A study performed by the audit company PwC on the topic "The effects of the pandemic on businesses" in a sample of 142 companies listed on the Athens Stock Exchange, in which the data of the first half of 2020 is compared with those of the corresponding 2019, showed

that in the first half of 2020 the total market value of listed companies decreased by 28%, their turnover decreased by 21% and their operating expenses decreased by 19%. Listed companies reacted to the decrease in demand by reducing their operating costs, and because of the uncertainty they appeared particularly cautious and did not make investments, while at the same time they kept their cash available as a safety valve.

Restarting the Greek economy after Covid-19

The pandemic also affected the economy of Greece, where in the first quarter of 2020 a drop in GDP of approximately 10% is observed compared to the corresponding period of the previous year. The consequences of the lockdown on the Greek economy were negative. According to an article by the president of the Hellenic Confederation of Commerce and Entrepreneurship (ESEE), Mr. Karanikas, the negative consequences of the lockdown reflected in economic ratios in the 3rd quarter of 2020 compared to those of 2019 are as follows: a reduction in GDP by 11,7%, a decrease in exports by 7,9% and a decrease in turnover by 15,8%. As regards, the time horizon of the restart of the Greek economy, Prontzas (2021), in his article analyzes three scenarios (basic, optimistic and unfavorable) where he estimates the evolution of the Greek economy until the end of 2023. The scenarios are as follows: a) Basic scenario (positive growth in the economy by approximately 4% per year, with the result that at the end of 2023 the GDP will have risen to the level of 2019), b) Optimistic scenario (acceleration of growth in the economy over 5,5% per year, with the result that at the end of 2023 the GDP will have exceeded that of 2019 by approximately 4,5%), and c) Adverse scenario (slow recovery of the economy at a rate below 2% with the result that for the GDP to reach the level of 2019 two additional years will be needed, i.e. until the end of 2025), and he estimates that the basic scenario will prevail. A survey was carried out from 10/9/2020 to 3/11/2020 by ICAP GROUP on a sample of 1.513 businesses operating in Greece related to the effects of the Covid-19 pandemic on businesses and sectors of the Greek Economy. According to the survey, 67%

of businesses said that their turnover will decrease in 2020, while 25% that it will increase, 33% believe that their turnover will return to pre-Covid-19 levels in 2022 and 17,3% in 2023, and only 9,7% stated that turnover showed an increase in 2020. Comparing the effects of the Covid-19 pandemic on the Greek economy with those of the financial crisis of the period 2009 – 2013, 55% believes that the consequences of the pandemic will be greater than the consequences of the economic crisis of 2019 – 2013 (Panteleou, 2020).

Ratios

The ratios express a fraction that connects two elements of the financial statements, such as the ratio of Equity to Debt (Babalos, 2021). The comparison of these elements is also expressed with the Latin word Ratio which means relationship. In financial analysis, a numerical ratio is considered a simple mathematical relationship between two accounting figures obtained from the same or different financial statements. It is simply a fraction and can be expressed either as a ratio or as a percentage (%) (Georgopoulos, 2014). The ratios can be used as a) Year over Year comparison, taking into account past financial data of the financial statements of the specific company, b) Comparison with competing companies which are selected appropriately, c) Comparison with industry ratios where the company belongs and, d) Comparison based on specific logical standards of the analyst based on his personal experience (Daskalakis, 2020). The main ratios are:

Liquidity ratios (Current, Quick, Cash and Defensive Interval ratio), that is, measure the company's ability to cope with its overdue obligations (Kantzios, 2002).

Profitability ratios (ROA, ROE, ROCE, ROS1, EBIT), measure the company's ability to produce either a positive or negative result (Zopounidis, 2020).

Leverage ratios (Debt-to-Equity, Equity-to-Total Capitalisation, Debt-to-Assets, Asset Financing, Debt-to-Capital ratio), examine the company's ability to service its long-term obligations arising from financing from its own funds and debt (Makris, 2021).

Debt service ratios (ICR, ECR, ECR_debt, ECR (extended), DSCR) show how many times the profits cover the company's debt interest and its total borrowings and check whether or not Debt is being used correctly.

Investor ratios (EPS, DPS, DPR) are used by shareholders and potential shareholders of listed companies so that they make decisions about whether to buy or sell shares of a company.

Case Study Hellenic Petroleum (HELPE) S.A.

The company Hellenic Petroleum (HELPE) S.A. was founded in 1998 by the merger of the subsidiaries of the DEP Group, which were renamed Hellenic Petroleum. It is a leading Group in the energy sector and plays a leading role in energy developments in Greece and in the wider region of South-Eastern Europe and is active in 6 countries. In 2022, following a decision of the General Assembly of the company's shareholders, the name of the company changes and becomes "HELLENIC PETROLEUM HOLDINGS SOCIETE ANONYME" with trade name: "HELLENIC PETROLEUM HOLDINGS S.A." (<https://www.helpe.gr/>). The Group, with a sense of responsibility, contributes to the national collective effort to deal with the Covid-19 pandemic by supporting the health system in practice by offering, after consultation with the Ministry of Health and the relevant agencies, hospital equipment, health material, special services, offering fuel and support to vulnerable social groups. The contribution to the response to the pandemic exceeded eight (8) million euros. Hellenic Petroleum Group records its highest profitability with net EBITDA amounting to 758 million euros and is ranked in 2017, according to the Reuters Thomson list, among the top 100 energy companies in the world. At the same time, it is among the largest exporters of products in the South Eastern Mediterranean, while the Aspropyrgos refinery's FCC unit is among the top two in the world, according to an international study conducted by Solomon (<https://www.helpe.gr/>).

Financial Analysis of the company HELPE S.A. years 2018 – 2021

Liquidity Ratios

A/ A	Ratios	2018	2019	2020	2021	2018- 2019	2019- 2020	2020-2021
1	Current ratio	1,18	1,19	1,10	0,85	0,85%	-9,49%	-25,17%
2	Quick ratio	0,78	0,79	0,79	0,47	0,68%	-0,27%	-32,25%
3	Cash ratio	0,48	0,40	0,51	0,26	-8,22%	11,57%	-25,39%
4	Defensive Interval ratio	75,38	83,11	98,96	68,34	10,26%	19,06%	-30,94%

The values of the liquidity ratios in the years 2018 and 2019 (pre-Covid-19 period) fluctuate at approximately the same levels with a small upward trend in 2019, apart from the cash liquidity ratio which shows a slight decrease with its value being 0,40 in 2019 compared to 0,48 in 2018, which means that the company is following a stable – improving path. However, the negative impact of Covid-19 and the restrictive measures taken by the Greek Government to avoid the transmission of the virus was depicted in the financial data of the company that contribute to the formation of the liquidity ratios, and by extension also in the values of the ratios. Specifically, there is a decrease in the company's cash equivalents and receivables in 2021 (Covid-19 period) compared to those in 2019 (pre-Covid-19 period) and at the same time a significant increase, of the cash equivalents by approximately 38% and short-term liabilities by approximately 46%. The increase in short-term liabilities combined with the decrease in liquid assets (except for inventory) of the company led to the decrease in the values of the ratios. On the other hand, the increase in inventory was not able to hold the decrease in the value of the ratios, as it was smaller than that of short-term liabilities. Thus, during the beginning of the period of Covid-19 in Greece (year 2020), before its effects from taking the measures to avoid the transmission of the virus, it is observed that only the current liquidity ratio shows a small decrease while the other ratios show an increase thus proving the positive

- improving trend of the company. However, in the year 2021, when the Covid-19 pandemic and the restrictive measures continued, the negative effects on the company's finances started, which are expressed by the significant reduction in the values of all ratios, compared to those of the year 2020, when the pandemic of Covid-19 began in Greece.

Profitability Ratios

A/ A	Ratios	2018	2019	2020	2021	2018 - 2019	2019 - 2020	2020-2021
1	ROA	7,46%	4,04%	-7,90%	4,38%	-3,42%	-11,95%	12,28%
2	ROE	24,38%	14,13%	-18,61%	11,51%	-10,25%	-32,74%	30,12%
3	ROCE	11,49%	6,19%	-11,63%	9,92%	-5,30%	-17,82%	21,55%
4	ROS1	5,30%	3,26%	-9,33%	4,04%	-2,04%	-12,59%	13,37%
5	EBIT	475.732	261.844	-477.277	340.367	-44,96%	-282,28%	-171,31%

The values of the profitability ratios in the years 2018 and 2019 (pre-Covid-19 period) have a downward trend which is mainly due to the decrease in the company's net profits and the decrease in the sales. However, the negative effect of Covid-19 and the restrictive measures taken by the Greek Government to avoid its transmission was depicted in the financial data of the company that contribute to the formation of the values of the profitability ratios, and by extension also to the formation of their value. Specifically, there is a decrease in the company's net profits in the year 2021 (Covid-19 period) compared to those in 2018 (pre-Covid-19 period) which amounts to approximately 56,11%, a decrease in the operating result by 28,45% as well as a decrease of its sales by 6%. It should be noted that in the first year of the Covid-19 pandemic in Greece (year 2020), the negative impact of the Government's measures played an important role in the company's financial figures and the year closed with a loss and a decrease in its sales. For this reason, all the company's profitability ratios were negative. In 2021, despite the fact

that the pandemic continued, the company managed to close its fiscal year with profits, and as a result the profitability ratios became positive again. It should be noted that throughout the period of the study (pre-Covid-19 period and Covid-19 period) the values of the ratios fluctuated at low levels characterizing the company's performance as average with the exception of 2020 when their values are negative and therefore the performance is considered unsatisfactory.

Leverage ratios

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A/A	Ratios	2018	2019	2020	2021	2018- 2019	2019- 2020	2020-2021
1	Debt-to-Equity	1,97	1,89	2,32	2,35	-7,89%	42,76%	3,54%
2	Equity-to-Total Capitalisation	0,34	0,35	0,30	0,30	0,92%	-4,46%	-0,32%
3	Debt-to-Assets	0,66	0,65	0,70	0,70	-0,92%	4,46%	0,32%
4	Debt-to-Capital	0,48	0,47	0,56	0,42	-0,01	-1,03	-0,14

The values of the capital structure ratios in the years 2018 and 2019 (pre-Covid-19 period) fluctuate at approximately the same levels with a slight variation in 2019 (a slight increase or decrease in the ratios) for the better, showing that the company is gradually improving its position. However, the negative effect of Covid-19 and the restrictive measures taken by the Greek Government worsened the financial data of the company and the leverage ratios. In particular, it is observed that the company's total liabilities in the year 2021 (Covid-19 period) compared to those of the year 2019 (pre-Covid-19 period) increased by approximately 10,95%, dragging the leverage ratios into an upward trend. In the year 2021, even though the Covid-19 pandemic and the restrictive measures continue, the values of the leverage ratios fluctuated at the same levels as those of 2020, which is positive for the company. The only exception is the debt-to-equity ratio which slightly

increased by 3,54%. The fact that the value of the debt-to-capital ratio in the year 2021 is decreasing and is formed at levels below those of the pre-Covid-19 period should be noted, which means that despite the restrictive measures taken by the Government to prevent transmission of Covid-19, the company in the year 2021 managed to control its long-term obligations, reducing them by 37,15% compared to those of the year 2020.

Debt Service Ratios

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A/ A	Ratios	2018	2019	2020	2021	2018- 2019	2019- 2020	2020-2021
1	ICR	3	2	-5	4	-35,06%	-305,48%	-178,96%
2	ECR	5	4	-3	6	-20,19%	-183,98%	-283,66%
3	ECR(debt)	0,24	0,17	-0,12	0,21	-29,92%	-172,28%	32,76%
4	Leverage	120%	112%	142%	126%	-7,54%	29,98%	-15,83%
5	Debt	2.572.948	2.514.597	2.590.046	2.523.744	-2,27%	3,00%	-2,56%
6	Equity	2.146.677	2.238.835	1.820.132	1.995.467	4,29%	-18,70%	9,63%
7	ECR (extended)	0,99	0,93	-0,21	0,83	-5,49%	-122,01%	-502,19%
8	DSCR	0,76	0,58	-0,33	0,54	-24,66%	-157,13%	-263,07%

The values of the debt service ratios in the years 2018 and 2019 (pre-Covid-19 period) have a downward trend which is not positive for the company. The negative effect of Covid-19 and the restrictive measures taken by the Greek Government to avoid its transmission were depicted in the financial results of the company and in the values of

the debt service ratios. More specifically, although there is a reduction in interest expense over time and during the pre-Covid-19 period and during the Covid-19 period, this reduction is much smaller than the reduction in the company's profits of the respective years and therefore the value of the ratios is reduced. In the year 2020, due to the restrictive measures due to the pandemic, the company's result were a loss, and thus the values of the ratios are negative. In the year 2021, even though the Covid-19 pandemic and the restrictive measures continue, the company managed to have profits, and the value of some ratios were formed at the same level or even higher than that of the year 2019 (pre-Covid-19 period).

Investor Ratios

A/ A	Ratios	2018	2019	2020	2021	2018 – 2019	2019 - 2020	2020-2021
1	Earnings per Share (EPS)	1,71	1,04	-1,11	0,75	-39,56%	-207,08%	167,80%
2	Divident Per Share (DPS)	0,50	0,25	0,10	0,40	-50,00%	-59,95%	299,67%
3	DPR	29,19%	24,15%	-9,03%	53,25 %	-5,04%	-33,18%	62,28%

The value of investor ratios in the years 2018 and 2019 (pre-Covid-19 period) showed a downward trend. Specifically for the EPS ratio, the decrease in its value from the year 2018 to the year 2019 is due to the fact that the company's net profits results decreased by approximately 39,56%. The negative effect of Covid-19 affected the financial results of the company and the investor ratios as well. Thus, the result of the year 2020 was a loss, forming the value of the ratios at negative levels. In the year 2021, despite the fact that the pandemic continued, the company's fiscal results were profits, improving its financial

position and the value of the ratio became positive again. Regarding the DPS ratio, the decrease in its value from the year 2018 to the year 2019 is due to the fact that the company decided to distribute dividends of a reduced value compared to those of the year 2018 by approximately 50%. Thus, the company in the year 2020, despite the difficult conditions, decided to grant a dividend which was reduced by approximately 59,95%, compared to that of the year 2019. Finally, in the year 2021, despite the fact that the pandemic continued, the company distributed an increased dividend, slightly reduced from what it had granted in the year 2018 (pre-Covid-19 period), forming the value of this ratio approximately at the level of the year 2018, making its share attractive again.

Case Study Papoutsanis S.A.

Papoutsanis S.A. is a leading Greek company and is one of the largest producers of soaps and liquid cosmetics in Europe. It has been active in this industry for over 150 years. It was founded in 1870 in Lesbos by Dimitrios Papoutsanis. It is one of the most competitive companies in Greece as it constantly evolves its products in order to stimulate consumer interest with new products, with their key features being their innovative features and high-quality raw materials. Its products are available in most European countries (UK, Germany, Belgium, Austria, Sweden, Netherlands, France, Italy, Spain, Portugal, Slovakia, Albania, Romania, Serbia, Bulgaria, Lithuania, Russia, Cyprus), in America (U.S., Canada, Mexico), in Asia (Japan, Hong Kong) and in Australia. In Greece it has an extensive distribution network with more than 6,000 points of sale of its branded products in the retail channel, selective distribution products in pharmacies and duty free and hotel products in the B2B channel. Recently, the company received two important distinctions, at the 22nd Marketing & Sales Conference organized by "The Business Review" magazine. Specifically, KARAVAKI was awarded the GOLD award in the "Century Brand Awards" category for its 72 years of presence on the Greek market, while

the new vegan Papoutsanis Aromatics range was honored with the top distinction "Best Launches Award 2021-2022" (<https://www.papoutsanis.gr/el/>). The first half of 2018 the company showed a significant increase in its turnover of approximately 19,8% (turnover for the first half of 2018 amounted to 12 million euros compared to 10 million in the first half of 2017).

Financial Analysis of Papoutsanis S.A. years 2018 – 2021

Liquidity Ratios

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A/ A	Ratios	2018	2019	2020	2021	2018 - 2019	2019- 2020	2020- 2021
1	Current ratio	1,23	1,30	1,09	1,18	6,90%	-21,01%	8,39%
2	Quick ratio	0,83	0,84	0,78	0,81	1,90%	-6,50%	2,96%
3	Cash ratio	0,32	0,30	0,30	0,32	-1,27%	-0,39%	1,61%
4	Defensive interval ratio	121,80	93,63	112,62	121,9 8	-0,23	0,20	0,08

The values of the liquidity ratios in the years 2018 and 2019 (pre-Covid-19 period) fluctuate at approximately the same levels with a small upward trend in 2019 with the exception of the cash liquidity ratio which shows a slight decrease (the value being 0,30 in the year 2019 against 0,32 in the year 2018), and the defensive interval ratio (which from 121,80 in the year 2018 is formed to 93,63 in the year 2019). Thus, we the company follows a relatively stable - improving path, in the pre-Covid-19 period. In the period of the Covid-19 crisis, the financial data of the company improved, as Covid-19 had a positive impact on them. More specifically, in the year 2020 there is a slight decrease in the value of the liquidity ratios, but in the year 2021 they are close to those of the pre-Covid-19 period and closer to those of the year 2018. Despite the fact that all the liquid assets of the company from year to year they increase from the pre-Covid-19 period but also during the Covid-19 period, the values of the liquidity ratios do not increase

accordingly. This is due the rapid increase in its short-term liabilities especially in the period of the Covid-19 crisis, where an increase of these is observed in the year 2021 (Covid-19 period) compared to the year 2018 (pre-Covid-19 period) over 117%. So, the increase in the liquid assets of the company (cash, receivables and stocks) during the Covid-19 period was not able to compensate for the increase in its short-term liabilities and for this reason the values of the ratios during the Covid-19 period did not improved corresponded to the rapid improvement of the company's financial results during this period.

Profitability Ratios

A/A	Ratios	2018	2019	2020	2021	2018– 2019	2019- 2020	2020-2021
1	ROA	4,30%	6,39%	11,23%	10,50%	2,09%	4,84%	-0,73%
2	ROE	6,02%	7,35%	17,64%	19,49%	1,33%	10,30%	1,84%
3	ROCE	5,62%	8,19%	15,49%	15,39%	2,57%	7,30%	-0,10%
4	ROS1	6,97%	8,22%	14,14%	12,19%	1,25%	5,92%	-1,95%
5	EBIT	1.690.514	2.521.261	5.767.420	6.676.432	49,14%	128,75%	15,76%

The values of the profitability ratios in the years 2018 and 2019 (pre-Covid-19 period) have an upward trend which is mainly due to the increase in the company's net profits results of the year and the increase in the sales. Based on its financial data it is noticed that in the year 2021, despite the Covid-19 pandemic, the company continued its positive trend and presented high performance, a significant increase in results and an increase in the sales of all the sectors in which it operates. The upward trend in the values of the profitability ratios in the year 2020 (Covid-19 period) continues and they become almost double compared to those of the year 2019 (pre-Covid-19 period). In the year 2021, despite

the fact that the company's sales and net profits increased, the prices of the ratios fluctuated approximately at the level of the year 2020. It should be noted that the entire time-period of the study (pre-Covid-19 period and Covid- 19) the values of the ratios fluctuated at low levels characterizing the company's performance as average, but the fact that over time the values of the ratios are increasing, is considered positive for the company.

Leverage Ratios

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A/ A	Ratios	2018	2019	2020	2021	2018 - 2019	2019 – 2020	2020-2021
1	Debt-to-Equity	1,14	1,05	1,37	1,52	-9,46%	32,07%	14,63%
2	Equity-to-Total Capitalisation	0,47	0,49	0,42	0,40	2,16%	-6,61%	-2,45%
3	Debt-to-Assets	0,53	0,51	0,58	0,60	-2,16%	6,61%	2,45%
4	Debt-to-Capital	0,39	0,37	0,42	0,42	-0,02	0,04	-0,01%

The values of the leverage ratios in the years 2018 and 2019 (pre-Covid-19 period) fluctuate at approximately the same levels with a slight variation in the year 2019 (a slight increase or decrease in the ratios) showing a better position. The total liabilities of the company in 2021 (Covid-19 period) compared to those of 2018 (pre-Covid-19 period) increased by approximately 82,47%, leading to an upward trend of the leverage ratios. Accordingly, there is also an increase in the company's long-term liabilities in the year 2021 (Covid-19 period) by approximately 53,84% compared to those of the year 2018 (pre-Covid-19 period), which resulted in a limited exposure to the debt. Despite the fact that the Covid-19 pandemic had positive effects on the company's financial results, in the period of Covid-19 (years 2020 and 2021) it failed not only to keep its long-term and total

liabilities at low levels, but also, they have increased. Thus, the leverage ratios fluctuated at levels higher than those of the pre-Covid-19 period. As a result, despite the good financial position of the company, its economic independence and its financial self-sufficiency as well as its creditworthiness are reduced.

Debt Service Ratios

A/ A	Ratios	2018	2019	2020	2021	2018- 2019	2019 – 2020	2020-2021
1	ICR	3	4	18	13	46,35%	359,80%	-25,86%
2	ECR	6	9	20	21	69,81%	108,51%	6,62%
3	ECR (debt)	0,29	0,46	0,60	0,50	62,31%	28,47%	-17,07%
4	Leverage	52%	42%	58%	66%	-9,79%	15,31%	8,40%
5	Debt	9.567.620	8.153.312	12.495.38	16.688.69	-14,78%	53,26%	33,56%
6	Equity	18.365.45	19.270.69	21.684.95	25.277.44	4,93%	12,53%	16,57%
7	ECR (extended)	1,16	0,62	1,26	1,28	-46,55%	25,67%	2,05%
8	DSCR	0,55	0,36	0,91	0,96	-35,07%	153,81%	5,82%

The values of the debt service ratios in the years 2018 and 2019 (pre-Covid-19 period) have an increasing trend which is positive for the company. Covid-19 had a positive

impact on the company's financials with a sharp increase in its profits in the year 2020 (Covid-19 period) which continued in the year 2021 as well, leading to an increase in the debt service ratios, which were formed in values much higher than the pre-Covid-19 period, which is very positive result for the company.

Investor Ratios

A/ A	Ratios	2018	2019	2020	2021	2018– 2019	2019- 2020	2020- 2021
1	Earnings per Share (EPS)	30,86	56,35	142,2 0	182,3 9	82,62%	152,34%	28,26%
2	Divident Per Share (DPS)	0,00	0,00	0,07	0,05	0,00	100,00%	-25,94%
3	DPR	0,00 %	0,00 %	0,05%	0,03%	0,00%	0,05%	-0,02%

The value of the EPS ratio in the years 2018 and 2019 (pre-Covid-19 period) showed an upward trend due to the increase in its profits. Then, in the year 2020 (in the period of Covid-19), the EPS value increased by about 152% as the net profit of the year increased more than 170% compared to that of the year 2019. In the year 2021, when the net profit of the company increased even more at a rate of about 29%, the EPS value was formed from 142,20 in the year 2020 to 182,39 in the year 2021. The Covid-19 pandemic favored the company as its performance in the crisis soared, the EPS value increased from 30,86 in 2018 (pre-Covid-19 period) to 182,39 in 2021 (Covid-19 crisis period). As for the DPS ratio, its value in the years 2018 and 2019 (pre-Covid-19 period) is zero because the company did not distribute any dividends. But when in 2020 its financial position improved considerably, the company decided to distribute dividends, making its shares

more attractive compared to the past. In the year 2021 the company distributed again dividends to its shareholders, but it was reduced compared to 2020.

Comparison of the Covid-19 impact in the financials of HELPE S.A. and Papoutsanis S.A.

For Hellenic Petroleum S.A. and Papoutsanis S.A. companies, which both hold a leading position in their industry, a financial analysis of their financial statements was made using financial ratios, for the period 2018-2021 (two years of the pre-Covid-19 period, i.e. 2018 and 2019, and two years of period of Covid-19, i.e. 2020 and 2021). The purpose of this study is not to compare the results of their ratios of the two companies, because they belong to different sectors of the economy, but to compare the effects of Covid-19 on their financial data and how it contributed to liquidity, efficiency, sustainability etc. The Covid-19 pandemic negatively affected the financial position of Hellenic Petroleum S.A., in contrast to Papoutsanis S.A. which was positively influenced. The conclusions of the study are listed below.

Liquidity

Observing the values of the liquidity ratios of the Hellenic Petroleum S.A. company, it is noticed that in the year 2020 (Covid-19 period) the values of the current and quick ratios decreased compared to those of the year 2019 (pre-Covid-19 period), while cash liquidity and defense interval ratio increased. In the year 2021 when the pandemic continues, the values of all ratios decreased significantly compared to those of the year 2020 and were formed at much lower levels than those of the year 2019 (pre-Covid-19 period). For the company Papoutsanis S.A. the values of the liquidity ratios in the year 2020 (Covid-19 period) decreased compared to those of 2019 (pre-Covid-19 period). In the year 2021, during the pandemic, their values increased compared to those of 2020, and in particular the prices of current and quick ratios were approximately at the level of 2019, while the cash liquidity and defense interval ratio increased a little compared to those of 2019 (pre-

Covid -19 period). Thus, the liquidity of Hellenic Petroleum S.A. has been affected more by Covid-19 compared to that of Papoutsanis S.A., although in a totally different way.

Profitability

The values of the profitability ratios of the Hellenic Petroleum S.A. company in the year 2020 (Covid-19 period) decreased, and turned into negative values, compared to those of the year 2019 (pre-Covid-19 period), since the year closed with a loss. In the year 2021, however, even though the pandemic continues, the values of the ratios became positive again but remained at low levels, much lower than those of the years 2018 and 2019 (pre-Covid-19 period). For the company Papoutsanis S.A. in the year 2020 (Covid-19 period) the value of these ratios increased considerably (almost doubled) compared to those of the year 2019 (pre-Covid-19 period), due to the leap in its profits. In the year 2021, however, despite the fact that the pandemic continues, the value of the ratios remained around the same level as they were in the year 2020 with a small deviation, but at higher levels than those of the years 2018 and 2019 (pre-Covid-19 period). Based on the above the performance of Hellenic Petroleum S.A. has been affected more by Covid-19 (negatively) compared to the performance of Papoutsanis S.A. (positively).

Leverage

Analysing the values of the leverage ratios of the company Hellenic Petroleum S.A. we conclude that in the year 2020 (Covid-19 period) their value fluctuations compared to those of 2019 (pre-Covid-19 period), is negative for the business. In the year 2021, despite the pandemic, the company kept the values of almost all its leverage ratios at the same levels as those of the year 2020, declaring its stability. An exception is the 25% reduction in the Debt-to-Capital ratio in 2021 compared to the year 2020, which was at even lower levels than in the pre-Covid-19 period. For the company Papoutsanis S.A. the fluctuations in the prices of the leverage ratios in the years 2020 and 2021 (Covid-19 period) compared to those of the year 2019 (pre-Covid-19 period) shows a negative impact to the company.

From the above it is concluded that the sustainability of the company Papoutsanis S.A. has been affected more by Covid-19 compared to that of Hellenic Petroleum S.A.

Debt service

The values of the debt service ratios of Hellenic Petroleum S.A. in the year 2020 (Covid-19 period) decreased, and turned into negative values, compared to those of the year 2019 (pre-Covid-19 period), because the specific year's result was a loss. In the year 2021, however, the values of the ratios became positive again and were formed approximately at the same levels as the ones of those of the year 2019 (pre-Covid-19 period). For the company Papoutsanis, in the year 2020 (Covid-19 period) the ratios showed a significant increase compared to those of the year 2019 (pre-Covid-19 period) due to the increase of the profits. In the year 2021, and while the pandemic continues, the values of the ratios decreased compared to those of the year 2020, but were formed at much higher levels than those of the year 2019 (pre-Covid-19 period). Based on the above, the values of the debt service ratios of the Papoutsani S.A. have been affected by Covid-19 more compared to those of the Hellenic Petroleum S.A.

Investor

The values of the investor ratios of the company Hellenic Petroleum S.A. in the year 2020 (Covid-19 period) decreased compared to those of the year 2019 (pre-Covid-19 period) which means that the position of the company worsened. In the year 2021, despite the pandemic, the values of the ratios increased, reversing the negative impact to the company. For the company Papoutsanis in the year 2020 (Covid-19 period) the value of the EPS ratio increased compared to this year 2019 (pre-Covid-19 period), similarly it increased in the year 2021 compared to this year 2020. The price of the DPS ratio year 2019 (pre-Covid-19 period) was zero, as the company did not issue any dividend, and in year 2020 (Covid-19 period) was 0,07 , while year 2021 decreased to 0,05 but the result is

still higher than the zero value of the years 2018 and 2019 (pre-Covid-19 period). Thus, Covid-19 had a bigger impact in the investor ratios of the company Papoutsanis S.A. compared to those of the company Hellenic Petroleum S.A.

Conclusions

The outbreak of the Covid-19 pandemic found Greece at a very different level of preparedness than it was before the financial crisis of 2009, as it had begun to recover from the financial crisis. In the year 2020, at the beginning of the pandemic, Greece had already completed the Economic Adjustment Programme and the Greek economy was now showing positive economic figures. In contrast to the general pessimistic climate that prevailed due to the uncertainty caused by the health crisis, which turned into an economic crisis, businesses reacted immediately by adapting them to the new situation created by the Covid-19 pandemic in order to be able to continue their operations. Nevertheless, the Covid-19 pandemic affected the financial position of the businesses, sometimes positively and sometimes negatively, depending on their field of activity. The companies analysed in this study (HELPE SA and PAPOUTSANIS SA) belong to two different industries of the economy with different operating activities (but both hold a leading position in their sector), so the pandemic had a different impact on their financial position. The company HELPE S.A. which belongs to the industrial sector and specifically to the energy sector and was first in the list of top ten companies in relation to its turnover saw its revenues and profits, during the period of Covid-19, decrease significantly. Specifically, its sales in 2019 decreased by 10,53% compared to 2018 (from €8.967 million in 2018 to €8.023 million in 2019), in 2020 they decreased by 36,25% compared to 2019 (from €8.023 million in 2019 they amounted to €5.114 million in 2020), while in 2021, when the situation started being more stable, they increased by 64,36% compared to 2020 (from €5.114 million in 2020 to €8.425 million in 2021). At the same time, its net profits results amounted to €523 million in 2018, €316 million in 2019, €338 million in 2020 (loss) and

€229 million in 2021. This means that in 2021, the company's revenue and net profit results increased to a large extent, approaching approximately the levels of the pre-Covid-19 period. The company Papoutsanis S.A. which belongs to the industrial sector and specifically to the production of goods that were in high demand during the first wave of the pandemic such as sanitary materials and personal hygiene items managed to cope with the impact of the Covid-19 pandemic by increasing its turnover and net profits. Specifically, Papoutsanis' sales in 2019 increased by 26,57% compared to 2018 (from €24 million in 2018 to €31 million in 2019), in 2020 they increased by 32,97% compared to 2019 (from €31 million in 2019 they amounted to €41 million in 2020), and in 2021 they increased by 34,24% compared to 2020 (from €41 million in 2020 to €55 million in 2021). At the same time, the net profit results amounted to €1,1 million in 2018, €1,4 million in 2019, €3,8 million in 2020 and €4,9 million in 2021. The company Papoutsanis S.A. the period of the study (2018 – 2021), as far as its financial data is concerned, managed to improve its ratios while the ratios of the company HELPE SA, in the same period were worse. This means that the Covid-19 pandemic positively affected the financial position of Papoutsanis SA. while the financial position of the company HELPE SA was affected negatively.

Suggestions for future research

In this paper we dealt with the financial analysis of the companies Hellenic Petroleum SA. and Papoutsanis S.A., two leading companies that belong to different sectors of the industrial sector and specifically in the energy sector (for the company Hellenic Petroleum S.A.) and in the hygiene production sector (for the company Papoutsanis SA). The research concerns the period 2018 – 2021, two years before the Covid-19 period (2018-2019) and two years during the period of the Covid-19 (2020-2021). Its purpose is not to compare the results of the financial analysis of two companies belonging to different sectors of the economy, but to study the effect of Covid-19 on top companies of different

sectors. It will be of interest for future researchers to continue the financial analysis of these companies in the post-Covid-19 period, in order to draw comprehensive conclusions about the effects of Covid-19 on their financial position. Also, it would be interesting to compare the results of these companies with the corresponding ratios of the respective industries of the foreign or global market or other similar companies abroad.

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Work-Based Learning and Traineeships in Greek Higher Education: from fragmentation towards unification

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Abstract

The paper studies the establishment of work experience programs in the context of the Greek Higher Education Institutions and connects it with the attempts to include Work-Based Learning (WBL) in the education system on a large scale. The particular study acquires special interest in the light of the intensification of the efforts made all over the world aiming to improve the organization and implementation of such interventions [1]. Work experience programs are required to be better adapted to the special educational and labor market characteristics of each country and to become more effective. In Greece, the educational and the labor market policy framework recognizes the significant contribution of WBL in general and of traineeships in particular to the development of the appropriate professional knowledge and competences by higher education students. At the same time, traineeships can operate as a communication channel between educational institutions, businesses and social partners, which facilitates their multifaceted information exchanges [2]. Considering, however, the operational autonomy that has been granted to HEIs in Greece, each University develops its own strategy as regards the connection between higher education studies and the labor market. The research presented in the paper constitutes a quantitative analysis of all the types of traineeships implemented by the Greek HEIs with special reference to certain axes, such as the scientific field, the optional or mandatory character of the schemes, their duration and the awarded ECTS. The fragmentation element is apparent in the analysis. Moreover, additional issues of interest are discussed, such as the small degree of WBL integration in some fields of study compared to the current labor market needs, the prevalence of specific study areas as fields of major importance and, in most work experience programs, the absence of a comprehensive and forward-looking follow up mechanism after their completion.

Keywords: Work-Based Learning, Traineeship, Higher Education Institutions

JEL Classification: E24, I23

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Moving from Incremental to Performance Budgeting

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Abstract

This study provides a comprehensive view of the Performance Budgeting and highlights the challenges and opportunities the new system of budgeting faces.

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Keywords: government policy, performance budgeting, budget systems, administrative reform, public economics

Jel Classification Codes: G18, H61, P41

Introduction

The goal of the current research study is the analysis of budgeting reform in Greece through a comprehensive view of the state budget. This is the second attempt to move from Incremental Budgeting to Performance Budgeting. The first attempt yielded for 5 years from 2006 till 2010 and suddenly abandoned. Through this lens, there is great need for further research on the implementation of performance budgeting in the public sector in light of the current emerging trends (economic crisis, Covid-19, austerity), into the reasons that dictate the Budgeting reform and the factors that lead to its success or failure.

In the European Union context, Greece has received severe pressures from member states and pressure groups to improve its efficiency (IMF 2005). It is a fact that our country has a very limited administrative capacity (Pissarides Committee, 2020) and the Greek administrative system will have to change in order to survive. In the current phase, the Ministry of Finance is called upon to implement a radical change in the structure of the State Budget.

From historical perspective, the transition of the State Budget in Greece from the classical form of Funds (Expenditures Oriented Budgeting or Line Item Budgeting) to a system that evaluates the performance of the financed policies (Performance Oriented Budgeting or Performance Budgeting) has a long history and a complex development. Because the new form of the Budget has been defined with various terms, e.g. Program Budget or Performance Budget, for reasons of convenience we use only the latter.

Generally, Performance Budgeting links resources used (Budget allocations) to measurable results. To implement this, political goals (government choices) must be prioritized and integrated into strategic objectives with programs and actions. The latter

are monitored with business objectives and efficiency and effectiveness measurement indicators (Key Performance Indicators). Based on the definition of O.E.C.D. (2009) "performance-based budgeting is the budgeting process that links the allocation of appropriations to measurable results". This change presupposes a change in the classification system of the Budget's expenses, as well as changes in the allocation of resources and in the accounting of their flow so that the allocation of money is linked to the performance objectives.

Obviously, Performance Budgeting emphasizes outputs and outcomes. By measuring the performance of government programs, the easier extraction of information is achieved, improving the accountability of Government actors. Likewise, the transparency of Government action increases, as the amount of funds allocated to each government program is clearly distinguished. An additional element is that for each program and action an implementation manager is designated, who is accountable for the course of the program or action undertaken.

The first reference to the transition to the Performance Budget was made in 2008, in the Budget Advisory Report, with the Government's clear goal of transitioning to the new budget system by 2012. During the early period, significant and unprecedented efforts took place in Greek terms, where: a) all the resources (material and human) allocated to the achievement of the objectives were recorded, b) the resources (inputs) were related to the results (outputs), c) objectives and indicators were set for the evaluation of the actions, d) it was (potentially) possible to evaluate public expenditure in terms of its feasibility and effectiveness.

Since 2009, the Introductory Report of the Minister of Finance to the Parliament was accompanied by a special edition entitled "Program Budget 2009", which presented the main advantages that would result from the reform in question. In 2010, in the corresponding report submitted by the Minister of Finance to the Parliament, it was mentioned that the rationalization of the state budget expenses is promoted immediately (within the year), through the program budget, so as to reduce the waste of public money and the opacity of public finances.

This particular reform, despite the announcements and the preparation of the competent services of the General State Accounts Office, was abruptly stopped and withdrawn from all official budget texts. The prevailing conditions were considered incompatible with the introduction of this particular reform, as the country was reeling from an unprecedented financial crisis and the Ministry of Finance was trying to manage a particularly increased, due to the circumstances, workload.

After nine years, a new attempt to reform the existing Budget system was launched with a focus on "cost centers", i.e. "where public funds are spent" and with "what effect". Initially, in 2021 the pilot application of the new system began in five ministries, while in 2023 the State Budget was also drawn up based on programs.

As it focuses on cost centers, its objective is to improve the quality of public services by better allocating resources that are consistent with political and social goals, improving efficiency, economy and effectiveness in their use and increasing accountability. Its focus is on what the public sector achieves with the resources and not how much money is spent in a Ministry.

Literature review

An analysis of what Public Budgeting is and what does is crucial. As noted by OECD, it is an essential keystone in the architecture of trust between a state and its citizens. Formally it is a central policy document of government, that shows which annual and multi-annual objectives will be achieved. It presents how public resources are raised and allocated for the delivery of public services. It is a way through this document that a government achieves, among others, transparency, accountability and declares its planning of national goals.

The state budget is the heart of government operation (Wildavsky, 1992), and this stems from the strong interdependence that prevails between the effectiveness of the Government and the state budget. It also includes a wealth of information on the income-expenditure accounts, the monitoring system of the specific accounts applied, the procedures followed for its preparation and maintenance, the form of the decisions taken, the way in which they are defined, the role of government institutions and the economic, social, political and cultural environment of the country that draws it up.

According to the OECD (Schick, 2003), there is no standard definition to fully describe the concept of a government budget, as the diversity and goals that budgets are asked to cover are as diverse as human goals (McCaffery, 1998). This explains the absence of a generally accepted theory (Kenno et al., 2018) that analyzes and predicts with certainty the events and factors that affect or may affect the budget. The most well-known research question touching on the basic budget problem, which has occupied many researchers to this day, was presented in 1940 by V.O. Key (1940) and is summarized in the phrase "On what basis shall we decide to allocate X dollars to Action A instead of Action B?" or else "How can we compare values of unlike functions (ex. education to defense) in order to allocate the scarce resources?".

The two main tendencies that prevailed theoretically and tried to explain the budget allocations are based on the Rational model (Synopticism/ Normative model), which interprets «what should be done» (continental model - normative theories) and the Incremental model (Incrementalism/ Descriptive model), which presents the "being" (Anglo-Saxon model - outcome measurement theories), i.e. what actually happened during its preparation.

The Rational Model is based on rational decision-making theories and uses the basic principles of Microeconomics and marginal utility to determine how finite resources should be allocated. This model breaks down budgeting into specific steps, such as

recording programs and government actions, measuring the costs and outcomes of public policies, and controlling action-takers for the use of performance information (Joyce, 1998). When using the rational model, it is assumed (bias) that performance information has a direct impact on the corresponding allocations of state budget resources. In this model, the criticism is based on bounded rationality when choosing decisions (as it presupposes a plurality of rational decisions) and on information costs.

Performance Budgeting is included in this view (Anderson, 2007), as it is based on the measurement of the efficiency and effectiveness of public expenditures and their use in making fiscal decisions. Because it is based on increasing performance (value for money), it is mainly applied in periods of economic crisis and financial distress, as then there are severe restrictions on the state budget and greater pressures for financial consolidation.

On the contrary, the Incremental model (Robinson & Brumby, 2005) is based on the logic of finite rationality of Herbert Simons, with Wildavsky as its main exponent. The budget that takes place with this theory appears nowadays as "the traditional line-item format" (hereafter Line Item Budget, or L.I.B.) and is influenced by the economic prosperity that prevailed at the time (Meyers 1998). Wildavsky argued that no one can answer Key's question, as the distribution of budget spending is unlikely to be accurately predicted, since government action, which depends entirely on the political system, is impossible to predict based on theoretical models (Jones, 1996). For this reason he argued that the rational model is utopian, as political conflict regarding the allocation of budget funds is a given and the role of each Government is influenced by a variety of factors (Wildavsky, 1992).

Nowadays Incremental Budgeting is used to allocate to Ministries the available resources with no connection between public policies and inputs. Consequently, no guidelines emerge during its implementation and it is a poor management tool that cannot be used for any strategic decision making on policies. As it focuses on items of spending (example wages, supplies etc), allocations are determined by past allocations, which means that they are predicted by the previous year's expenditure base with few modest adjustments and budgetary base of main resources are more or less taken for granted. It is obvious that through this model only cost matters.

When we refer to Incremental Budgeting we mean the traditional form of government budgeting where resources are allocated each year based on small incremental changes (Cong-qin, 2007), by policy area and output category. This perspective presents the budget as the result of political compromise, which takes into account bureaucracy and current financial situations. For supporters of this model, the budget is not so much an economic problem as a political one. The logic that prevails between the economic and political sectors is not identical and often the two sectors are not led to the same choice of decisions. According to the proponents of the Incrementalist view, when budget resource allocations change the political influence of the Government changes at the same time, because they assume that there is no significant change in the budget without a

corresponding change in the political domain (Wildavsky, 1992). Therefore, in any reform effort in the area of budgeting (budgeting reform) one should examine who benefits from it and who loses, as it turns out to be a veil of hidden political preferences (Schick, 1983).

Between these two theories, there was also an intermediate model, which was supported by Etzioni (1967) and Dror (1964), proposing a "middle solution", i.e. a complex model of decisions that would take into account both previous theoretical aspects (McGrew & Wilson 1982), which simultaneously collected their respective disadvantages.

Similarly, Lewis (1952) attempted to formulate an economic theory of budgeting, according to which three basic principles should be met and based on which an alternative procedure of budgeting should be followed. The first principle is based on the scarcity of public resources and argues that budgeting decisions should be based on the relative value of marginal costs. The next principle tries to answer the second basic question we encounter during budgeting "How can the values of unlike functions be compared?". To answer this he examines the diminishing utility of goods, using incremental analysis to compare the marginal equilibrium point of non-comparable public policies (eg funding for research into a disease cannot be compared to funding for defense systems). The third principle asserts that the allocation of resources should be done by comparing the relative effectiveness that different policies can have for the defense of a common goal, resulting in an evaluation or prioritization of the goals that each Government is called upon to achieve. As expected, this theory is challenged by a variety of non-cognitive and non-rational factors (eg political games, ideologies), many of which are not known in advance, as a result of which it cannot be applied more generally.

The effort to crystallize a theory of budgeting has led some authors to borrow elements from open systems theory in order to gain a more general understanding of the context around which budgeting and completion takes place. In this context, the analysis is promoted not only of the technical, structural and behavioral characteristics that affect the state budget, but also the examination of more general political and social values that prevail in each period, as well as ideological currents that influence the actors and their decisions regarding with government spending (Gibran & Sekwat 2009).

According to Schick (1966) a general feature that all types of state budgets meet are three basic functions: planning, management and operational control, which, although functionally invisible, are separated for technical reasons. Over the years it has been observed (Joyce, 1998) that the emphasis has moved from control to management and then to budget planning.

Planning, while in practice implemented as a bureaucratic process, is in fact the most difficult part of the budget, as it deals with the basic economic problem of allocating finite resources to competing actions. In this phase, a series of predictions regarding the needs

of the system is carried out, so that the best possible allocation of state budget resources can be obtained, taking into account the ideological needs of the political system.

The prevailing trend in recent decades in the field of public administration has shifted the interest of researchers from the continental-bureaucratic model of organization (France and Germany) to an Anglo-Saxon (England and U.S.A.) model, which is characterized by management by objectives. The emphasis began to be placed on the quality, effectiveness, efficiency and economy of administrative actions and is now widely known as New Public Management or New Public Management (NPM). While the classical system of bureaucratic organization was based on the legal framework, cells of responsibility, homogeneity of tasks, unity and span of control, hierarchical structures and accountability at all levels to the hierarchical superior, in contrast, NPM is based on improved and less legislation, limiting the vertical organization, rationalization of administrative structures and wider citizen participation.

Performance measurement under N.P.M. has led to the shift of the center of gravity towards performance/performance in all public management and consequently also in the state budget (Ter Bogt et al., 2015). In this light, performance is a tool through which government action can be improved in three ways: better allocation of budget resources, better management due to more information (p.i.), financial reporting (Joyce, 1998).

Contrary to the private sector, where performance is perceived as an economic concept, in the public sector there is no consensus on its measurement (Brewer et al., 2000). It is obvious that the actors involved in the preparation of the budget differ in terms of their political aspirations, for this reason the meaning they give to the achievement of the performance also differs. Over the years, the concept of performance has particularly concerned public management and has taken various forms: productivity, profitability, efficiency, etc. Its definition is also influenced based on the goal of achievement, the level of examination of the problems or the policy area. As mentioned, performance is directly affected by the one who chooses the goal, the measurement method (Van Dooren et al., 2015) and the acceptable level of performance (Behn, 2003). For the sake of simplification, in this paper we accept that the concept of performance is linked to the improvement of the actions that took place and results from comparative measurements of results determined by the political leadership.

Through NPM the concept of performance gained enormous importance, while at the same time a new wave of government budget rationalization emerged globally, with the aim of linking government resources to performance. The need to control public expenditure, the effort to increase transparency and government accountability, as well as the establishment of the "value for money" logic, are just some of the components that led to the change of standard in budgeting.

On the other side, Performance Budgeting or Program Budgeting, arises from New Public Management movement and tries to rationalize the budgetary process. It accomplishes that by linking resources to results. Political goals of Governments are

prioritized and integrated into strategic objectives, divided into programs and actions accordingly. By doing so it connects inputs to outputs and outcomes, improves the resource allocation system and management, supports programs that achieve their goals and helps to avoid horizontal cuts in all Ministries.

Additionally, pressures for fiscal consolidation and new performance control methods, through measures of the efficiency and effectiveness of public services, have led, mainly in OECD countries, to a need to replace the classic income-expenditure budgeting (line-item budgeting) with a new model, which combined targets with indicators, while checking the smooth functioning of state action with feedback information. In this way, a state, through the presentation of comparative results, improved the transparency regarding the distribution of state expenses and the accountability of its public services.

The paradigm shift in the way the Budget is drawn up is also linked to a theoretical shift of the state towards the New Public Financial Management (Guthrie et al., 2002). Public action is now possessed by a concept of Total Quality Management, with principles of efficiency and rationality. A key feature of the new era is the planning of the state budget based on the intended results.

The transition we are experiencing marks the shift from the classic form of Line Item Budgeting to a system that evaluates the performance of the financed policies (Performance Oriented Budgeting). Applying the principle of sound financial management, the Budget is based on performance, emphasizing outputs and results. Thus, the drawing of conclusions is facilitated through accountability, since information and explanations are now provided regarding the achievement of the actions financed, as well as through transparency, since the amount of funds allocated to each public action can be clearly distinguished. Everything that is related to resources is considered public information and is provided at the discretion of the public, whether it concerns the results of the performance of public services, the cost of public policies, etc.

The shift in focus from inputs to outputs is partly also due to the cumulative increase in information and the effort to use this information in both budgeting and execution. The interest of the OECD, the World Bank and the International Monetary Fund turned to the collection and use of performance information of state policies, through the drafting of Performance-Based Budgeting (P.B.B.).

Performance Budgeting was first implemented in 1949 in America, with President Hoover's Commission, while in the mid-1960s it was replaced by a modified form of it, called the PPBS- Planning, Programming and Budgeting Systems (Kong , 2005). Even today, during the Presidencies of Presidents Bush and Obama, various forms of it (PART – Program Assessment Rating Tool) were implemented (Diamond, 2003). The International Monetary Fund estimated that in the mid-1960s Performance Budgeting was being implemented by 50 countries, while in the late 1980s it was identified with the application of New Public Management principles. From the mid-1990s to the early 21st century, it gained wide acceptance and was implemented by the majority of OECD

countries, while in 2016 it was estimated that the Performance Budgeting framework was the norm for OECD countries. In a more general context, within 65 years it evolved from a simple administrative reform to a method of drafting a Budget that was applied worldwide.

In general, Performance Budgeting links the resources used (Budget allocations) to the measurable results produced, through the systematic use of performance information (p.i.), with the aim of improving the efficiency and effectiveness of public policies (Robinson & Last, 2009). To realize this, political goals (government choices) must be prioritized and integrated into strategic objectives with programs and actions. The latter are monitored with business objectives and efficiency and effectiveness metrics.

With the new system, the center of gravity shifts from where the Budget money is allocated to what was achieved, that is, the results obtained from each public action. Consequently, not only the amount of public money spent is examined, but also the quality of the results of public expenditure. The transition to the new system has significant benefits for Governments, as with this specific system information is improved during decision-making, with the consequence that both allocation efficiency and productive efficiency are improved (Aliabadi et al., 2021).

The benefits of implementing Performance Budgeting are that the government's objectives are clearly defined and can be documented on how each Policy area and each Program contributes to the achievement of the strategic objectives, performance management and progress towards each objective are better identified what works and what does not, and clarify underperforming policy areas, facilitate short-term and long-term budget planning, also improves management and service delivery. It also makes Program Managers accountable for the output and results of programs and provides better support to Citizens when they are asked to choose between issues of public interest. Those benefits are closely linked to increased Value for money, Transparency and Accountability of a Government.

It is clear that Performance Budgeting has significant advantages over Fund Budgeting, but there are significant challenges in its implementation (Mauro et al. (2021). Already in the early 1960s, Performance Budgeting has been heavily criticized, first and his most famous critic Aaron Wildavsky. Some inherent problems that characterize it (Nguyen, 2007) are that it is a tool for management and falls short of objectives, evaluation of alternative proposals, to authorize selected programs that facilitate its planning. Therefore, it cannot solve the problem of the financial crisis.

Moreover, its implementation fails when various public services are involved. The complexity of the information it contains gives pressure for multiple conclusions, where the actors can play "political games", resulting in making the wrong decisions (diverse selection). Commonly used metrics are difficult to define in practice both in terms of their range and their height. Poorly performing programs are usually easy targets for

restructuring, and for this reason stakeholders often become reluctant to track all metrics correctly.

Reviewing the literature on government budget reform, we find a wealth of analysis of the challenges that the implementation of Performance Budgeting may face. While its adoption was associated with great ambitions in terms of the changes it could bring about, its implementation was often characterized by disappointments in terms of results (Mauro et al., 2021).

In general we can distinguish the technical difficulties, which include structural problems (institutional drivers, barriers to implementation, public sector features, political influence), problems resulting from the changes that take place due to the reforms (lack of coordination with other tools, modernizing accountability), as well as problems linking performance with the allocation of budget resources (lack of agreement on objectives and priorities, identification of proper performance measures).

In addition, during the implementation of the reforms, behavioral problems arise, related to the agreement or indifference of the actors to the changes resulting from the reform, weak leaderships to enforce or provide incentives for change, as well as problems of game theory, due to competition of social partners (Aliabadi et al., 2021). Finally, reforms are also affected by their external environment, especially when this includes unprecedented conditions both economic (financial crisis), health (COVID-19) (Anessi-Pessina et al., 2020) and socio-political (war).

According to OECD (2016) the deficits of a performance culture, the corresponding capacity or performance measurement training, the deficit of available resources and time, as well as the lack of performance information are the most important factors that may make the implementation of the new budget system ineffective.

Recognizing the difficulty of establishing a state budget reform, various theoretical guides have emerged as to the steps that should be completed in order for the reform to succeed. The key recommendations presented in the budget reform theory (Douglas, 2000) include:

1. Advocates of budget reform should not overestimate the benefits and underestimate the costs of reform efforts.
2. Major budget actors must be convinced that there is a problem with the status quo and that change is imperative.
3. The best time to adopt a budget reform is during a time of financial distress.
4. The goals of the reform should be clear and not in conflict with each other.
5. Potential problems/obstacles should be identified and addressed before starting the process.
6. Reform should permeate the entire budget structure
7. The reform should be supported by the main actors of the budget

8. The involved "actors" who have shouldered the implementation of the reform should understand it and have received special educational tools and training to implement it.

9. Calculations should be manageable, i.e. neither extensive nor incomplete

10. The reform should be tested on a small scale before being widely implemented

A similar view by Sterck and Scheers (2014) claims that the four main challenges for a successful transition to the new budget system are:

A. Aligning the fiscal framework with results-oriented budget reform.

B. The creation of a legal interest in performance

C. The provision of high level performance information

D. The establishment of leadership and administrative principles in the General Accounting Office of the State

According to Andrews & Hill, budgeting is a vehicle for culture change. An institutional reform, such as the transition from incremental to performance budgeting, requires changing rules, procedures and roles. Examining the culture change deficit in states that implemented budget system reforms, the authors concluded that when the new performance budgeting system is implemented alongside or within the existing system, institutional conflict is created and the new system underperforms. The influence of established institutional structures is so strong that it dominates the new order unless there is a radical change in the budget model.

For this reason they argue that the two budget systems should not be used in parallel, but during the reform process the existing model should be completely replaced with the new performance budget system, which is based on much more than simply measuring performance. They argue that in order to solve the complexity of such a large institutional change, the reform should be done in such a way as to address the issue of culture change, introducing incentives, giving more autonomy but also responsibilities to the participants and understanding that if there is no systematic evaluation of their behavior, changing the system does not become possible.

A more specific view holds that even if the budget reform fails in the sense that the conditions we mentioned are not met, a country or a sector may still show improvements in its performance. This fact is explained as the incentives, improved organizational capacity and flexibility of the new system can in themselves lead to significant performance improvements compared to sectors that did not implement any reform (Andrews & Moynihan, 2002). Similarly, the enhanced interest of society and officials about where their money goes has led to performance improvements, which are evident through the use of improved measures of performance, efficiency, effectiveness and productivity, offering assurances that government funds are being used correctly, considering the indirect utility of performance information (Aristigueta & Justice 2006).

Because the modern theoretical pluralism (Anessi-Pessina et al., 2016) found in the modern literature exceeds the expectations of this paper, this research is limited, based

on the contingency theory, to the study of the behavior of the actors (principal agent problem) during the implementation of the reform effort being made in the Greek public administration.

Results of the study

The Preliminary results of the study have demonstrated the significant advantages of Performance Budgeting over the Incremental Budget form, but have also shown that there are significant challenges coming from its implementation. Interviews with participants in the current budgeting reform confirm that there is a pluralistic framework, relevant with the theoretical standards, that defines the reasons that could lead to the failure or success of the reform.

Firstly, factors such as the political system, the political culture or the fiscal environment are closely related to the implementation of budget reform. They arise from the tragedy of the commons, leading to conflict over scarce resources, competing priorities and competition among public officials for budget allocation. In addition, ideological pressures, lack of support regardless of political party and political gaming are also strongly related to its future path.

Secondly, in Greek state there are inherent inefficiencies such as lack of performance culture and culture of change, lack of experienced and motivated human resource, lack of motives, lack of Information Technologies, lack of valuable methods of data collection and reporting, principal-agent goal differences, information asymmetries, cost for public decision making, usual “gap” between what is officially declared and what is practically achieved

Ultimately, a budget reform is part of a bigger image and is accompanied by a wider set of financial reforms, which require better standards, such as better fiscal knowledge and effective tools as Key Performance Indicators.

Conclusion

In conclusion we accept the complex nature of budget reforms and although there is not an easy way of implementation, the benefits it can bring to the State are attractive. There is much room for improvement and the main challenges remain. It is expected that some of the issues to be considered are the specific features of Greek public services that should be improved before and after the upcoming reform and also the ability of the government to successfully implement appropriate fiscal reform.

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Data driven decision making in business: an overview of Business Intelligence application and Industry 5.0

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For the companies that have already realized the potential of smart technologies and data-driven decisions, “Industry 5.0” is the next step on their business intelligence roadmap. The fifth industrial revolution represents industries based on smart digital information technologies and data-driven decision making. As opposed to the previous “Industry 4.0”, the fifth revolution has a more collaborative approach to human-robot interactions. While in “Industry 4.0” robotics and smart technologies and tools are used for human replacement in order to automatize repetitive actions, and human error prevention, in “Industry 5.0” humans and robots are joining forces by “specifically putting research and innovation at the service of the transition to a sustainable, human-centric and resilient industry.” [1] According to the European Commission, “Industry 5.0” focuses on creating an industry that aims beyond efficiency and productivity as the sole goal, but also places the wellbeing of workers at the center of the production process [1] The discussion of business intelligence application in current business processes can also make industries more robust to external factors, such as the COVID-19 world pandemic. Additionally, this paper discusses the future of “Industry 5.0”, mainly focusing on business intelligence and data driven decision-making in business. Information about the benefits of business intelligence, “Industry 5.0” transformation methodology and the place of intelligent digital technologies in business processes will be debated.

The author has performed a literature review on the concept of business intelligence (BI) and data-driven decision making from a managerial perspective. The qualitative methodology of this study allows detailed analysis of the chosen data, but gives little ground for generalizability. To address this limitation, future research can discuss the proposed theory made by the author by testing various industries functioning during pandemic limitations.

KEYWORDS

Business Intelligence, Industry 5.0, Decision Support Systems

JEL CLASSIFICATION CODES

O14 Choice of technology, M12 Personnel Management, M15 IT Management

INTRODUCTION

In a recent study, called “On the way from Industry 4.0 to Industry 5.0: From digital manufacturing to digital society”, it is stated that Industry 4.0 is still at its initial stage and the years between 2020-2025 are expected to represent the major achievements of this era. However, the Industry 5.0 paradigm can be already predicted and businesses should begin to prepare for the necessary requirements they must cover in order to be able to move forward and develop in the new era. [2] But what truly makes room for change is Business Intelligence or the process of transforming data into actionable insights. The importance of quality data collected through all business processes is underlined in BI, facing the paradigm that decisions are as reliable as data they are based on. Business intelligence gives reliable well-informed decisions to executives and CEO's, making time and resource economy of scale possible.

Transforming data into business decisions is especially powerful when it improves operational efficiency and customer service. But in a very technological era, where according to Harvard Business Review, it took 30 years for electricity and 25 years for telephones to reach 10% adoption but less than five years for tablet devices to achieve the 10% rate (and 39 years for telephones to reach 40%), it only took users 10 years to adopt smartphone technologies by as much as 40%. This data gives a very positive overview of the human-technology alliance. [3] Nevertheless, a McKinsey global study found that 87% of executives were either already experiencing skill gaps in their employees' adoption skills or expecting them within the next couple of years. [4] A clear sense of skill gaps is precisely one of the challenges addressed in Industry 5.0, where technologies are made to adapt employee skillsets, as opposed to the current reality of Industry 4.0, where technologies are presented to employees with the expectation of clear understanding how

to adapt to technological complexity of new age technologies with average technological knowledge. And this is where BI and Industry 5.0 meet – creating an environment where technology is based on workforce capabilities, that are tracked, analyzed and categorized, and where data is used for data driven decision making, moving the focus from tasks, that can be data-based to tasks, that require human interaction.

An overview of previous, current and future Business Intelligence programs in European countries gives a hopeful image of Industry 5.0 – the industry, that prioritizes mental health, honors human talent and seeks quality data. Decisions based on quality data, human-centric strategic management and sustainable manufacturing are undoubtedly the future of all industries. Whether near or further future is a topic this paperwork aims to discuss through extensive literature research. The European Commission claims that Industry 5.0 complements the Industry 4.0 paradigm by underlining that research and innovation are motivity for a more sustainable, human-centric and resilient transition of industries. [5] This paperwork intends to stand on an unbiased ground to discover a prospect of Industry 5.0 and Business intelligence coexistence, human-robot coworking, employee investment and skill development in the context of Industry 5.0, as well as Business intelligence benefits and applications for data driven decision making in business. This article also intends to answer the question rather we are living between two industrial revolutions or slowly transitioning to a new techno-social revolution and weather technological- centricity (as seen in BI platforms) can coincide with human-centricity, that Industry 5.0 professes.

Transitioning from “Industry 4.0” to “Industry 5.0”

Throughout the many changes the world has faced in the years following 2019 – a world pandemic, war, global fuel shortage, the future of global economy has been widely discussed. Centered around the impact of digital transformation on industries, technology is thought to be the single most important driver of new knowledge economy. [6] Therefore, it could be implemented that economic growth is no longer market based, but knowledge based. The need for digitization of business processes requires moving to a new stage of the industrial revolution, which conditions the creation of "Industry 4.0", characterized by the entry of robots into industrial processes, Internet of Things and many new technologies that aim to increase efficiency and quality of production processes. “Industry 4.0” successfully

changes the way companies manufacture, improve and distribute their products. Manufacturers are integrating new technologies, including the Internet of Things (IoT), Cloud Computing and Analytics, Artificial Intelligence and Machine Learning into their manufacturing and business processes. Mass digitization of processes is a prerequisite for improving the flexibility of manufacturers so that they can better meet customer requirements. By collecting more data from production transparency and better decisions based on data, improvement can be achieved. Industry 4.0 combines the physical and cyber world to derive data from processes, giving decision making a new meaning by creating data-based decisions. Essentially, digital transformation and Industry 4.0 are very closely linked. The use of Artificial Intelligence, Cloud Computing, Robotics, Internet of Things, among other technologies, allows businesses to offer better quality of customer service, use advanced manufacturing technologies and replace repetitive routine tasks with software and tools.

The revolution of Industry

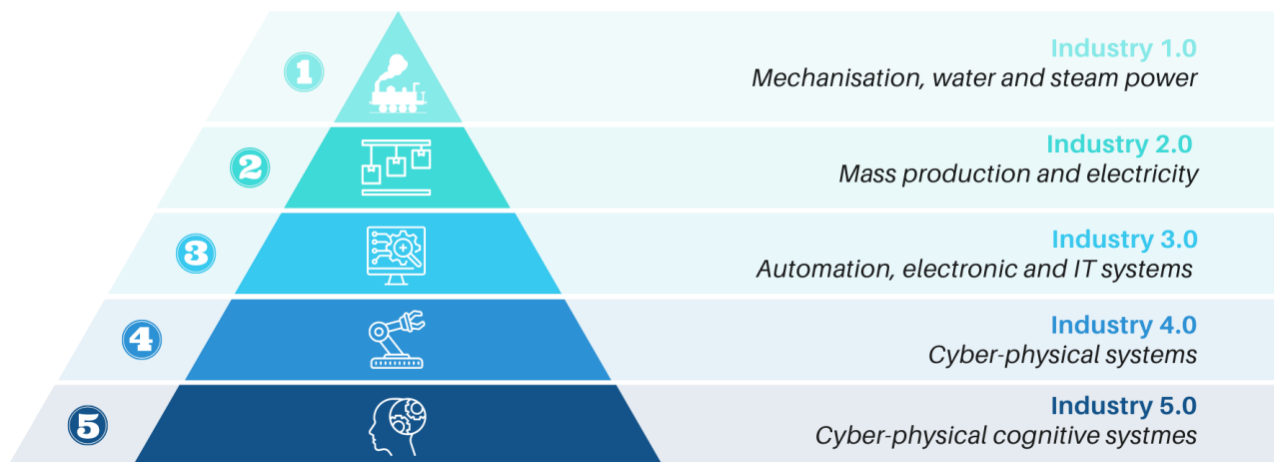


Figure 1. The revolution of industry

After deriving the key benefits of Industry 4.0, businesses started to aspire to bring the human touch back to industrial growth processes, leading to a slow transition to a more value driven revolution and the beginning of the Fifth Industrial Revolution, better known as "Industry 5.0". In an era, where

both revolutions coexist, Industry 4.0 is considered to be technology driven, whereas “Industry 5.0” is very much value driven. [7] What is more, in literature the fifth revolution is often described as human-centric. Accordingly, the human-centric approach’s focal points are determining possibilities for technology to adapt to working processes and workers’ skills and needs, rather than workers and processes adapting to evolving technology. The European Commission confirms that the new industrial revolution complements the existing Industry 4.0 model by introducing a sustainable, human-centric and resilient industry, as illustrated on “Figure 2”, which moves focus from solely shareholder value to stakeholder value. The same report also highlights the purposefulness of the new industry by moving beyond production of goods and services for profit, by focusing on responsible innovation aiming to increase prosperity for all involved: investors, workers, consumers, society, and the environment. [5]

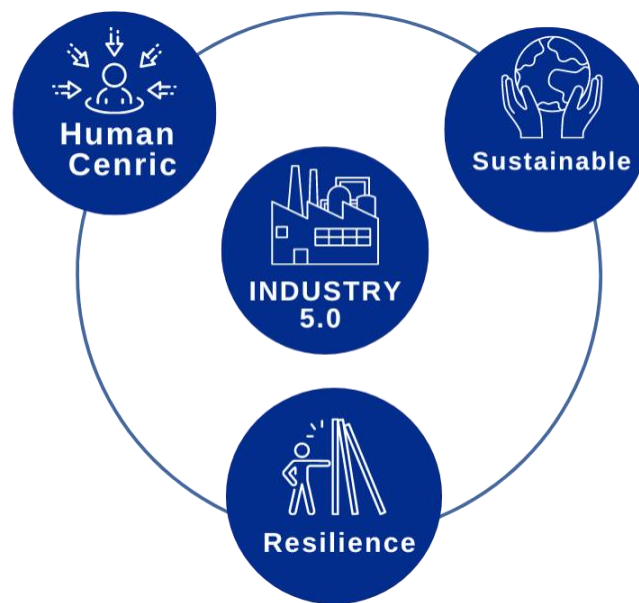


Figure 2. Industry 5.0 pillars

“The introduction of Industry 5.0 is based on the observation or assumption that Industry 4.0 focuses less on the original principles of social fairness and sustainability but more on digitalization and AI-driven technologies for increasing the efficiency and flexibility of production. The concept of Industry 5.0, therefore, provides a different focus and point of view and highlights the importance of research and innovation to support the

industry in its long-term service to humanity within planetary boundaries.” [8] Industry 5.0 also pivots around the idea of a more sustainable economy, circular economy, that advocates recycling natural resources, reduces waste and the traces the environmental impact of manufacturing processes. The European Commission outlines the importance of resilience as a key factor of Industry 5.0, making sure that businesses can provide and support critical infrastructure in times of crisis. [5] However, as with any other grand transition, transitioning to a cyber-human manufacturing methodology faces several challenges businesses must acknowledge and be ahead of: *Social challenges*: In order to coexist, artificial intelligence and human behavior should be examined extensively to create a, what is called, “empathetic AI systems”, that need to be reliable, intelligent, enjoyable to work with and care about privacy. [7] Computational empathy will empower employees to connect with the new technologies, especially since empathetic AI can detect and respond to human emotion in a preset way. This feature adds up to the managerial requirements for Industry 5.0 adoption by creating the need to support a more autonomous and efficient type of work from technological specialists, that should design new technologies, adaptable to both human needs and business goals, or in other words – technology “with a soul”.

Technological challenges: As with the previous industrial revolution, where technology was introduced in all trackable processes, resulting in need of extensive technological education for workers to adapt and use the full potential of new tools and software, Industry 5.0 faces the same need for life-long education for best results. A change of team dynamics is also expected while machines are integrated in the physical world of human processes, which could give rise to the importance of employees well understanding how artificial intelligence works and how they can benefit from the collaboration of human and artificial intelligence in work processes. A high level of transparency and understandability should be introduced regarding data collection and processing. A recent study on the topic of “Industry 5.0 – A Human-Centric Solution” indicates that senior members of a society and stakeholders in particular may find it much more difficult to adapt with the new industrial revolution and adapt to newly integrated technologies, despite their customization to human needs. Skill gapping is also addressed by the authors, mainly discussing conversion rate optimization in future management and executive roles as a possibility for skill gapping where more attention should be paid. [9] An appropriate budgeting plan should also be prepared for these major manufacturing rotation, since technology customization and IT services needed for the “mass customization

revolution” come at a price that businesses should be prepared for. Overall, the positives of the near future industrial revolution are endless, both for employees and the industry, choosing a more human-centric approach in all industries to create an environment, where humans and AI coexist, following sustainable and ethical policies in an empathetic and accessible technological world. Further opportunities of Industry 5.0 are to be discussed in the following paragraph.

Defining “Industry 5.0” – benefits for workers and industry

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Productivity and competitiveness are just the basic benefits, which every revolution is based around. However, each revolution aims to give more benefits to all participants in the industry, but as opposed to the previous fourth revolution, the new era puts the workers back in the spotlight, giving countless opportunities to businesses to use the full potential of all their resources.

The European Commission divides the key benefits of Industry 5.0 to benefit for workers and benefits for the industry [5], as following:

Benefits for the workers:

Skill development via continuous education is most definitely a key benefit for both employees and businesses. Need of shift in qualifications could be identified with some employees, which show that further education is not applicable to current skills. This statement concludes the previously discussed topic of the need of elderly members to adapt to newly added technology and software they have not faced yet in their career path. This topic has been continuously discussed in Industry 4.0, where many software tools have been introduced for learning and development purposes, but in Industry 5.0 software is much more human-centric and devoted to the needs of the employee, which certainly makes it more accessible. Furthermore, it is expected that technology will be more user-friendly, allowing users to learn to use it each step of the way, continuously adding to their skillset.

Employee investment is what drastically differentiates industries 4.0 and 5.0. While in Industry 4.0 employees are considered an additional cost that could be rationalized, in Industry 5.0 employees are defined as investments that could lead to significantly better performance, giving the human capital a whole new meaning in the strategic business plan by

associating it with revenue, rather than costs. New roles and opportunities will be given to the workers of the near Industry 5.0 future, proposing bigger investments in skill developments and well-being of employees to retain and improve financial revenue through human capital. This strategy aims to expand workers' capabilities with innovative technological approaches, rather than replacing workers with robots. There is one key feature that discerns robots and humans, that also makes them so valuable over long periods of time and that is their capability to evolve independently, developing better professional skills with no other resource needed than time. But to achieve even greater results, humans and AI are to emerge in Industry 5.0, where workers are expecting to be involved in the design and creation of industrial robotics and AI. A recent study identifies the need of robotic knowledge humans should adopt in the sake of the future markets. The survey studies how people interpret actions performed by robots by performing several experiments between people and robot interactions. Results suggest that people may benefit from additional information to understand robotic behavior in order to improve the development of a fast growing market. [10]

Safe and inclusive work environment is what the human-robotic industry participants should invest in to be competitive in the new market reality. The fear of being replaced by a robot is misplaced by correct usage of technology to build workplaces where satisfaction and well-being of employees is prioritized. The European Commission underlines the importance of safe work environment due to data showing that the majority of workplace accidents happen in industries where these dangerous tasks could easily be automated. The potential of robots to take over a great amount of repetitive tasks while not minoring the importance of human participation is crucial. This major improvement of work environment is expected to majorly improve work safety, leading to economic benefits, employee satisfaction and productivity gains.

Benefits for the industry

Industry 5.0 gives a new definition for the term personalization, which no longer only describes products, but also labor, increasing human value, productivity growth and human-machine trust. Recent body of scholarly work identifies four common benefits for the industry in the transition process to "Industry 4.0":

Increased resiliency is one of the three pillars of “Industry 5.0”, following the uncertainty of world pandemic and war, where only resilience and flexibility could save businesses from the inconceivable effect outer factors have on business activity. The possibility for mass-customization to customer satisfaction and digital product integration is a great advantage to industry and society in Industry 5.0, increasing resiliency and flexibility. In a recent study customization is discussed to be in a direct correlation with the objectives of social value creation, sustainability, and bioeconomy, involving collaboration with robots and computers, benefitting humans in many ways.

Talent attraction and retention is yet another benefit for the industry, which could solve the problem of qualified workforce attraction and retention, especially when it comes to positions that require digital skills. Introducing digital up-skilling enables companies to stay competitive in the hiring market. According to a recent research, distributed to 640 executives worldwide in 2022, leadership for high potentials is the top talent investment expected in Industry 5.0, followed by hiring new leadership talent and redeploying or retraining current employees. In terms of senior-level talent retention, the study indicates that Internal mobility or job rotation, hybrid working, leadership development and bonuses are most effective retention strategies. With regard to recruitment, sign-on bonuses, performance-related pay and ESG (Environment, Social and Governance) commitment approach is most suitable. Regarding talent attraction and recruitment, respondents have pointed out **innovative recruitment tactics** such as *part-time options to retiring employees, refer-a-friend programs, paid internships and mass media advertising* as most effective, and **innovative retention tactics** including *private pensions, recognition of family responsibilities, internal job swaps, allowing executives to run (non- conflicting) private businesses, and scholarships for dependents. Bonuses in all forms are used: extra annual bonuses for best performance, guaranteed bonuses and long-term incentive plans* as successful retention practices. [11]

Productivity is expected to increase with the human-machine collaboration in “Industry 5.0” as a result of the skill-biased technological change, that advocates for more educated labor, consequently increasing productivity. Furthermore, the human-machine flow also allows new product and service development as a result of up- skilling. Artificial intelligence systems can effectively perform tasks and services that could provide

solutions in general work situations, but moreover, enabling robotics and craftsmanship to form a collaboration enabling product effortless product customization with high productivity with the additional need of human touch, not undermining the importance of human skills. A case study on technological options and approaches for robotic integration in handcraft artisans offers a hybrid digital craft approach to collaborate robotic patternmaking and handcrafting. An experiment concerning a collaborative industrial robot that is to assist in cutting and perforating materials into 2D patterns is performed. Results of the study show that even though custom tasks are still frequently performed by hand, there is a capacity for implementation of digital assistance tools, while still experiencing a need for human creativity and craftsmanship. [12] Digital assistance tools evolvement could potentially increase productivity without sacrificing quality of details. Business Intelligence - opportunities, challenges, and applications Business Intelligence (BI) is the strategic process following integration of digital technology into all areas of the business activities by then using collected data for decision-making with the aim to reach company's goals based on data and research. BI is applicable in many industries, giving collected data a new meaning in the strategic plan of organizations. BI makes data analysis and visualization possible creating countless opportunities for leaders by also decreasing productions costs and increasing productivity. Business intelligence is a powerful enabler of digital transformation, even though its business value comes after the process of digitization. Business Intelligence activities can be derived into three main groups – data analysis, data visualization and reporting capabilities.

1. **Data analysis** - Extraction, Integration and Interpretation
2. **Data visualisation** - Graphs, Charts & Diagrams
3. **Reporting capabilities** - Dashboards, Trends & Performance

Another important approach in the BI terminology is **self-service business intelligence**, describing the opportunity end users are given to analyze any amountsof business data and independently build decisions based on the dashboards produced by modern tools. As opposed to traditional BI, self-service business intelligence empowers end users to access the same recourses that only business intelligence experts and IT teams could access. Self-service business intelligence tools offer intuitive interface while making data analysis more accessible. On the basisof academic work [13], the following opportunities and challenges of both approachesare presented in "Figure 3".

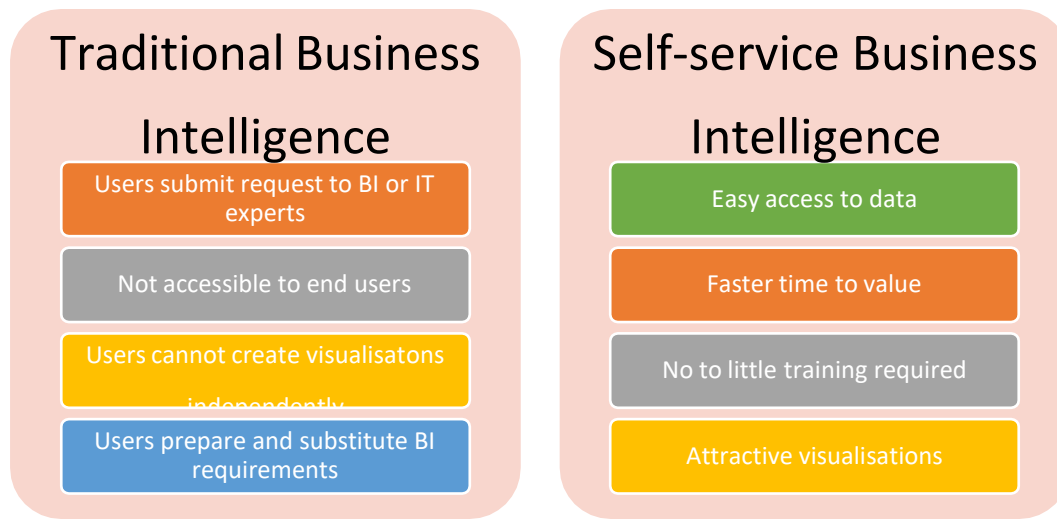


Figure 3. Traditional Business Intelligence vs. Self-service Business Intelligence

Opportunities:

- *Decision-making improvement* is the most desired advantage of BI. Data- based business strategies are based on the use of BI tools, that can help transform the decision-making process and improve risk management. High quality data can empower businesses to make well informed intelligent decisions by understanding where performance can be improved, identifying where problems have occurred and create a strategic plan for goal reaching. Data analysis also offers an accurate financial picture, that can be used as the basis for future financial plan development.
- *Improved customer service* is a top business priority in “Industry 5.0”, using interactions between humans and machines to businesses can increase retention rates and revenue by focusing on customer relationships and the overall customer experience.
- *Operating efficiency.* A recent paperwork uncovers few possibilities for efficiency improvement BI gives to businesses by providing software support embedded systems, integration of mobile devices and integration of the technology for the processing of various data. The same study also identifies BI’s strength to increase work

performance via implementation of new software solutions.
[14]

- *Cost management* could easily be accomplished via Business Intelligence tools and services. BI services outline it is beneficial to cut costs and where investment is needed. What is more, BI allows participants to save time on decision-making tasks by giving the data needed for an informed decision. Software also allows the atomization of time-consuming processes like data gathering and analysis, usually performed by employees.

Challenges

A recent survey carried out by “Matillion” through 10,000 senior executives and decision-makers from 150 countries answered the question ‘What is your biggest management information challenge?’. This section discusses some of the potential social and technical challenges of Industry 5.0, as following:

- *Poor data quality* – The quality of BI decisions is as good as the quality of data presented. High quality of data is of high importance for BI instruments, because even the most broad-spectrum software cannot better the quality of raw data presented, if it is originally corrupted.
- *Data silos* data is data collected by one group that is not accessible by other groups in the same organization. For instance marketing, finance, human resource management and administration teams need different information, that is often stored in different locations, therefore creating a data silos. This way data silos are limiting the view of data and discouraging collaborative work.
- *Absence of required training* needed for successful BI platforms adoption. Effective training and change management are required for BI adoption, ensuring access to high-quality data once the process is successfully integrated.
- *Business Intelligence unification* is the challenge of merging source systems. Each data gathering system often works with own languages and practices, making data unification extremely laborious. BI software and tools are challenged to

collect data from multiple data sources, creating a data silo above all. To avoid this challenge, businesses should establish a well-defined data modelling system and a clear definition of KPI factors.

- *Lack of BI strategy*, resulting in a chaotic integration process, lack of efficiency and improvement. Setting clear goals and a step-by-step roadmap of change is obligatory for BI project effectiveness.
- *High costs*, as a result of integration, maintenance and support associated costs is one of the main challenges of impeding organizations' BI usage and expansion. However, BI can significantly reduce costs through automation of time-consuming tasks and increase the revenue throughout better customer relations and employee retention.
- *Mobile Business Intelligence*, because it is important for decision-makers to be able to access data wherever they are located.

Technologies

BI technologies are generated to acquire actionable insights from gathered data and to exploit the untapped potential of your business actions. This section discusses the most applicable technologies and tools in Industry 5.0:

- **Data mining**, also known as knowledge discovery on data (KDD), is the process of extracting usable data from a larger set of any raw data. This process makes analyzing data patterns in large quantities of data possible, using software. The process of data mining follows three main steps – setting a business objective, data preparation and model building. Data mining is applicable in many industries, empowering businesses to create process transparency and optimize insights. Data mining is applicable in sales and marketing by collecting massive amounts of data about customers and prospects through data about their behavior and demographics. This type of software allows businesses to target their audiences correctly, improve segmentation, reach higher return on investment (ROI), etc. KDD is also used in education so institutions could collect data to

understand their student populations, mainly due to online platforms, who allow performance evaluation. [15]

- **Data visualization** provides interactive visual presentation for data. Data visualization significantly impacts an organization's decision-making process by presenting data in a more interactive visual or pictorial form. One key component of BI is dashboards. **Dashboards** deliver analytic information by displaying important business metrics and data points. Dashboards offer multiple data visualization possibilities, make intense data easier to comprehend and overall offer better-informed decision making. In a recent study, strengths and weaknesses have been discussed. According to the information presented, strengths and opportunities include metrics focus, clear goal setting, routine data review processes, transparency, quality improvement interventions and centralized monitoring. Weaknesses and threats included usability issues, cultural barriers, wrong metrics, tunnel vision and siloed development. [16]
- **Data warehouse** is described by IBM as data repository, that stores data from different sources for sophisticated analysis and decision support. "DW is a system that aggregates data from different sources into a central data store to support data analysis, data mining, artificial intelligence (AI), and machine learning. A data warehouse system enables an organization to run powerful analytics on huge volumes (petabytes and petabytes) of historical data in ways that a standard database cannot." [17] Data warehouse presents better data quality, faster business insights, growing competitive advantages and smarter decision making.
- **Descriptive analysis** is process of history data analysis, based on which trends and patterns of current activity can be established. The gathered data is often presented with visual instruments, giving a good basis for future analysis. Good example of descriptive analysis are annual revenue reports, revenue per customer, sales growth percentage, etc.
- **Performance benchmarking** tools gather and analyze data by analyzing past performance, comparing results against industry performance (other competitors and industry

leaders) and process and product improvement in order to promote client retention. Different performance indicators are used as a basis for the analysis, depending on the process businesses would like to track and improve. Sales, products, services, customer service and growth can be measured and compared to industry results. Sales performance benchmarking should be regularly tracked by comparing business to industry results, in order to identify how the business is performing in the current market situation and outline the opportunities for growth that might have been missed in the observed period.

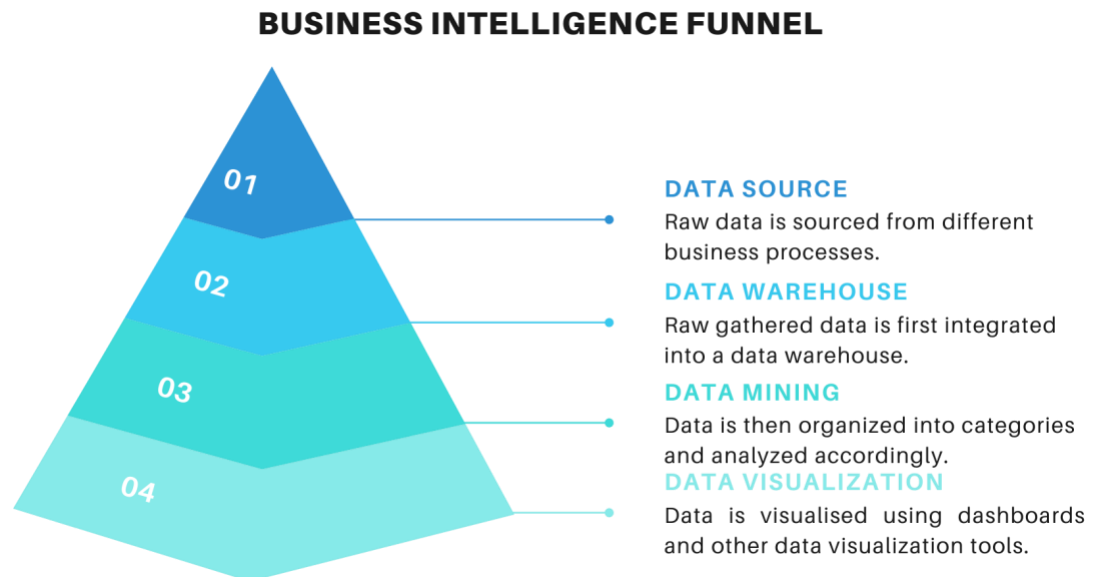


Figure 4. Business Intelligence funnel

To summarize, business intelligence tools lay a solid foundation for businesses to expand and improve their performance in the market by formulated on the ground of extensive data analysis. The raw gathered data is first integrated into a data warehouse, data is then organized into categories and analyzed accordingly. After the process of data mining, descriptive analysis and performance benchmarking allow data to be compared to industry and history results, forming results that can be visualized using dashboards and other data visualization tools. Then the outcome of all these steps is used for decision-making and strategic planning, allowing executives and workers to make well-informed decisions. The whole process leading to

data- based decision making is illustrated on “Figure 4”.

Modern Business Intelligence is where traditional business intelligence challenges are improved. According to Deloitte, traditional BI is lacking On-Demand Analysis Capabilities, making data analysis available at any time and for any purpose. [18] Traditional BI is also lacking predictive analysis, offering only historical data but no future insights with predictive data features. Traditional BI is criticized for not allowing mixing of data types. Modern users now require access to unutilized data in all available formats, allowing them to combine data types and create on demand accurate decision-making. Modern data presents the term **data lakes** describing the process of raw information storage structured, semi- structured, or unstructured, performing automated cleansing and transformation of data, that allows business users to prepare and analyze data. “Modern business intelligence platforms help organizations take advantage of mass amounts of existing and new information in vastly different ways than were previously possible, allowing users to ask and find answers to any question, with any data, at any time. To do this, organizations don’t have to replace their existing data platforms but rather leverage existing investments and expand capabilities by augmenting with modern tools and technologies.” [18]

Business Intelligence in the context of Industry 5.0

In the center of both Business Intelligence and Industry 5.0 concepts lays data. Data collection, analyzation and visualization and well-informed decisions based on extensive data research for all industries and hierarchy levels. However, Industry 5.0 puts another rule in the book by prioritizing human involvement by examining human capabilities, skill shortage and mental health. Industry 5.0 is a human-centric, resilient and sustainable industry that gives perfect ground for BI adoption, providing an environment that enables the development of smart technologies. The reverse is also true – Business Intelligence gives Industry 5.0 participants the needed toolkit to create a sustainable, resilient and human-centric environment where quality data can provoke more qualitative strategic processes.

Business Intelligence – literature review

Case studies provide rich insights into Business Intelligence opportunities, challenges and applications in different industries. On the basis of extensive research of available literature on the topic of Business Intelligence, the

following range of theoretical perspectives have been highlighted:

Theoretical perspectives	Industry	Key findings	Authors
Failure Factors in the Control of Large-Scale Business Intelligence Systems	Engineering	<p>1. According to this case study, the key failure factors of the process of BI project adoption in the west are (in order of importance) lack of user involvement, incorrect management of change, incorrect top management support, poor or incorrect requirements definition, unrealistic expectations, incorrect ISD methodology, lack of project managerial and technical expertise, incorrect estimation of time & cost, inappropriate software choice, stakeholder and organizational changes.</p> <p>2. Unrealistic expectations are connected to incorrect estimation of time and constant change of organizational staff and stakeholders.</p> <p>3. Insufficient technical expertise is connected to poorly managed change process, unrealistic expectations and incorrect estimation of time.</p> <p>4. Inappropriate development methodology is linked to ineffective top management support and insufficient end user involvement.</p> <p>5. Ineffective top management support is related to insufficient end user involvement.</p>	M. Ramirez Arizmendi & L. Stapleton [19]

<p>The impact of business intelligence on marketing with emphasis on cooperative learning</p>	<p>Insurance</p>	<p>Through descriptive-survey research and field study the following key findings have been underlined, valid for the Insurance industry:</p> <ul style="list-style-type: none"> • Business Intelligence does not have a significant effect on Marketing; • Business Intelligence has a positive and significant effect on Marketing through Organizational Learning • Business Intelligence has a significant effect on Financial Performance; • Business Intelligence has a significant effect on the Customer Behavior Performance; • Business Intelligence Teams have a significant impact on Financial Performance. 	<p>Zhi-xiong Huang, K.S. Savita, Li Dan-yi, Abdullah Hisam Omar [20]</p>
<p>Business intelligence adoption</p>	<p>Retail</p>	<p>A case study on a sports-fashion multibrand chain of retail stores of large size, operating in Slovakia since 2003, highlights the following benefits of BI for the retail chain:</p> <ul style="list-style-type: none"> – acquiring up-to-date and better-quality information for decision-making; – improved decision-making (faster, better, based on better quality information); – stock management optimization; – improved ability to anticipate earlier changes on the market and better pricing strategy. 	<p>Cecilia Olexova [21]</p>

		<p>Factors affecting the speed with which BI system was adopted:</p> <p><i>Relative advantage:</i> BI enabled interviewers to accomplish tasks more quickly, improved the quality of their work and made it easier to do their job. Using the BI improved the job performance, was advantageous in the job, and increased the productivity.</p> <p><i>Compatibility:</i> According to all six commercial managers, BI was completely compatible with their current situation.</p> <p><i>Trialability:</i> Members of the project team agreed that they had a great deal of opportunity to try other BI systems and test various applications.</p> <p><i>Ease of use:</i> The interviewees, from the position of view as the end users of the BI system, found it cumbersome to use BI at the beginning.</p> <p><i>Visibility:</i> The use of BI was visible for all. The interviewees could also see the use of BI outside the company.</p> <p><i>Result demonstrability:</i> The results of using the BI were apparent to the managers.</p>	
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Industry 5.0 contribution to sustainable development	Sustainability in 1 industries	<p>The study aims to explain how Industry 5.0 can convey sustainable development values to industries. The chosen reference model aims to fight ambivalence surrounding the sustainability side of Industry 5.0. To summarize, the following conclusions have been made: 1. Industry 5.0 can contribute to sustainable development via 16 interdependent functions, ranging from micro-technical functions like real-time communication to macro-operational functions like supply chain adaptability. 2. Industry 5.0 offers a digital transformational ecosystem that allows synchronized and conclusive development.</p> <p>3. Sustainability functions of Industry 5.0 cause synergy of such factors that maximize the possible sustainability gain of the Industry 5.0 framework.</p>	<p>Morteza Ghobakhloo, Mohammad Iranmanesh, Muhammad Faraz Mubarak, Mobashar Mubarik, Abderahman Rejeb, Mehrbakhsh Nilashi, [22]</p>
Use of Data Warehouse and Data Mining for Academic Data	Education	<p>Inferences from data warehouse architecture and use of data mining techniques adoption for academic data, based on research handled in UNAS's (National University):</p> <p>1. Data shows that presence of a data warehouse at the university simplified the reporting procedure. The option to modify reports according to the user's preferences reduced reporting time from one month if done manually or one week if done by establishing a new program.</p>	<p>Primasatria Edastama, Amitkumar Dudhat, Giandari Maula ni [23]</p>

		2. Further data analysis has been successfully carried out via data mining techniques with the information stored in the UNAS data warehouse (for distinctive patterns of students who pursue various specialization program acknowledgment).	
Application of business intelligence in the tourism industry	Tourism	<p>This case study provides a brief introduction of business intelligence (BI) adoption practices in the tourism industry. Focusing on a local festival as starting point for the study, researchers have selected the following points as most relevant to the process of BI adoption in tourism:</p> <p>1. There is great value that BI platforms give to tourism planners, festival organizers, and marketing analysts at the festival sites. Massive data, worked through the business intelligence platforms has helped top-performing organizations successfully offer visitors an improved festival experiences and promote follow-up campaigns to retain visitors for future events.</p> <p>2. A BI framework has been proposed, following 7 steps, starting from setting up business goals and objectives, following defining KPI, collecting data, data integration, exploring the data before model development, gaining insights into visitors' behavior through data exploration and finalizing with clearing a data analysis scenario.</p>	<p>Thanathorn Vajirakachorn, Jongsawas Chongwatpol [24]</p>

Table 1. Theoretical perspectives of Business Intelligence in the context of “Industry 5.0”: literature review

The presented literature review of six case studies on the role of Business Intelligence and “Industry 5.0” in industrial development give a brief view of platform applications in different industries with individual priorities and capabilities, but yet similar expectations of how platform integration can change the usage of data for decision making purposes. Key failure factors of BI platform adoption give a basic understanding on how important integration process is and how every step of the integration roadmap is important to its successful introduction. Factors affecting the speed in which BI systems were integrated highlight key qualifications executives should prioritize in the introduction process. Benefits and challenges of the process have also been underlined, in order to give a transparent description of BI integration to executives and employees. This brief literature analysis gives good ground for future research and necessary basis for BI integration forecast.

Business Intelligence forecast

The European Commission [5] highlights few ongoing and future Business Intelligence projects that focus on skill shortage challenges, mental health awareness, heat waste management, sustainable and inclusive economic growth, etc. This section aims to discuss near future BI programs in the European Union, providing basic guidelines for Business Intelligence development.

- **SPIRE-SAIS *Skills Alliance for Industrial Symbiosis (SAIS) – A Cross- sectoral Blueprint for a Sustainable Process Industry (SPIRE)*** (1 January 2020 - 31 December 2023) – A project overlooking skill shortage in the Energy Intensive Industries, and the skill sets needed for future job profiles.
- **MindBot *Mental Health promotion of cobot Workers in Industry 4.0*** (1 January 2020 - 31 December 2022) - MindBot aims to identify methods for implementation of solutions for better mental health within the context of small and medium-sized enterprises (SMEs) that adopt collaborative robots (cobots) in their production lines. The MindBot’s aim is to create a workplaces where workers abilities and challenges of the job are matched, in order to support employee engagement with cobots in a personalized way.

- **H-WORK** *Multilevel Interventions to Promote Mental Health in SMEs and Public Workplaces* (1 January 2020 - 30 June 2023) – This project's objective is to design and implement effective toolkits (H-TOOLS) for managers and CEOs to effectively evaluate organisational psychosocial risk (HAT), apply appropriate interventions (HIT), and estimate individual and organisational outcomes of the
- **EMPOWER** *European platform to Promote Wellbeing and Health in the workplace* (1 January 2020 - 31 December 2023) is a integrative research and innovation system aiming to modify existing interferences focused on mental health and awareness factors to create a combined online modular platform feasible in various workplace settings by culturally and contextually adapting it.
- **INCUBIS** *An Industrial Symbiosis Incubator for Maximizing Waste Heat/Cold Efficiency in Industrial Parks and Districts* (1 May 2020 – 30 April 2023) refers to the process of Energy Symbiosis (the selling and buying of excess energy) that is an energy efficiency movement that aims cost. INCUBIS launches five Energy Symbiosis Incubators to support waste heat & cold exchange within industrial areas in few European countries. These Incubators will contribute to local industries by introducing expertise and training required complete desired energy symbiosis projects.

There are plenty of recently completed programs such as **EMB3Rs** *User-driven Energy-Matching & Business prospection tool for industrial Excess heat/cold Reduction ; Recovery and Redistribution*, **GROWINPRO** *Growth Welfare Innovation Productivity* (1 January 2019 - 31 December 2021); **PAPERCHAIN** *New market niches for the Pulp and Paper Industry waste based on circular economy approaches* (1 June 2017 - 31 May 2021); **TECHNEQUALITY** *Inclusive Futures for Europe BEYOND the impacts of Industry 4.0 and Digital Disruption* (1 January 2019 - 31 December 2021); **PLUS** *Platform Labor in Urban Spaces: Fairness, Welfare, Development* (1 January 2019 - 31 December 2021). The programs presented give a hopeful outlook of BI adoption across industries and prioritization of employee- centism in the future of industry and society.

CONCLUSION

This paper thoroughly examines recent body of academic work within the previous five years between on the topic of Business Intelligence and Industry 5.0. The literature review performed on the concept of business intelligence (BI) and data-driven decision making from a managerial perspective, through a qualitative methodology, allows detailed analysis of the chosen data. Paperwork from journal articles, conference papers and other official sources have been gathered to shed more light on three perspectives:

- Whether we are living between two industrial revolutions or slowly transitioning to a new techno-social revolution;
- If technological-centricity can coincide with human-centricity, that Industry 5.0 proposes;
- What are the benefits and challenges of both BI and Industry 5.0 for businesses and whether they are applicable in every industry.

Several methodologies of Business Intelligence platform adoption have been proposed. However, platform adoption should be strictly personalized per each industry and especially per each company. BI integration is a process that requires evaluation of data and business' readiness for change and data gathering and analyzation possibilities. It is a costly integration, that will however bring economy recourses by making the decision-making more time-efficient and producing quality results based on real-time data from all processes. Self-service BI platforms are another step to full business autonomy, replacing IT department's role in the process with more intuitive BI software. The promptly changing business environment worldwide increase the need for knowledge management, putting Business Intelligence in the spotlight. This paper attempts to inform practitioners and academics about the application of BI across sectors.

In conclusion, several subject areas that need further exploration have been identified – can Industry 5.0 improve employee well-being by prioritizing employee capabilities and needs; is business ready for Industry 5.0 requirements; can Business Intelligence platforms improve healthcare worldwide thought quality data analyzation. These subjects raise awareness of the importance Business Intelligence platforms and Industry 5.0 play in the beginning stages of a more mindful human-centered environment, where a human-technology collaboration allows industries to develop their full potential through a well-designed Business Intelligence pathway and

knowledge management.

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The Endeavor of Thematic Diving Tourism in Greece. Ninety-one Challenges and Perspectives

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Tu te plais à plonger au sein de ton image ;

Ch. Baudelaire, XIV. – L'HOMME ET LA MER

Abstract

Not only European Union is endowed with a policy relevant to diving tourism, such as the European Commission Communication entitled 'A European Strategy for More Growth and Jobs in Coastal and Maritime Tourism', but Greek joint ministerial decision No. 92225 of 3rd March 2022 regulates the first group of 91 historical wrecks of ships and aircrafts, which are made accessible. The shipwrecks 'HMS MARQUETTE' and

‘THÉOPHILE GAUTIER’ in the continental shelf of the Greek State may be protected by it on the basis of the principle of extraterritorial jurisdiction, consecrated in article 13 par. 4 of law No. 3658/2008. It is time for ships to be equipped with quasi-rights, in the framework of their anthropomorphism, whilst shipwrecks would deserve a comparable approach. Both anthropomorphism and the still unconsecrated right to tourism image are enhanced by free artificial underwater attractions, which law No. 4688/2020 introduced along with glamping. The institutionalized coastal territory/maritime heritage couple has reached maturity, through a synthetic approach which promotes tourist expansionism and includes beach glamping and wreck diving.

Keywords

diving tourism; European Union acquis on tourism; quasi-rights of ships; tourist expansionism; right to tourism image

1. Introduction: Tourism and Sea

Memory tourism is an important version of tourism in various countries, such as France, in which places of remembrance are getting up to date and making edutainment their new hobbyhorse⁸. Besides, new tendencies in the field of tourism seemed to appear at the dawn of the 21st century. For instance, the wild expanses of the White Continent or the Arctic have become ‘the place to be’⁹. Small luxury liners, scientific ships embarking a handful of tourists and old rigs make it their new playground. However, submarine tourism is still a far concept imagined by Jules Verne¹⁰. Anyway, diving tourism is not a

⁸ P. Filliâtre, A-C. Delorme, *Tourisme en France : tout change !*, Tour hebdo, 1593, juin 2018, p. 25.

⁹ Th. Beaupère, *La conquête des pôles*, Tour hebdo, 1592, mai 2018, p. 28.

¹⁰ L. Jégouzo, *Le droit du tourisme*, 2^e édition, LGDJ, 2018, p. 30.

matter of science fiction, particularly in Greece, which is one of the three 'archaeological countries', along with Egypt and Italy¹¹.

The current research focuses on the question of thematic diving tourism, in the light of the Greek project on the first group of 91 historical wrecks of ships and aircrafts which have become open to divers.

2. The Antecedent of Deconstruction of Shipwrecks till 2003

Until 2003, private individuals obtained permission from the Greek State and turned the wrecks of the correspondent seas into scrap metal, to sell them and get rich. It is worth mentioning that the 2001 UNESCO Convention on the protection of underwater cultural heritage stipulates in Article 2 par. 7 that '*Underwater cultural heritage shall not be commercially exploited*'.

In some cases, probably they took advantage of that permission for double towing, namely related not only to the authorized wreck but also to another one. Even the protected cruiser ELLI, which sank on 15 August 1940 at Tinos, was not exempted from the process of deconstruction, even though after World War II, as compensation for its sinking, Italy gave Greece the cruiser EUGENIO DI SAVOIA, which was commissioned in June 1950 for the Greek Military Navy with the name ELLI.

A historical shipwreck deserves not only the cultural interest but also the environmental one. Each shipwreck constitutes a peculiar reef that offers ideal conditions for development for a wide variety of marine organisms. For instance, this is the case of the Ottoman battleship FETH-I BULEND, which Englishmen tend to translate 'Causer of

¹¹ A. Maniatis, *Egypt, Greece and the Law of the Sea*, in D. Petropoulos & G. Kyriazopoulos, *Book of Proceedings 4th International Conference of Development and Economy (ICODECON)*, January 2021, p. 227.

(great) Conquest'. The shipwreck is situated outside the jetty of the port of Thessaloniki. The researcher who would locate it in 1998 had been previously told by local people that in the past amateur fishermen used to go to it for fishing and also that the wreck had a lot of breams¹². The coexistence of natural and cultural features at wreck sites provides the multi-thematic touristic attraction, relevant to the diving industry whilst fishery is favored near shipwrecks, which fish tend to frequent.

Since 2003, the culture of the Greek State has changed significantly. In the Greek legal order, the wrecks of ships and aircrafts of over fifty (50) years from the date of sinking have been declared as monuments, according to a ministerial decision which was published in the Newspaper of the Government on 19.11.2003 (1701/B)¹³. Furthermore, in virtue of law No. 3409/2005, scuba diving for recreational purposes has been liberalized in Greece for the first time.

Later, the new model of governance of Greece, called with the impressionistic name 'executive State', has been endowed with the 'Code on legislation of the protection of antiquities and of the cultural heritage in general'. This text, which could be called 'Cultural Heritage Code', was ratified by law No. 4858/2021.

3. Joint Ministerial Decision No. 92225 of 3rd March 2022 on 91 Wrecks

New rules have been adopted through joint ministerial decision No. 92225 of 3rd March 2022. It is about a regulation which emerged in delay, given that it was prepared by a unanimous act, a year ago. It is about the opinion of the Central Council of Modern

¹² A. Maltsidis, *Nikolaos Votsis and the torpedoing of FETH-I BULEND*, Logos & Eikona Editions, Thessaloniki 2012 (in Greek), p. 15.

¹³ A. Maniatis, K. Papadimitriou, *The BRITANNIC as a visitable shipwreck*, 15th Annual Conference of the EuroMed Academy of Business. Sustainable Business Concepts and Practices, 2022, p. 450.

Monuments of the Ministry of Culture and Sports, No. 11 of 19 March 2021, which was deprived of any legal force.

The decision previews that the first group of 91 historical wrecks of ships and aircrafts will become accessible. It clarifies that no fees are caused for the State budget whilst an eventual revenue is produced in favor of the Organization of Management and Development of Cultural Assets, which comes from the imposition of charges, as long as the documentation material on those monuments is used by the provider of diving services either directly or indirectly for a commercial objective¹⁴. It permits recreational diving in the 91 wrecks, on certain conditions that are defined in detail.

First, the providers of diving services and the private individuals that want to make a free or autonomous diving or snorkeling are obliged to inform the Ephorate of Underwater Antiquities, at least one day in advance, about the exact date, the hour and the duration of diving, the number of divers, the elements of the floating means of approach and the way of anchorage of that means.

Each monument must be documented through the production of static images. The Ministry of Culture and Sports is exclusively competent for the depiction of those wrecks, which has been institutionalized as a public service, in terms of administrative law. Nevertheless, this process may be externalized to providers who would like to enact that role. In this case of privatization, entrepreneurs have to apply for this mission and are likely to be granted a written permit by the Ministry, whose collaboration is explicitly previewed. Providers acquire a specific motivation consisting in commercialization of the image of the depicted historical wreck. As long as the documentation material is to be used by them for trade purposes, a specific previous authorization is required.

¹⁴ A. Maniatis, K. Papadimitriou, *The BRITANNIC as a visitable shipwreck*, 15th Annual Conference of the EuroMed Academy of Business. Sustainable Business Concepts and Practices, 2022, p. 451.

The depiction constitutes a key issue because it has been institutionalized as a prerequisite for any diving attempt. The Ephorate of Underwater Antiquities must issue a relevant decision, which has to be uploaded on the website of that Ministry and on its own website. This act should be communicated to the Directorate of Port Police and to the General Navy Staff. In the matter of diving at a historical wreck whose ownership has been acquired by the legal person under public law 'Shareholding Navy's Fund' in virtue of legislative decree No. 2648/1953, a decision of the Ephorate of Underwater Antiquities is required, on the basis of a previous positive opinion of that public owner.

In all cases, the authorized visit is dissociated from research projects. Any research to discover mobile objects on the site of the historical wreck or in the wider region, which are likely to be associated to the wreck, is prohibited.

The process of production of images was completed for 11 historical wrecks in early June 2022, which is interpretable in terms of tourism development, given that scuba diving is regarded as a wonderful summer outdoor activity, adored by innumerable people. Those monuments, whose first in row is the sister of the famous British passenger liner 'RMS TITANIC' and the most important shipwreck in Greece, are the following:

- 1) HMHS BRITANNIC, Kea,
- 2) Ocean liner S/S BURDIGALA, Kea,
- 3) PATRIS paddle steamer, Kea,
- 4) Cargo steamer ARTEMIS PITA, Milos,
- 5) Freight steamer SIFNOS, Milos,
- 6) Steamship MINNEWASKA, Marathi of Crete,
- 7) MYTILINI Shipwreck, Kypsa Bay, Kassandra, Halkidiki,

- 8) Shipwreck (unknown) at Kalamitsi, Halkidiki,
- 9) Cement ship S/S CRETELAND, Agios Georgios of Evia,
- 10) Cement ship PIONEER I, Lihades of Evia,
- 11) Steamship VOLOS, Lefteris reef, between Pelion and Skiathos.

The sum of 91 historical wrecks dates from 1868 to 1970 and their depth is quite varied, from 5 to 130 meters, hence snorkeling instead of diving with autonomous breathing apparatus is possible in some cases¹⁵. Whilst a major theme of the 91 historical wrecks derives from the fact that most of them are from the period of World War II¹⁶ (forty-four ships and seventeen aircrafts sank during the period 1940-1945), the information provided by Joint Ministerial Decision No. 92225 is rather heterogeneous in terms of completeness at the description of their characteristics: a) for the 31 of them, there is no direct mention for their sovereignty; b) for 12 wrecks that can be distinguished as airplanes, this description is missing; and c) besides 18 wrecks that refer to airplanes (not common to assign names to them), for 5 historical wrecks the ship-name is not provided, while two more are included as ‘unknown’.

4. ‘HMS MARQUETTE’ and ‘THÉOPHILE GAUTIER’: Waiting Away, Waiting for a Way of Protection

The British ship ‘HMS MARQUETTE’ and the French one ‘THÉOPHILE GAUTIER’ are the unique of the 91 historical wrecks to be located beyond territorial waters of Greece (Figure 1), namely more than six nautical miles off the national baselines at the Aegean

¹⁵ A. Maniatis, K. Papadimitriou, *The BRITANNIC as a visitable shipwreck*, 15th Annual Conference of the EuroMed Academy of Business. Sustainable Business Concepts and Practices, 2022, p. 455.

¹⁶ Ministry of Culture and Sports, Press release 22/03/2021 (culture.gov.gr/el/information/SitePages/view.aspx?nID=3707)

Sea, whilst Greece (since January 2021) has extended its territorial sea to the twelfth nautical mile at the Ionian Sea alone, up to Cape Tainaron.

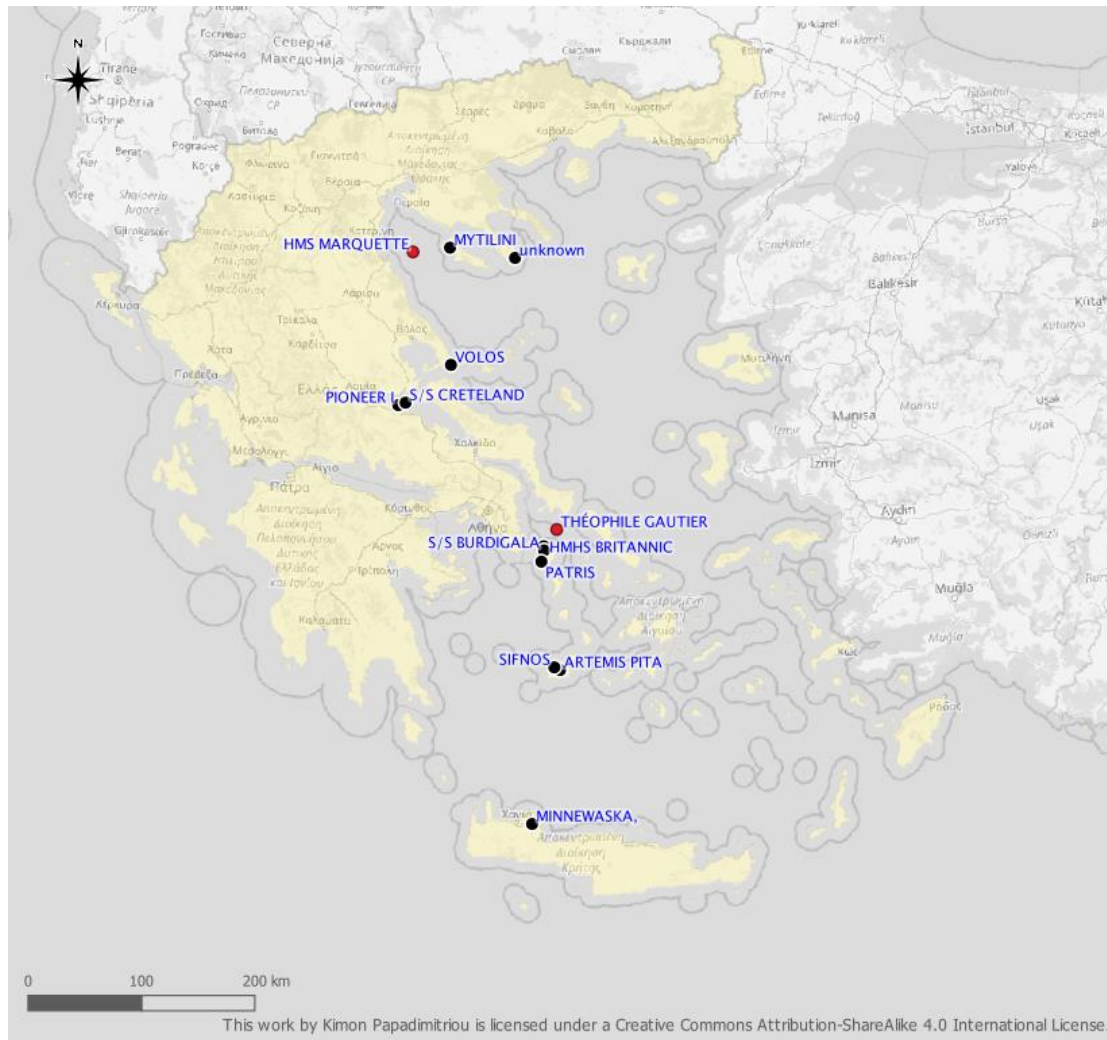


Figure 1. Indicative positions of the 11 accessible historical wrecks (black dots) and 2 historical wrecks beyond territorial waters (red dots)

The troopship 'HMS MARQUETTE' was torpedoed and sank on 23 October 1915, in her way to Thessaloniki, and is located 14 nautical miles offshore. As for the passenger motor ship 'THÉOPHILE GAUTIER', she belonged to the Vichy political regime, which came out as a partner of Nazi Germany, after the French capitulation on 22 June 1940. That ocean liner was torpedoed and sank by the British submarine 'HMS TALISMAN' on 4

October 1941, while returning from Greece to France. She is located in a distance of almost 8 nautical miles from the island of Makronisos. As already signalized, both shipwrecks, which included the loss of many human lives, are expected to become accessible, after the completion of a photo-based documentation.

They are situated in the continental shelf of Greece, despite the fact that no mutually recognized delimitation has been produced so far, between the coastal countries of Greece and Turkey at the Aegean Sea. They may be protected by the Greek polity, not only through their opening to scuba divers and tourist promotion but also in terms of anticriminal policy. They are covered by article 13 par. 4 of law No. 3658/2008 on measures of the protection of cultural goods, which has been the first specialized law in antiquities looting. In virtue of that pioneer disposition consecrating the principle of extraterritorial jurisdiction, the offences that are previewed in the penal dispositions of chapter 9 of law No. 3028/2002, as it is applicable from time to time, are prosecuted and punished according to the Greek penal laws, even in case they are committed abroad. As law No. 3028/2002 has been replaced by the Cultural Heritage Code (law No. 4858/2021), the set of applicable dispositions are no more those of chapter 9 of that law but articles 53 to 72 of the Code. Anyway, monument looting and monument damage (vandalism) are illegal acts, for which Greek authorities are competent. Hellenic Coastguard is competent for the prevention and suppression of such crimes against the two historical shipwrecks on the matter.

Furthermore, this protection could be completed and emphasized through the adoption of a similar measure of the law of the sea. The Greek polity should consecrate a contiguous (archaeological) zone, up to the 24th nautical mile from the baselines, following the paradigm of France, and thus empowering its competences against antiquities looting.

Last but not least, Greece should make the step forward, by ratifying the aforementioned UNESCO Convention. It did not sign this text and has not been a contracting party, to date. This important legal tool previews the obligation of states parties to preserve underwater cultural heritage, which is defined in article 1 par. 1.a as follows: '*all traces of human existence having a cultural, historical or archaeological character which have been partially or totally under water, periodically or continuously, for at least 100 years*'. It encourages both scientific research and public access¹⁷.

5. The Quasi-rights of Ships and the Comparable Regime of Shipwrecks

5.1 Correlation of Ships to Natural Persons

The anthropomorphism of ships is a multifaceted phenomenon, which is present inter alia in maritime law¹⁸. Vessels are quite similar to human beings, in terms of various characteristics such as their name, which may be anthropomorphic itself. This is the case of a name coming from the name of a man or woman (e.g., ELLI), which is thus connected to a certain natural person and his or her descendants.

Furthermore, in case vessels, including the military ones, are made of wood, anthropomorphism is enhanced. For instance, the fact that Greek fishermen have been led to officially destroy a very large number of their fishing vessels for economic reasons which are linked to the fisheries policy of the European Union reinforces that

¹⁷ A. Maniatis, *The Archaeological Zone in the Constitution for the Oceans*, 11th Annual Conference of the EuroMed Academy of Business. 2018, p. 885.

¹⁸ A. Maniatis, *Le Droit Maritime*, Neptunus e.revue, 2018/2.

phenomenon¹⁹. This kinship is intrinsically accentuated as ships are built from living and malleable material, such as wood. Moreover, this is indeed the case with gondolas in Venice, for which the regulations of gondoliers impose such a material. Gondolas have been able to escape their full marginalization thanks to their use for leisure activities, such as tourism. In that way, culture has been well protected both at the tangible level (gondolas) and at the intangible one (know-how of construction of gondolas, exercise of the traditional profession of the gondolier). In general, if a ship is designated by a State as a monument, her anthropomorphism is enhanced, given that she is protected from destruction, just like natural persons are endowed with the right to life.

Besides, given that people have been recently endowed with the right to their personal image, a parallelism could be made between it and a 'right' of ships to their own image. The phenomenon of personal image is particularly related to waters. As cited by the doctrine, *'Water is the first of all mirrors. It throws our contradictions back in our faces'*²⁰. It is about a classical topic in literature, exemplified by Baudelaire's poem 'The man and the sea'. It is also possible to correlate the visual representation of shipwrecks, as already described in the matter of their opening to divers, with the tourism image of the coastal country involved. This version of image goes much beyond the limited social group of divers, it is related to potential tourists (primary tourism image) and also tourists (secondary tourism image).

In the current context of the new approach to underwater cultural heritage, it is time ships were endowed with quasi-rights. The reason is that vessels are similar to human beings, which are entities having rights (natural persons). For instance, the tourist has the

¹⁹ A. Maniatis, *Aspects de la Politique Commune des Pêches (PCP) avec emphase au tourisme*, Neptunus e.revue, 2019/3.

²⁰ É. Orsenna, *L'avenir de l'eau*, Fayard, 2008.

right to his own image and also the right to tourist image of the place visited. In a similar way, the yacht has the rights to image as well as to the tourism image of the place visited.

5.2 Correlation of Shipwrecks to Human Corpses

Human corpses are *sui generis* things, for instance they are respectable by law and non-tradable. Shipwrecks, which are comparable to them, are also respectable, all the more so since they constitute the ark of remains of the human body.

We suggest shipwrecks be endowed with an approach being inspired by the proposed theory on quasi-rights of ships and the legal status of human corpses. For instance, they deserve a special treatment by the polity involved since they are a form of evidence of the historical past and thus any action implicating damage or alteration of them should be prohibited, like the integrity of the human corpse is protected.

Underwater cultural heritage should be maintained, let alone *ipso loco* according to the aforementioned UNESCO Convention. A question arises about the wreck of the ship 'ENDURANCE', which went down during an expedition by the explorer Ernest Shackleton in 1915 and was discovered in March 2022 in the Antarctic. The intact image of the monument was not unexpected, due to the cold character of the sea water and the lack of wood-eating marine life in the Weddell Sea, which has damaged other wrecks elsewhere²¹. The archaeologist who discovered 'ENDURANCE' declared that the wreck will disintegrate at the bottom of the Antarctic if it is not recovered and preserved.

5.3 Free Artificial Underwater Attractions (Ships) and the Right to Tourism Image (Theater)

²¹Newsroom, *Fears over fate of legendary 'Endurance'. She will "disappear" if not recovered from sea, archaeologist says. Chief explorer of expedition that discovered her expresses concerns*, lifo.gr, 7/10/2022 (in Greek), <https://www.lifo.gr/now/world/foboi-gia-tin-tyhi-toy-thrylikoy-endurance-tha-exafanistei-den-anasyrthei-apo-ti-thalassa>

There is a special, recent approach of States to both ships and shipwrecks in tourism law. For instance, Greek law No. 4688/2020 on special forms of tourism and on tourism development, which codifies the dispositions relevant to diving tourism, incorporates explicitly shipwrecks into the definition of ‘leisure diving tourism’, even if they are under 50 years old. So, they have been institutionalized as a form of tourism resources, let alone for a modern specific form of thematic tourism, such as diving tourism.

Furthermore, the same law introduces for the first time the possibility to create a free artificial underwater attraction. Stakeholders in the public sector (e.g., Municipalities) or the private sector (e.g., coastal hotel companies) may create artificial underwater attractions at their own expense. This concept includes ships, traditional ships, shipwrecks, floating shipyards or other artificial structures or works of art (e.g., statues), which are installed on the seabed with the aim of improving the biodiversity and the diving attractiveness of the marine area. A necessary condition for the creation of a free artificial underwater attraction is the issuance of a relevant environmental permit, according to law No. 4014/2011.

According to a doctrinal approach, mainly through the free artificial underwater attractions the authenticity of the underwater landscape is altered and, by extension, the element of authenticity is removed from reality, which is now staged²². It is not considered necessary to ‘stage’ the reality of the Greek underwater space, as the seascape itself in all the environments of the country, coastal and insular, arouses the interest of those engaged in diving as a leisure activity²³.

However, we consider that the new legislative development is intrinsically related to the right to tourism image, which is a genuine human right and a quasi-right of ships as already signalized. This guarantee is significantly promoted through the innovation

²² D. Mylonopoulos, *Tourism Law*, 3rd edition, Nomiki Vivliothiki, 2021 (in Greek), p. 380.

²³ D. Mylonopoulos, *Tourism Law*, 3rd edition, Nomiki Vivliothiki, 2021 (in Greek), p. 380.

related to modern cultural goods, which implicates a serious change relevant to the status of a ship, being convertible into a submerged object. The anthropomorphism of ships is enhanced by this practice as long as they are supposed to enact a role in the *sui generis* underwater space, which constitutes essentially a theater, just like the man in his life may operate as an actor. It is notable that “teoros”, namely the word for tourist in ancient Greek, and “theater” have a common etymological origin and the same point of reference, consisting in spectacle, let alone in the country which was the first to invent theater.

Not only is the practice of artificial underwater sightseeing common on international scale²⁴, but Greece has been a pioneer country on the matter. Already in 1993 thematic diving tourism took place in Corfu with the use of a transparent-hull ship, which was just one of the three ships of that category, operating worldwide. During the voyage, divers dived into a sea area in which modern cultural goods such as statues of ancient Greek style were submerged. Nevertheless, the legislator did not institutionalize this pioneering method of diving tourism until almost three decades later.

Last but not least, the coastal territory/maritime heritage couple, which has been institutionalized, has reached maturity²⁵. This development is comparable to the fact that communicatively, from the investors’ point of view, the plan for a very big hotel unit on the beach of Falasarna, which is one of the most important sites of the Natura 2000 network of nature protection areas in Crete, is presented as a ‘luxurious but mild’ investment with respect for the environment. The main argument is that there will be no buildings on the beach whilst 61 wooden single-story huts (glamping) will be placed on

²⁴ A. Alexopoulos, *Wrecks in the Greek maritime space as models of sustainable tourism development according to international law*, Perivallon & Dikaio, 3/2022 (in Greek), p. 383.

²⁵ F. Péron, *Les logiques de construction du patrimoine maritime culturel. De l’émergence d’un concept à sa prise en compte dans les politiques territoriales*, in N. Boillet, G. Goffraux Callebaut, *Le patrimoine maritime : entre patrimoine culturel et patrimoine naturel. Actes du colloque de Brest 23 et 24 juin 2016*, Editions A. Pedone, Paris, 2018, p. 25.

stilts, so that they will not touch the ground²⁶. Huts on stilts constitute one of the forms of glamping, as it has been introduced for the first time in Greek tourism law through article 36 of law No. 4688/2020. It is about a new practice, being devoted to the offer of luxurious experience of staying in nature.

6. Tourism and the European Union

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Tourism is an activity including an international dimension, so it is connected with the mission of some international organizations. The sciences involved in the academic field of tourism have accepted the conceptual corpus proposed by the World Tourism Organization (WTO), or other relevant organizations²⁷. Although the European Economic Community had initially developed no policy on sea for a long time and it had not included tourism as one of its policy areas, tourism began to make gradually an entry in European policy and law.

The European Union is the first tourist destination worldwide and so it would be paradoxical to abstain from the field of tourism. It mentioned tourism in the treaties for the first time in 1992, although in a rather marginal way. This osmosis has evolved into the actual status of tourism in the European context. In virtue of the 2007 treaty of Lisbon, initially known as the Reform Treaty, tourism has been the scope of supporting and complementary competencies of the European Union whilst each Member State has maintained its primary competence on the matter. More precisely, according to Article 6 of the Treaty on the Functioning of the European Union (TFEU), the European Union shall have competence to carry out actions to support, coordinate or supplement the actions of the Member States in tourism. Moreover, in the same text a specific section for

²⁶ M. Dionellis, *They make Falasarna ... a hotel*, I Efimerida ton Syntakton (in Greek), p. 3.

²⁷ A. Maniatis, E.- E. Cortés-Rodríguez, *The Right to Tourist Information. Reversing the Role of the Guide*, Our Knowledge, 2020, p. 15.

tourism was created, Title XXII (Article 195), which lays down the procedure for adopting measures in the sphere of tourism.

There is no normative text that has been introduced by the European Union, on the basis of that article²⁸. Therefore, European tourism law, in the strict sense of the term, is non-existent, something which does not seem to encourage a dialogue between the administrators of various countries. The European Union regulates tourism either through law, mainly in a wider context such as package travel, or through soft law, such as communications. If there is no normative text to debate, the European Commission tends to fill this legislative vacuum and communication problems while making use of various mechanisms. For example, an advisory committee of this institution holds sessions twice a year on tourism.

Another tool towards quality assurance for tourism and related services are the international standards (e.g., solely for the case of recreational diving, 15 ISO standards apply²⁹). Among others, ISO 13810 for visits to industrial tourism organizations and to natural, cultural and historical sites *'establishes general requirements for organizations, that offer guided or self-guided visits in order to enable visitors, to learn: a) how a service, an activity or a product is developed now or was developed in the past (industrial tourism) or b) about the characteristics on the cultural, historical or natural value of a tourist site'*³⁰.

Since 2001, the European Commission has published several communications, setting out its policy guidelines for the development of the tourism sector³¹. It adopted a strategy

²⁸ A. Maniatis, *Les voyages à forfait et les prestations de voyage liées dans le cadre de la directive 2015/2302/UE*, RDUE 3-2019, p. 94.

²⁹ ISO, Standards by ISO/TC 228, Tourism and related services (<https://www.iso.org/committee/375396/x/catalogue/p/1/u/0/w/0/d/0>)

³⁰ ISO, *ISO/DIS 13810(en) Tourism and related services – Visits to industrial, natural, cultural and historical sites – Requirements and recommendations*, <https://www.iso.org/obp/ui/#iso:std:iso:13810:dis:ed-2:v1:en>

³¹ D. Pernice, *Fact Sheets on the European Union. Tourism*, European Parliament, 03-2022, <https://www.europarl.europa.eu/factsheets/en/sheet/126/tourism/>

for tourism in 2010, with a Communication on 'Europe, the world's No 1 tourist destination – a new political framework for tourism in Europe'. That soft law text outlined the EU's tourism policy and actions to be implemented jointly by the Commission, Member States and their regions, as well as by industry stakeholders. One of the four priority areas for action consists in the consolidation of the image and profile of Europe as a collection of sustainable and high-quality destinations. Another one consists in promoting the development of sustainable, responsible and high-quality tourism, for which the Commission proposed the protection of heritage of tourism destinations.

In order to achieve the objectives, set in the European Union tourism strategy, this institution has launched numerous projects and initiatives, including the Calypso initiative and its follow-up Tourism for Seniors³².

The most recent of the aforementioned communications was issued in 2014, under the title 'A European Strategy for More Growth and Jobs in Coastal and Maritime Tourism'. It seeks to promote sustainable growth and competitiveness in coastal and maritime tourism. However, it makes no reference to 'hospitality', which is the symmetric principle of tourism, and also to 'image', particularly to 'tourism image' either of European Union or of a destination at an inferior level of reference. Moreover, the use of the term 'leisure' is marginal although both phenomena of recreational diving and diving tourism constitute specific forms of leisure activities. However, it makes a reference to underwater tourism and also to diving as water-based sport³³. Furthermore, the Commission invites Member States, regional and local authorities and industry to develop cultural heritage-

³² M. Juul, *Tourism and the European Union. Recent trends and policy developments. In-depth analysis*, European Parliamentary Research Service, September 2015 – PE 568.343, p. 16, [https://www.europarl.europa.eu/RegData/etudes/IDAN/2015/568343/EPRS_IDA\(2015\)568343_EN.pdf](https://www.europarl.europa.eu/RegData/etudes/IDAN/2015/568343/EPRS_IDA(2015)568343_EN.pdf)

³³ European Commission, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A European Strategy for more Growth and Jobs in Coastal and Maritime Tourism*, Brussels, 20.2.2014 COM(2014) 86 final, p. 7.

based tourism, underwater archaeological parks (based on work done by UNESCO), and nature and health tourism in coastal destinations³⁴. It is to underline that this institution applies the principle of integration of tourism development in other policies of the European Union, being inspired by the explicitly recognized principle of integration of environmental policy in other domains. So, tourism law confirms its close relationship with environmental law. More precisely, the communication previews the Commission will ensure that coastal and maritime tourism is included in other policies of the European Union, like IT connectivity, sustainable transport, safety issues and freedom of movement for workers whilst cross-cutting policy aspects such as environmental protection, regional development, training, consumer protection and climate change mitigation and adaptation policies will also be considered³⁵.

7. Conclusion: Diving Tourism and the Emergence of Rights and Quasi-rights

Tourism is not merely a form of leisure, but also a set of rights, such as the generic ones to tourism and hospitality and other specific ones. The second category includes the new human right to tourism image.

It makes a part of the European Union acquis, particularly since the Lisbon Treaty has been adopted. Although the European Commission has made a reference to the image of the European Union in a soft law text relevant to tourism, no legal consecration of this new human right exists. It should be consecrated explicitly, at internal, European and

³⁴ European Commission, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A European Strategy for more Growth and Jobs in Coastal and Maritime Tourism*, Brussels, 20.2.2014 COM(2014) 86 final, p. 8.

³⁵ European Commission, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions. A European Strategy for more Growth and Jobs in Coastal and Maritime Tourism*, Brussels, 20.2.2014 COM(2014) 86 final, p. 10.

international levels. Furthermore, tourism has proved to be an important way of safeguarding both tangible and intangible cultural goods, so it is strictly related to the protection of cultural heritage.

Thematic diving tourism has recently gained the interest of the European Union in the framework of its policy on maritime tourism. In a parallel way, it is an important endeavor for Greece, let alone the fact that it symbolizes the divorce from the negative and anachronistic practice of deconstruction of shipwrecks for economic reasons. The first group of 91 historical wrecks is open to human visit, in various ways, mainly through scuba diving but also eventually through other methods. It is also recommended to examine mixed projects, such as diving tourism through transparent-hull ships for normal wrecks and artificial underwater attractions.

Besides, the Hellenic polity, which has made a very important step forward with the novelty of highlighting two historical shipwrecks being located out of the space of its sovereignty, should take relevant radical measures, such as the delimitation of contiguous archaeological zone and the adoption of the UNESCO Convention.

It is also notable that ships should be treated in a systematic way as carriers of quasi-rights whilst shipwrecks would deserve a comparable approach. Furthermore, the man/ship couple is similar to the coastal territory/maritime heritage couple, which has reached maturity, through a synthetic approach, promoting tourist expansionism. By the last term we declare the phenomenon of the process and the result of the process for the tourist to expand in the physical space, in terms of accommodation infrastructures (e.g., glamping) and also of visiting modes (e.g., free or scuba diving). Moreover, it is notable that the aforementioned approach includes inter alia beach glamping and diving tourism focusing on historical shipwrecks and other elements of underwater cultural heritage.

Falasarna is the symbol of the historical reorientation of sea-centered economic development of coastal areas, from piracy to marine tourism and glamping...

THE EFFECTS OF ENERGY AND TOURISM DEVELOPMENT ON ECONOMIC GROWTH: AN EMPIRICAL ANALYSIS

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Abstract

This study focuses on tourism market, whose Spain is one of the most important countries. This State managed to more than double the number of international tourist arrivals from 2002 to 2017, occupying the third position. Moreover, the Autonomous Community of Madrid in 2009 became the first entity to liberalize fully the regulated profession of tourist guide, which is strictly related with the new trend of free tours. The current research deals with the effects of tourism and energy development on economic growth estimating a linear regression model for Greece and Spain covering the period from 1995 to 2017. For this purpose a Monte Carlo simulation method is applied in order to define the predictive ability and sensitivity analysis of the structural system model. Tourism and energy sectors are the main pillars of economic growth in Greece and Spain

in the South European Union member countries zone, despite the grievous consequences of economic crisis in the last decade.

Keywords: economic growth, energy, Greece, Spain, tourism, energy, Monte Carlo simulation

JEL O11, C22

1. Introduction

Spain is one of the most important countries in the tourism market, which managed to more than double the number of international tourist arrivals from 2002 to 2017, occupying the third position. Moreover, the Autonomous Community of Madrid in 2009 became the first entity to liberalize fully the regulated profession of tourist guide, which is strictly related with the new trend of free walking tours that appeared in that period (Maniatis & Cortés-Ramírez, 2020).

Besides, the study of main determinants of economic growth has become an issue of extensive analysis. The question is how tourism and energy development affects economic growth in developed countries. The most empirical studies support the tourism-led growth hypothesis, because a stable economic system is an impetus of tourism growth in developed countries and developing ones (Balaguer & Contavella-Jorda, 2002; Lokman & Abdalnasser, 2005; Aslan, 2014; Tang & Tan, 2015).

Eugenio-Martin et al. (2004) proved that tourism growth is associated with economic growth only in low- and medium-income countries but not in high-income countries, estimating panel data analysis for Latin American countries for the time period from 1985 to 1998. Katircioglu (2009) examined the effects of tourism and trade development on economic growth for Cyprus. She confirmed that economic growth causes tourism and trade development in the long-run period. Romero & Molina (2013) supported that the relation between tourism sector and economic growth is based on

various factors such as the country's degree of specialisation in tourism, the standard of living and the visitor's increase in tourist destination country.

Furthermore, the empirical results are very sensitive to the choice of the model specifications and the use of modern econometric methods such as stationarity tests, cross-sectional and panel data analysis. Bilen et al. (2015) concluded that there is bidirectional causality between tourism development and economic growth applying panel Granger causality tests for 12 Mediterranean countries for the examined period 1995-2012. They supported that panel Granger causality tests permit country-level heterogeneity leading with this way to more accurate and reliable empirical results.

Pérez-Rodríguez et al (2022) confirmed the tourism-led growth hypothesis (TLGH) for North European countries rather than in South European/Mediterranean countries applying panel fractional cointegration techniques. Pérez-Rodríguez et al (2022) highlighted the negative effects of the COVID-19 crisis on international tourism development and economic growth too. Pérez-Rodríguez et al (2022) cited that there was a decrease in international tourism flows by 22% worldwide and by 19% in Europe during the first quarter of 2020 according to the World Tourism Organization (UNWTO) (2020).

2. Data and Methodology

2.1. Data analysis: The main theoretical hypothesis of this empirical study suggest that tourism, energy consumption and energy production foster economic growth for Greece and Spain respectively. This empirical study investigates the interrelation among tourism, energy development and economic growth estimating a linear structural system regression model with Monte Carlo simulation method. For this purpose the predictive ability of the empirical model is examined by calculating the inequalities ratios indices of Theil. The system equation model has the following general form:

$$LGDP_t = c_1 + c_2 LEN_CS_t + c_3 LEN_PROD_t + c_4 LTAR_t + c_5 LGDP_{t-1} + u_{1t} \quad (1)$$

$$\begin{aligned} \text{LEN_CS}_t = & c_6 + c_7 * \text{LGDP}_{t-1} + c_8 * \text{LEL_PROD}_t + c_9 * \text{LREN_CS}_t \\ & + c_{10} * \text{LST_OIL}_t + c_{10} * \text{LST_GAS}_{t-1} + u_{2t} \end{aligned} \quad (2)$$

where:

GDP = gross domestic product

EN_CS = energy use

EN_PROD = energy production

TAR = tourist arrivals

EL_PROD = electricity production

REN_CS = renewable energy consumption

ST_OIL = stock of oil

ST_GAS = stock of gas

L = logarithmic symbol

t = time trend

Following the empirical studies of Aslan (2014), Adamopoulos and Thalassinou (2020), Adamopoulos (2021) the variable of economic growth (GDP) is measured by the rate of change of real GDP, while tourism sector is represented by tourist arrivals and energy sector is expressed by energy consumption and energy production.

Based on theoretical hypotheses of the system equation model we can infer that an increase of tourist arrivals and energy production causes a relative increase of economic growth. Furthermore, an increase of energy consumption causes an increase of economic growth through the relative increase of electricity production and stock of oil and gas, but a relative decrease of renewable energy consumption.

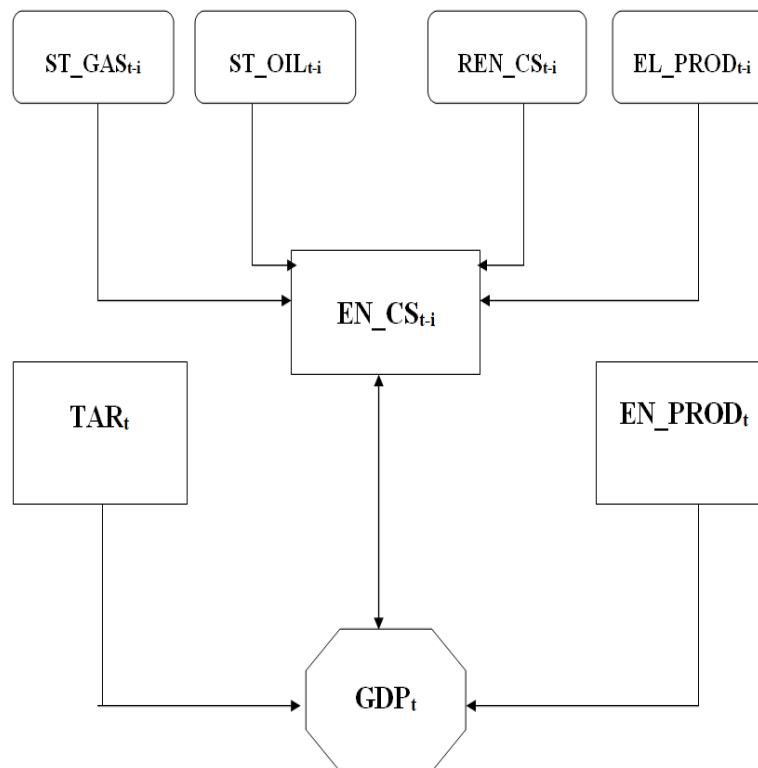
$$\begin{aligned} \text{HYPOTHESIS H}_1 \quad & \uparrow \text{EN_CS}_t \Rightarrow \uparrow \text{GDP}_t \\ & (\uparrow \text{ST_OIL}_t \quad \uparrow \text{ST_GAS}_t \quad \uparrow \text{EL_PROD}_t \quad \downarrow \text{REN_CS}_t) \end{aligned}$$

HYPOTHESIS H₂ $\uparrow EN_PROD_t \Rightarrow \uparrow GDP_t$

HYPOTHESIS H₃ $\uparrow TAR_t \Rightarrow \uparrow GDP_t$

In this empirical study annual data are used for Greece and Spain covering the time period from 1995 to 2017, regarding 2015 as a constant year. The statistical data variables are obtained from statistical database of European Committee Economic and Financial Affairs (AMECO, 2020) and World Bank (World Development Indicators online database). The data variables are transformed into their logarithmic values in order to obtain better statistical results. The Eviews 10.0 (2017) software conducts the relative econometric tests. The system equation model is presented by the following diagram (Figure 1).

Figure 1- Structure of the system equation model



2.2. Methodology

Two-stage least squares method is selected for the estimation of the structural system equation model. The structural system regression model is consisted by four logarithmic

equations, where the dependent variables are LGDP_t, LEN_CS and the independent variables are LGDP_{t-1}, LEL_PROD_t, LREN_CS_t, LST_OIL_t, LST_GAS_{t-1}, LEN_PROD_t, LTAR_t. Monte Carlo simulation method is adopted in order to make simulation policies. According to Seddighi et al (2000) simulation defines the simultaneous solution of the system equations model. Finally, the dynamic multipliers of dependent variables are estimated in order to test for *predictive ability* of the estimated model. For this reason we estimate the percentage change of experimental values of dependent variables to simulated values as follows:

$$mpl = \frac{x_t^{\text{exp}} - x_t^{\text{sim}}}{x_t^{\text{sim}}} * 100 \text{ or } mpl = \frac{x_t^{\text{exp}}}{x_t^{\text{sim}}} . \quad (3)$$

where x^{exp} =experimental values of x and x^{sim} =simulated values of x (Katos, 2004)

The best predictive ability of the system equation model is achieved by estimating the inequalities ratios indices of Theil, specifically bias ratio, variance ratio and covariance ratio as follows:

$$U = \frac{\sqrt{\frac{1}{T} \sum (x_t^{\text{sim}} - x_t)^2}}{\sqrt{\frac{1}{T} \sum (x_t^{\text{sim}})^2} + \sqrt{\frac{1}{T} \sum (x_t)^2}} \text{ Theil index} \quad (4)$$

$$U^M = \frac{(\bar{x}^{\text{sim}} - \bar{x})}{\frac{1}{T} \sum (x_t^{\text{sim}} - x_t)^2} \text{ bias ratio} \quad (5)$$

$$U^S = \frac{(s_{x^{\text{sim}}} - s_x)^2}{\frac{1}{T} \sum (x_t^{\text{sim}} - x_t)^2} \text{ variance ratio} \quad (6)$$

$$U^C = 1 - (U^M + U^S) \text{ covariance ratio} \quad (7)$$

The smaller dynamic multipliers and inequalities ratios indices the better predictive ability of the system equation model is achieved. Perfect adjustment exists when Theil index equals to zero (Seddighi *et al.*, 2004).

3. Empirical Results.

The significance of the empirical results is based on the examined variables. The accurate number of fitted time lags was selected in order to achieve better estimation results. The main theoretical hypothesis proves that there is a positive interrelation between tourism, energy and economic development. Estimating the linear structural system equation model with two-stage least squares method, we conclude that there is a statistical significance in all estimated coefficients of independent variables, based on probabilities and t-student distribution test statistics. The empirical results of two-stage least squared method for Greece and Spain are summarized as follows:

The empirical results of system equation model for Greece are the following one:

$$\begin{aligned} \text{LGDP}_t = & 0.006 + 0.68 \text{LEN_CS}_t + 0.65 \text{LEN_PROD}_t + 0.06 \text{LTAR}_t \\ & + 0.53 \text{LGDP}_{t-1} + u_{1t} \end{aligned} \quad (8a)$$

$$\begin{aligned} \text{LEN_CS}_t = & -0.02 + 0.08 * \text{LGDP}_{t-1} + 0.27 * \text{LEL_PROD}_t - 0.24 * \text{LREN_CS}_t \\ & + 0.03 * \text{LST_OIL}_t + 0.01 * \text{LST_GAS}_{t-1} + u_{2t} \end{aligned} \quad (8b)$$

The empirical results of system equation model for Spain are the following one:

$$\begin{aligned} \text{LGDP}_t = & 0.005 + 0.89 \text{LEN_CS}_{t-1} + 0.46 \text{LEN_PROD}_{t-2} + 0.14 \text{LTAR}_t \\ & + 0.82 \text{LGDP}_{t-1} + u_{1t} \end{aligned} \quad (9a)$$

$$\begin{aligned} \text{LEN_CS}_t = & 0.014 + 0.07 * \text{LGDP}_t - 0.26 * \text{LREN_CS}_t + 0.03 * \text{LST_OIL}_t \\ & + 0.10 * \text{LST_GAS}_{t-1} + u_{2t} \end{aligned} \quad (9b)$$

As we can infer from the above results an increase of energy consumption per 1% causes a relative increase of gross domestic product per 0.68, an increase of energy production per 1% causes a relative increase of gross domestic product per 0.65, an increase of tourist arrivals per 1% causes a relative increase of gross domestic product per 0.06 (Equation 8a), while an increase of gross domestic product per 1% causes a relative increase of energy consumption per 0.08, an increase of electricity production causes a relative increase of energy consumption per 0.27, an increase of renewable energy consumption per 1% causes a relative decrease of energy consumption per 0.24, and finally an increase of stock of oil and gas causes an increase of energy consumption per 0.01 and 0.03 respectively (Equation 8b).

Furthermore, an increase of energy consumption per 1% causes a relative increase of gross domestic product per 0.89, an increase of energy production per 1% causes a relative increase of gross domestic product per 0.46, an increase of tourist arrivals per 1% causes a relative increase of gross domestic product per 0.14 (Equation 9a), while an increase of gross domestic product per 1% causes a relative increase of energy consumption per 0.07, an increase of renewable energy consumption per 1% causes a relative decrease of energy consumption per 0.26, and finally an increase of stock of oil and gas causes an increase of energy consumption per 0.03 and 0.1 respectively (Equation 9b).

Therefore, as we can conclude from the estimated results, energy use, tourist arrivals and energy production have a positive direct effect on economic growth, while electricity output, stock of oil and gas have a positive indirect effect on economic growth. Also, it is obvious that renewable energy consumption has a negative direct effect on energy

consumption. Estimating the structural system regression model with Monte Carlo simulation method for Greece and Spain, we can infer that the estimated simulated values are very close to actual one, so the model is very well simulated (Figures 2a, 2b).

Figure 2a –Monte Carlo Simulation model for Greece

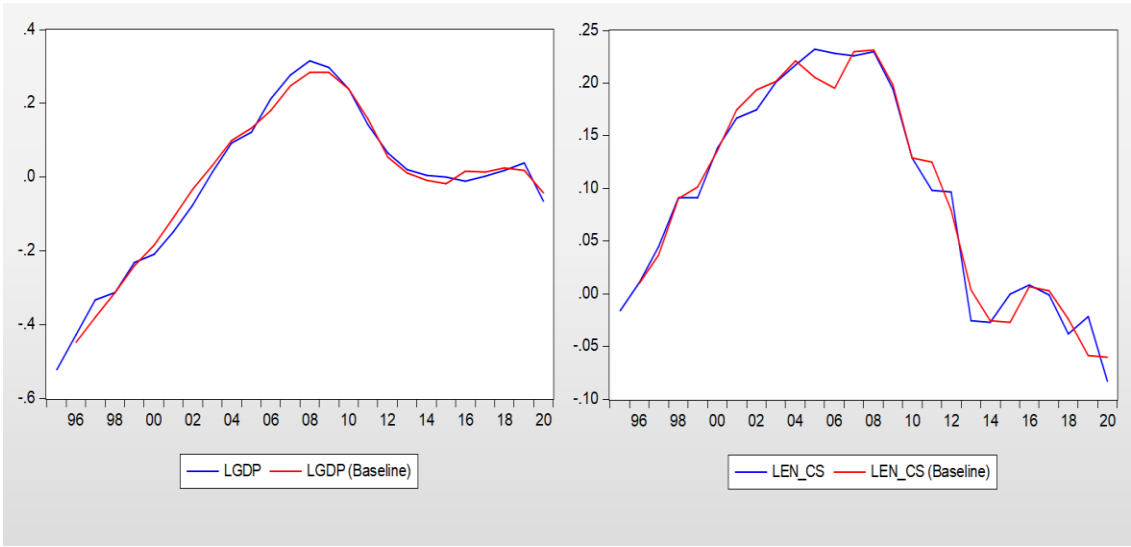
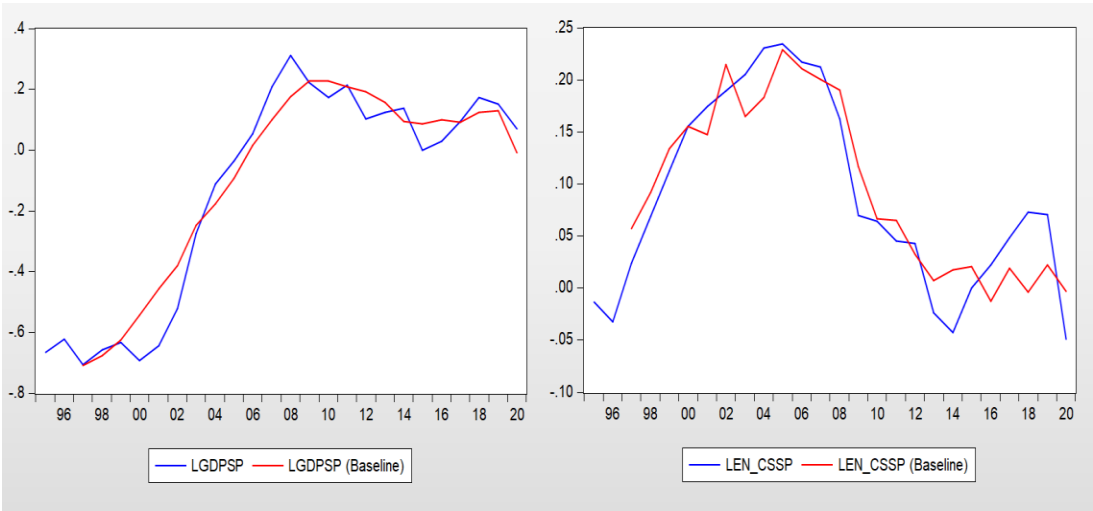


Figure 2b –Monte Carlo Simulation model for Spain



The empirical results of estimated inequalities ratios indices of Theil suggested that there is a good predictive ability of simulated system equation model for Greece and Spain (Table 3). A possible change in tourist arrivals in 2016 causes a rapid decrease of dynamic multipliers of economic growth and energy consumption in 2016 relatively. Comparing the Theil indices ratios values between Greece and Spain we found that there is a better predictive ability of simulated system equation model for Greece than for Spain due to the lower values of Theil indices in Greece (Figures 3a, 3b, 4a, 4b).

Table 3: Estimations of inequalities ratios indices

	U THEIL INDEX	U^M BIAS RATIO	U^S VARIANCE RATIO	U^C COVARIANCE RATIO
LGDPGR _t	0.0545	0.1679	0.2631	0.5689
LGDPSP	0.1116	0.1050	0.1051	0.7889
LEN_CSGR _t	0.0617	0.0139	0.0021	0.9838
LEN_CSSP _t	0.1337	0.0208	0.0216	0.9575

Figure 3a – Graphs of inequalities ratios indices
for Gross Domestic Product

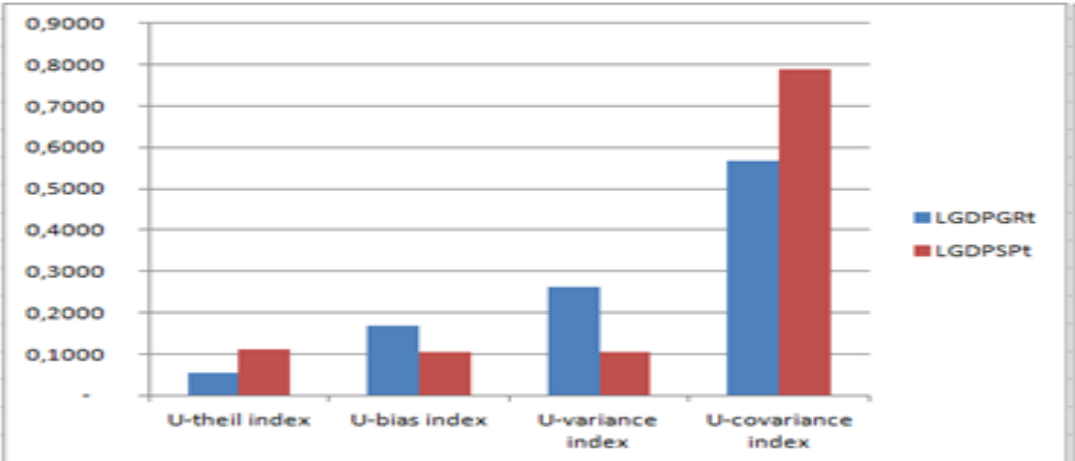


Figure 3b – Graphs of inequalities ratios indices for Energy Consumption

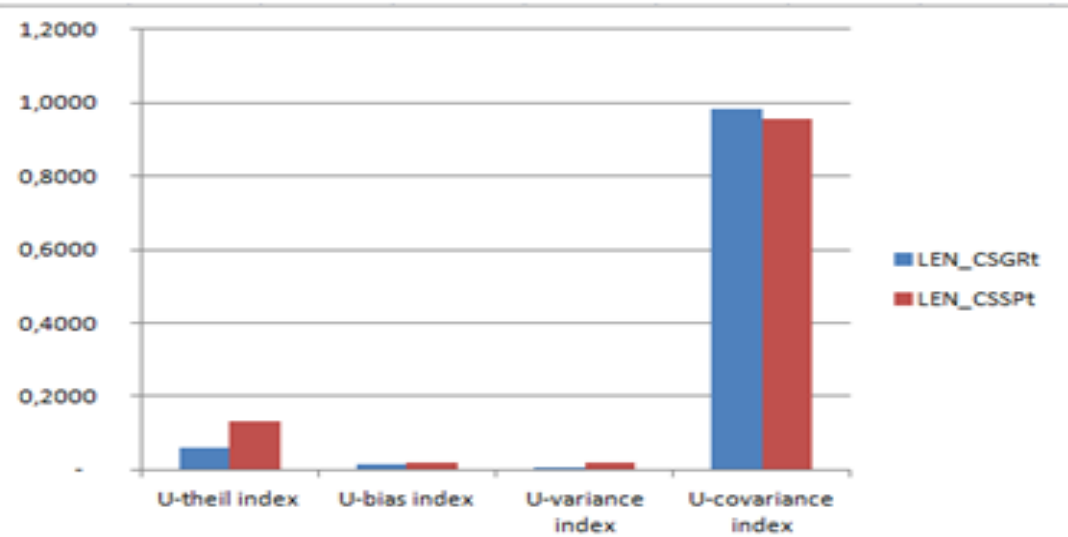


Figure 4a – Graphs of estimated multipliers for Greece

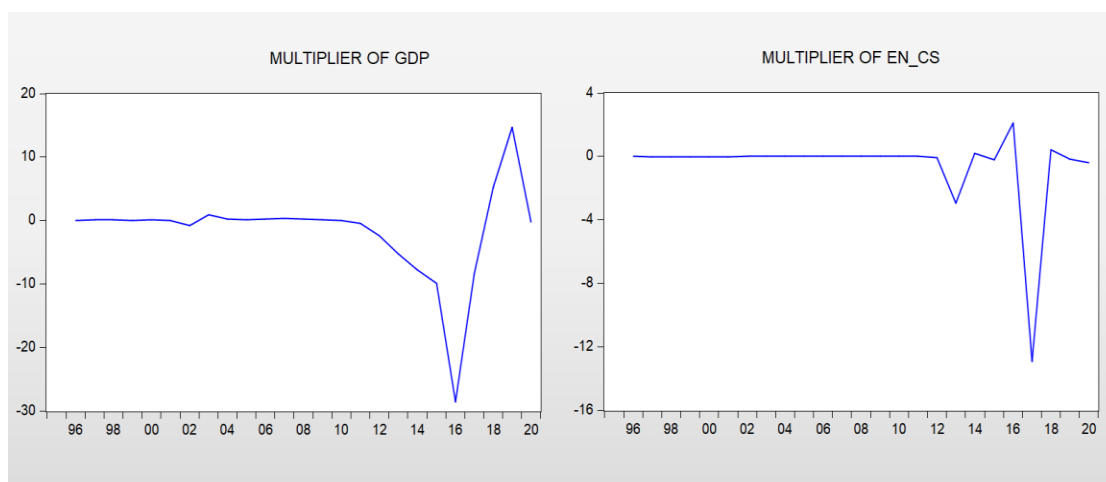
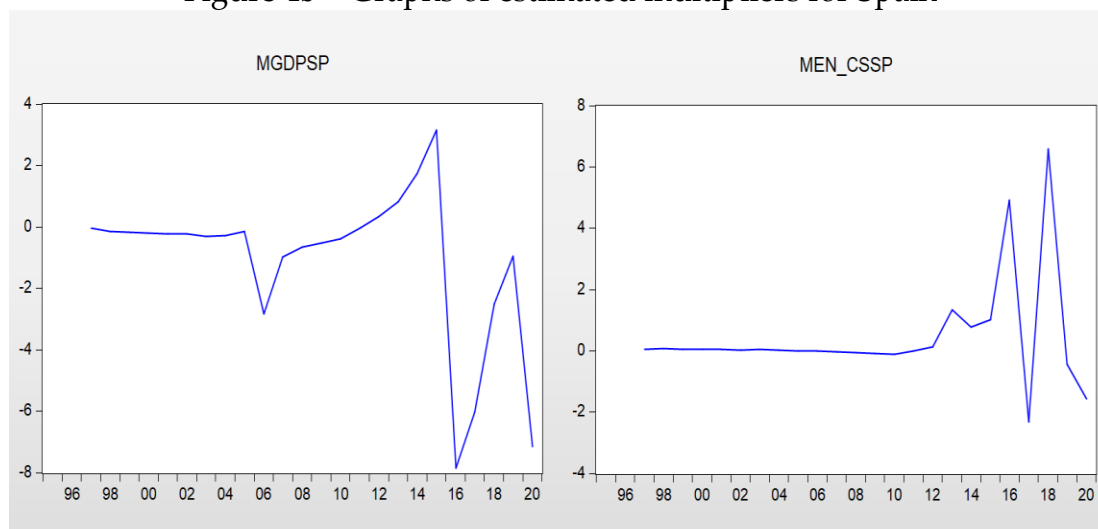


Figure 4b – Graphs of estimated multipliers for Spain



4. Conclusions

The current study has investigated the interrelation among economic growth, tourism and energy sectors development for Greece and Spain covering the time period from 1995 to 2017. For this purpose a structural system equation model is adopted by estimating a two-stage least squares method. Finally, Monte Carlo simulation method is applied in order to find out the sensitivity analysis and predictive ability of the empirical model. Economic growth is mainly characterized by the direct effect of tourist arrivals, energy consumption and energy production, but an *indirect* effect of electricity production, renewable energy consumption, stock of oil and stock of gas on it. The empirical results

indicated that Greece has better predictive ability of simulated system equation model than Spain due to the lower values of Theil indices. Anyway, Spain constitutes a role model in the international tourist market.

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FOREIGN AID AND SUSTAINABLE DEVELOPMENT IN THE WEST AFRICAN MONETARY ZONE

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Abstract

The post-World War II events necessitated that less developing countries receive financial help from the developed ones if they were to thrive. Several meeting and conventions were held by world leaders towards achieving sustainable development in the world, particularly the developing countries and these culminated into the campaigns for financial flows in form of aid to help developing ones overcome extreme poverty, environmental degradation, child and maternal mortality, social dislocation, illiteracy among other critical challenges. The extent to which these financial aids have achieved some of these goals in the six member countries in the West Africa Monetary Zone (WAMZ) between 1992 and 2020 is the focus of this study. The study achieved three main objectives: an examination of the effect of financial aid (FAD) on sustainable development in the WAMZ countries, a comparative analysis of the effect of FAD between two sustainable development indicators: poverty reduction and under-five child mortality rate and an examination of the causal relationship between FAD and sustainable development from the two stated perspectives. The study used panel autoregressive distributed lag (PARDL) to find the effect of official development assistance (ODA) and other official flows (OOF) on the GNI index (a measure of poverty reduction) on one hand and on under-five child mortality rate (MORT_RATE) on the other. The PARDL results show no evidence of significant relationship between FAD and sustainable development in terms of poverty reduction in the short run but significantly reduced child mortality. In addition, on the long run, foreign aid significantly aided poverty reduction but had mixed effects on child mortality rate. A comparison analysis shows that in both the short and the long run, there is a marked difference between the effect of foreign aid on poverty reduction and child mortality rate. The study concludes that FAD significantly impacted on sustainable development and that the effect of foreign aid variables differs across sustainable goal areas. The study recommended that countries in the West Africa Monetary Zone can still benefit if judicious use is made of

such aid flows into the countries. This will include a closer monitoring of the disbursement and spending of foreign aid towards set sustainable development goals.

Key Words: Foreign Aid, Sustainable Development, ARDL

Introduction

The major action that spurred foreign aid and sustainable development efforts was the Rio Earth Summit 1992 in Brazil where the need for the developed world to assist in the development of the less developing countries ravaged by poverty and general underdevelopment. The summit produced a blueprint (Agenda 21) to address sustainable issues globally. According to the World Bank (2019), the blueprint specifies that countries in the world should evolve new developmental processes aimed at preserving the environment, resources and nature for the convenience of present and future generations. The summit recognized the need for huge movement of capital between developed and less developed countries (LDCs) for the processes to yield fruit hence the call for foreign aids to the LDCs. Olaniyan (1996) had stated that since the inception of Agenda 21, it has dictated the speed advancement in sustainable development among many African countries. Focus of sustainable development has been poverty eradication apart from other ancillary targets. The author observed that achieving sustainable development in Africa has been an uphill task not because foreign aids have not been coming to the continent but because of self-created constraints such as political instability, corruption and institutional deficiency. For sustainable development to be achieved, requisite institutional, legal and political frameworks must be put in place by countries benefiting from foreign aid.

Abeselom (2018) asserted that there are controversies surrounding the need for foreign aid by less developing countries. The sincerity of donor countries to help the LDC had been subjected to constant scrutiny by scholars. Some have argued that foreign aid is

a veritable diplomacy tool used by rich countries to control the poor ones. The author opined that development aid is “a myth which serves as a means of preserving the existing economic and social structures and privileges in the world.” This means that many aid donors are merely safeguarding their political, economic and security interest. According to Lancaster (2008), governments of rich countries give aid to poor ones for several reasons which may include a genuine willingness to help, domestic politics, economically derivable benefits by the rich countries or other strategic reasons.

Prince and Vitenu-Sackey (2020) posited that though foreign aid promoters since the close of WW2 aimed at fast-tracked development of developing countries, Africa, in particular, still remained undeveloped despite the flows of aid into it over the years. Poverty rate, child mortality, insecurity, low standard of living, number of children out of school, environmental degradation among several other indicators have been on the worse. Researchers and donor agencies have been interested in the reason why this phenomenon persisted for so long.

Veiderpass and Andersson in an elaborate study of 60 countries across the world between 1995 and 2000 asserted that greater attention has been put on foreign aid issues since early 2000s. the plan to achieve some stated Millennium Development Goals (MDGs) in 2015 latest spurred interest on how foreign aid affects sustainable development in developing countries. Issues such as extreme poverty, low school enrolment, gender inequality, child mortality, maternal health, the spread of pandemics and safe environment among several others have been on the main board of the MDG promoters. For aid to be beneficial however, Roodman (2004) opined that some domestic factors in terms of policies, history, governance and external circumstances must be taken into consideration.

According to Andrews (2009), “the growing gap between the developed and

developing countries has dominated international relations and diplomacy for a long time. This gap has led to constant capital inflow from the developed countries to those in the developing including Africa, with the goal of helping them overcome their problems and reduce the gap.” The author observed that as of 2009, foreign aid had not done much to change the precarious economic and social lives of the African continent. Underdevelopment was still widespread as it was before foreign aid was introduced.

Although the effect of foreign aid should be poly-dimensional, achieving all targeted goals at the same time, the question arises as to whether some goals can be achieved while others are not, or still, whether some other development indicators are getting worse when efforts are being made to achieve others. This is the focus of this study: an attempt to examine the effect of foreign aid on sustainable development in the West African Monetary Zone countries from two goal points: poverty reduction and child mortality.

Literature Review

Measuring Sustainable Development

The United Nation, UN (2001) reported that its Commission on Sustainable Development (CSD) listed some indicators of SD during its third session in that year. These indicators, which can be further broken down into several other metrics are tabulated in table 2.1.

Table 2.1: Key Indicators as spelt out by the by CSD

Social	Environmental
Education	Freshwater/groundwater
Employment	Agriculture/secure food supply
Health/water supply/sanitation	Urban
Housing	Coastal Zone
Welfare and quality of life	Marine environment/coral reef protection

Cultural heritage	Fisheries
Poverty/Income distribution	Biodiversity/biotechnology
Crime	Sustainable forest management
Population	Air pollution and ozone depletion
Social and ethical values	Global climate change/sea level rise
Role of women	Sustainable use of natural resources
Access to land and resources	Sustainable tourism
Community structure	Restricted carrying capacity
Equity/social exclusion	Land use change
Economic	Institutional
Economic dependency/Indebtedness/ODA	Integrated decision-making
Energy	Capacity building
Consumption and production patterns	Science and technology
Waste management	Public awareness and information
Transportation	International conventions and cooperation
Mining	Governance/role of civic society
Economic structure and development	Institutional and legislative frameworks
Trade	Disaster preparedness
Productivity	Public participation

Source: UN (2001)

According to the CSD, measuring sustainable development can be done from four broad perspectives: social, environmental, economic and institutional. These four divisions can be further decomposed to sub-themes with each having its indicators. For example, the UN (2001) defined a social SD sub- theme to include poverty, health, education among others. Each of these sub-themes has its indicators which are also many. Of importance to our present study is the Gini index of income inequality which measures the level of poverty (reduction) in the country over a given period. Secondly, the study also considers mortality rate of under 5 children as a crucial measure of the health sub-theme of sustainable development.

The West African Monetary Zone (WAMZ)

Harvey and Cushing (2015) stated that the quest for a West Africa monetary union started in 1975 with an establishment, through Article 2, Section 2 of the Lagos Treaty. This Treaty established the Economic Community of West African States

(ECOWAS) which was created for “harmonization, required for the proper functioning of the community, of the monetary policies of the member states.” Soyibo (1998) listed some of the initiatives towards monetary unions as the West African Clearing House (WACH) in 1975, the West African Economic and Monetary Union (WAEMU) in 1994, the West African Monetary Agency (WAMA) in 1996, the ECOWAS Monetary Cooperation Programme (EMCP) was launched in 1987, and the West Africa Monetary Zone (WAMZ) in 2000 comprising a six nation states (Nigeria, Gambia, Sierra Leone, Ghana, Guinea and later Liberia). The “West African Monetary Institute” (WAMI) was established in the same year but attempt to create a “West African Central Bank and introduce a common currency did not yield fruitful result due to the failure of member countries to meet the set conditions. However, the WAMZ in 2002 set criteria for effective harmonization of sub-regional monetary and fiscal policies. The criteria include price stability by 2004, sustainable fiscalism on the part of government by 2005, reduction in deficit financing by government by 2005 and stable exchange rate between 2003 and 2005 (WAMZ, 2002).



Figure 1: The West Africa Monetary Zone Source: www.dreamstime.com

Foreign Aid and Sustainable Development in Africa

According to Olaniyan (1996), international aid and official development assistance (ODA) can be traced to the events after World War (WW2), where countries that were less hit by the war came in to rescue the badly hit ones. Over several decades, development assistance and foreign aid have played significant role in poverty alleviation and economic development of less developing countries in Africa and other continents. Several years after the WW2 at the “Earth Summit” in 1992, world leaders developed the Agenda 21 which was targeted at facilitating the movement of huge amount of financial aids to developing countries whose economies were weak and vulnerable. The World Bank (1998) reported that ODA and foreign aid arose in the spirit of international partnership to help fellow countries in economic trouble many of which are in sub-Saharan Africa. The Bank however noted that inflows of aid to less developed countries continued to decline, having adverse effect on sustainable development and economic growth (Babalola & Shittu, 2020).

The ADB (2019) identified the declining inflow of foreign aids to Africa inspite of the hype about Agenda 21 and the need for improved economic development in the continent. Granted that the tenetsof the Agenda were integrated into the economic policies of many African countries, its effect on the development of the continent has become a subject of debate. Nevertheless, national, regional and interregional organizations have continued to incorporate some aspects of the sustainable development goal targets in their plans, including environmental, institutional and human policies. Issues such as poverty alleviation, access to healthy living, population control, urbanization, food security, waste management among others have been brought to the fore in their planning and programmes. The ADB (2019) attested to the fact that expected progress in sustainable development in the Africa continent is yet to be achieved due to the enormity of difficult faced in the implementation of designed

policies and programmes. These includes problems relating to shortage of requisite skilled manpower, lack of adequate training facilities, absence of integration, information gap and paucity among others. In many instances, sustainable development is difficult to achieve because of duplicity of activities, resource wastages and lack of commitment by donor countries. Paucity of fund required to execute sustainable development projects worsens the situation.

Another factor advanced for the decline in aid flows into African countries was events in the international community such as the collapse of the Soviet Union which gave birth to many other aid seeking countries so that attention was shifted away from African countries. This is apart from the need to reduce fiscal deficit by many who previously donated huge aids. According to Babalola and Shittu (2020), donor countries usually dictate the purpose of foreign aids. The focus of these donor countries and agencies can be for strategic and political purpose, commercial and economic reasons or humanitarian purpose.

Theoretical Underpinning and Empirical Review

Easterly, (2003) stated that the theoretical basis for linking foreign aid with development in a straightforward manner is challenging, although researchers normally rely on the dual gap model by Chenery and Strout (1966). This model, which takes its root from the Harrod-Domar growth model, also called the 'Two-gap' model states that foreign aid and development assistance spurs development in benefiting countries by supplementing their domestic capital. The dual gap model assumes (reliably so) that LDCs are faced with paucity of domestic savings, uncompetitive financial system and infrastructural decay. The model identifies two major gaps that impair growth and development: savings (paucity of savings for investment) and foreign exchange gaps (insufficient export earnings to finance import). To fill this gap,

foreign aid becomes a necessity. Morrissey (2001) listed the channels through which foreign aid supports domestic development as (i) facilitating more investment in human and physical capital (ii) aiding the importation of technology and capital goods, and (iii) technology transfer for increased productivity.

Also, the reason for development assistance and aids for developing countries is also rooted in the donor-oriented theory (also termed international relations theory). White (1974) posited that the donor-oriented theory assumes that donors have other aims apart from economic development. These according to the theory can include political, strategic or other reasons hence the author argued for what is termed “supplemental theory of foreign aid which posits that aid is only necessary to supplement domestic savings. After the recipient country has utilized the aid and attain a level of self-sustenance, foreign aid can be discontinued. This has become unachievable for most less developing, aid benefiting countries, especially those in Africa. A generally acceptable theory of foreign aid must encapsulate the metrics of sustainable development.

The African Development Bank, ADB, (2019) stated that economic growth in the West Africa sub region differ among countries over time. Specifically, the ADB recorded that 9 of the countries’ economy grew at about 5% rate in 2017 and 2018, while the economy of countries like Senegal, Guinea, Ivory Coast and Mali have had the same growth rate (5%) from 2014 to 2016. Macroeconomic stability, inflow of foreign aid and political stability are some of the reasons adduced by the ADB for this growth. The Bank however posited that the stimulating effect of foreign aid in those countries and others is an unending debatable issue.

Babalola and Shittu (2020) investigated how institutions affect the link between foreign aid and sustained economic development in 16 West African countries between 1996 and 2017. The authors used a panel data sourced from the World Bank Development Indicators and analyzed it with a panel autoregressive distributed lag

(PARDL) and found that foreign aid did not significantly affect general economic development but negatively affected it when institutional variable is included in their model. This implies that institutional variable reduces the effect of foreign aid on sustained economic development in the countries studied. The authors further posited that government of West African countries should build strong economic, political and social institutions that can fast-track positive impact of foreign aid on African economy and people.

Prince and Vitenu-Sackey (2020) assessed the effect of foreign aid on Africa's development from 1996 to 2017 using a GMM and Granger causality techniques to analyze a panel data of 50 African countries. The authors discovered that foreign aid significantly impaired development in African countries instead of improving it. Having identified political instability, corruption, low human capital development and fragmented institutional framework as hindering development in Africa, the authors recommended focusing on technical and educational assistance aimed at strengthening institutions in the continent.

Njoroge (2020) studied the comparative effect of foreign aid on the development indices in Ghana and Angola. The study mainly focused on foreign aid – development nexus in these countries and factors that hinder effective aid utilization. Factors such as inability to properly manage and coordinate aid flows, volatility of aid, donor fragmentation, inadequate counterpart funding and absence of local involvement in aid sponsored projects in the two selected countries.

Literature is replete with empirical studies on the relationship between foreign aid and sustainable development generally. However, what appears scanty is the examination of such effect in more goal specific terms, especially in West Africa. Furthermore, there have been studies carried out to examine this relationship in a cross-country and continental manner. However, it is also rare to find a study carried

out on this relationship based on a common monetary, currency or union. Therefore, this study bridged the identified lacuna by addressing the effect of foreign aid on sustainable development from two perspectives: poverty reduction (economic goal) and child mortality (health goal) in the six- member West Africa Monetary Zone countries including The Gambia, Ghana, Guinea, Liberia, Nigeria and Sierra Leone.

Data, Models and Methods

This study used a panel data of six WAMZ countries (The Gambia, Ghana, Guinea, Liberia, Nigeria and Sierra Leone) on official development assistance (ODA), other official flows (OOF), the gross national income (GNI) index, a measure of poverty rate (UN, 2001), under five years mortality rate and inflation as measures of sustainable development for the year 1992 to 2020. All data used are presented in Appendix 1. The year 1992 was selected as the starting year because it marked the commencement of drastic action plan that spurred foreign aid and sustainable development through the Rio Earth Summit in Brazil. The data used in this study are sourced from secondary sources, the World Bank Development Indicators and the OECD Sustainable Development Indicators for various years and countries. Data availability however limited the number of sustainable development indicators and foreign aid measures that could be used.

The models for the present study are as follows:

$$SSD = f(FAD)$$

Where SSD = sustainable development And FAD = foreign aid

While SSD is a vector of GNI (Gross national income index) and MOT (child mortality rate) FAD is a vector of ODA (official development assistance) and

OOF (other official flows).

To examine the effect of foreign aid on sustainable development in the WAMZ from the perspective of income level (poverty alleviation) and mortality of children (child mortality), we state the models for the study in econometric forms as follows:

$GNI = \theta_{it} + \bar{U}_1 ODA_{it} + \bar{U}_2 OOF_{it} + u_{it} \dots \dots \dots$ (i) for effect on income enhancement/poverty reduction
and

$MOT = \theta_{it} + \bar{U}_1 ODA_{it} + \bar{U}_2 OOF_{it} + u_{it} \dots \dots \dots$ (ii) for effect on mortality rate reduction
Where = regression intercept/constant and \bar{U}_1 and \bar{U}_2 are regression coefficients.

Pre-Estimation Tests

We subjected the variables to preliminary deterministic tests in order to ascertain the statistical properties of the variables, to determine the stationarity of the variables and to establish whether the variables have long-run co-integration relationship. Specifically, the descriptive statistics, correlations, test of unit root and co-integration test were carried out. We used the Fisher – Augmented Dickey Fuller test of stationarity to test for the presence of unit root and the Johansen’s Fisher – ADF combined co-integration test to panel the panel data (Trace and Max-Eigen).

Estimation Techniques

We employed the panel autoregressive distributed lag (Panel ARDL) to examine the relationship between foreign aid and sustainable development from two perspectives:

poverty reduction (in terms of the GNI index – a measure of economic welfare) and health (child mortality rate). This elicited two different models. Furthermore, this

study examined whether there exists causal relationship between foreign aid and poverty reduction (personal income improvement) in the WAMZ for the years under study, a general panel causality model between foreign aid (Q) and sustainable development in terms of poverty reduction (P) is expressed as follows

$$Q_t = \sum a_i P_{t-i} + \sum b_j Q_{t-j} + u_{1t}$$

$$P_t = \sum_{i=1}^k c_i Q_{t-i} + \sum_{j=1}^k d_j P_{t-j} + u_{2t} \quad \text{..... (iv)}$$

$$\quad \text{..... (v)}$$

v) Equations (iv) and (v) presupposes that variables P and Q Granger causes each other if previous

changes in one elicit present changes in the other more than previous changes in the other can cause in its present changes. For P and Q to have causal relationship, if at and dt must both be significant. The probability of F-Statistics <0.05 level of significance.

Theoretically, while ODA and OOF are expected to have direct and positive effect on GNI, they are however expected to have a negative effect on MORT_RATE (that is reducing child mortality)

Analysis of Data

The analysis of pooled data for the six WAMZ countries is done in this section. The descriptive statistics, which show the statistical properties of the variables, correlations, test of stationarity for each of the variables and co-integration test are the preliminary tests carried out. Results of these tests suggested that the panel ARDL technique was fit to examine the effect of foreign aid on sustainable development in the WAMZ. The causal relationship was examined using the panel granger causality model.

Preliminary Tests

4.1.1: Descriptive Statistics

Table 4.1 contains the descriptive statistics, which describes the statistical properties of the variables for models 1 and 2

Table 4.1: Descriptive Statistics – Models 1 and 2

	GNI	MORT_R ATE	ODA	OOF	INFL
Mean	2165.683	134.2518	7.59E+08	-51.88727	15.85488
Median	1790.000	126.4000	3.80E+08	-1.360000	10.39134
Maximum	5540.000	255.6000	1.14E+10	3124.520	100.6077
Minimum	600.0000	46.40000	34349998	-13548.56	-5.969119
Std. Dev.	1276.461	53.17540	1.26E+09	1209.737	18.23500
Skewness	1.281701	0.386926	5.383458	-9.951436	2.554046
Kurtosis	3.032984	2.769959	3.32032	3.450811	1.37344
Jarque-Bera	41.16885	5.767328	9265.168	72948.98	465.9991
Probability	0.070552	0.055929	0.10304	0.643210	0.023127
Sum	301030.0	18661.00	1.05E+11	-7212.330	2203.828
Sum Sq. Dev.	2.25E+08	390211.9	2.18E+20	2.02E+08	45887.10
Observations	139	139	139	139	139

Source: Authors' Computation (2022)

Of interest here are the skewness, kurtosis and Jarque-Bera statistics. From Table 4.1, GNI, MORT_RATE, ODA and INFL are skewed to the right with positive values of 1.281701, 0.386926, 5.383458 and 2.554046 respectively while OOF is skewed to the left (-9.951436). although all the variables are leptokurtic, except INFL, they all hover around the benchmark of 3 for a normally distributed variable. This is also confirmed by the probability of J-B statistics that are greater than 0.05 except INFL. The J-B results show that the variables are normally distributed.

Correlations

The coefficients of correlations between GNI, MORT_RATE and ODA, OOF and INFL are contained in Appendices 2(a) and 2(b). GNI correlates in direct direction (positive) at about 54% (0.539046) with ODA and in opposite direction, though weakly, with

OOF and INFL (-0.14923(- 1.5%); -0.0832515 (-8.33%)) respectively. For MORT_RATE, it correlates negatively (-0.124660 (- 12.5%)) with ODA and (-0.077647(-7.8%) with OOF. It however correlates positively (0.150680 (15.1%)) with INFL. These correlations are expected.

Unit Root Tests

The variables were tested for stationarity. Results of the stationarity tests are recorded in table 4.2. Table 4.2: Results of Fisher-ADF Unit Root Tests

Variable	At Level		At First Difference		Order
	Fisher-Stat	ADF Prob.	Fisher-ADF Stat	Prob.	
GNI	2.04264	0.9960	39.2936	0.0000	1(1)
MORT_RATE	25.9523	0.0038	-	-	1(0)
ODA	10.4886	0.3987	64.9901	0.0000	1(1)
OOF	32.6499	0.0003	-	-	1(0)
INFL	37.1920	0.0001	-	-	1(0)

Source: Authors' Computation (2022)

A variable becomes stationary (without unit root) when the probability of the test statistic is less than the level of significance. Here, while GNI and ODA are stationary after the first difference, MORT- RATE, OOF and INFL are stationary at level. This provides the basis for the use of VAR models for estimation of the effect of independent on dependent variables.

Test of Co-integration

The Johansen's Fisher-ADF co-integration test was used to ascertain the existence of long runrelationship between foreign aid and sustainable development variables. From appendices 4(a) and 4(b), both Trace and Max-Eigen statistics stipulated that

there exist at least two (2) co-integrating equations among the variables in both models 1 and 2, implying that there is long run relationship between the dependent and independent variables in the two models. This result provides the basis for our use of panel ARDL to estimate the effect of foreign aid on sustainable development in the WAMZ.

Estimation of Effect of Foreign Aid on Sustainable Development

The variables are co-integrated, hence there exists long run relationship among them. This study used the panel ARDL technique to determine the actual effect of foreign aid on sustainable development in WAMZ. The results of Panel ARDL model is summarized in Table 4.3

Table 4.3: Panel ARDL Results for Models 1 and 2

Variable	Short Run Effect					
	Model 1			Model 2		
	Dependent Variable = GNI			Dependent Variable = MORT_RATE		
	Coefficient	Probability	Remarks	Coefficient	Probability	Remarks
D(ODA)	-1.25E-07	0.2973	Insignificant	8.11E-10	0.7017	Insignificant
D(OOF)	0.290778	0.2700	Insignificant	-0.002377	0.0048	Significant
D(INFL)	0.698591	0.2629	Insignificant	-0.004501	0.2005	Insignificant
COINTEQ01	-0.014552					
Long Run Effect						
ODA	2.15E-06	0.0006	Significant	0.95280	0.0000	Significant
OOF	0.212849	0.9126	Insignificant	-0.12730	0.0017	Significant

INFL	5.304143	0.6298	Insignificant	0.291084	0.0652	Insignificant

Source: Authors' Computation (2022)

As revealed in Table 4.3, with respect to the effect of foreign aid on sustainable development from poverty reduction perspective, in the short run, a unit increase in official development assistance (ODA) will cause an insignificant decline of 0.00000125 in GNI (Gross national income per capita) ($p = 0.2973 > 0.05$ level of significance (LOS)). Other official flows have an insignificant positive effect (Coeff 0.290778, $p = 0.2700 > 0.05$) on GNI. The rate of inflation INFL also exerted an insignificant positive effect on GNI in the short run (coeff. 0.698591, $p = 0.2629 > 0.05$ LOS). All these results contradict the theoretical *a priori* expectations on the relationship between foreign aid and sustainable development in the WAMZ.

On the long run, ODA exerted significant positive effect on GNI (coeff 0.0000215 $p = 0.0006 < 0.05$ LOS) such the GNI increased by 0.000215 as ODA increased. However, the positive effect of OOF on GNI was insignificant (coeff 0.212849, $p = 0.6298 > 0.05$ LOS). The effect of INFL on GNI was also positive and insignificant.

With respect to the effect of foreign aid on sustainable development from health indicator perspective in the short run, ODA also exerted an insignificant positive effect on MORT_RATE (coeff 8.11E-10, $p = 0.7017 > 0.05$ LOS). OOF had a significant negative effect on MORT_RATE (coeff -0.002377, $p = 0.0048 < 0.05$ LOS) implying that during the short run, OOF reduced child mortality rate. This is theoretically expected. On its part, INFL had an insignificant negative effect on MORT_RATE (coeff -0.004501, $p = 0.2005 > 0.05$ LOS).

On the long run, ODA exerted a significant positive effect on MORT_RATE such that

a unit increase in ODA will increase child mortality by about $9.52E-08$. This result is contrary to the theoretical expectation that ODA should reduce child mortality. Similarly, OOF had a significant negative effect on MORT_RATE such that a unit increase in the former will reduce the latter by about 0.12730; this result is expected. Finally, the effect of INFL on MORT_RATE is statistically insignificant.

Comparatively, the effect of foreign aid variables on sustainable development in the WAMZ differs between poverty reduction and improved mortality rate considerations as revealed in the results. In the short run, foreign aid did not have any statistically significant effect on poverty reduction/income improvement but had a mixed effect on child mortality rate. On the long run, however, official development assistance and official flows had a positive effect on poverty reduction/improved income and child mortality rate. These effects are significant.

Causality Test

The results of panel causality tests on models 1 and 2 are displayed in Appendix 7. For model 1 which sought to examine the effect of foreign aid on poverty reduction and personal income level. Appendix 7 shows that only official development assistance (ODA) has a causal relationship with GNI (gross national income index) with F-Statistics = 8.07567, $p = 0.0005 < 0.05$ LOS. The causality runs from ODA to GNI. The remaining variables (OOF and INFL) have no causal relationship with GNI. For model 2 (Appendix 8) none of the foreign aid and inflation variables have causal relationship with child mortality rate as their respective p values are all greater than the 0.05 LOS.

Discussion of Findings

This study examined the effect of foreign aid on sustainable development in the West Africa Monetary Zone which comprises of six West African countries from two perspectives: poverty reduction and child mortality. First, results from panel ARDL analysis revealed on the long run, official development assistance from foreign countries positively affected the national income (GNI) during the period under examination. This result is expected and agrees with the theoretical expected effect as one of the cardinal goals of the sustainable development agenda is poverty reduction through improved income for the people. This however contradicts the finding of Babalola and Shittu (2020) who found that foreign aid did not have positive effect on sustainable development in selected West African countries. However, it is important to observe that foreign aid did not have any significant effect on sustainable development in terms of poverty reduction in the short run. This means that the intended impact of foreign aid on poverty reduction may not be achievable within a short period because of the time lag between advancement of foreign aid, execution of income generating ventures and transmission of the income to the people.

Second, and interestingly too, foreign aid had a positive effect on child mortality rate during the long run. This relationship is theoretically unexpected as a key objective of sustainable development effort is reduction in the mortality rate of under five children. As shown in the results, rather than reduce child mortality, official development assistance increased it. Several factors earlier discussed in this research can be the cause of this unexpected relationship (Babalola & Shittu, 2020; Prince & Vitenu-Sackey, 2020). The significant effect during the short run can be attributable to the fact that some foreign aid for health-related issues are in the form of response to emergency health situations and distribution of health materials such as drugs. Hence, the effect of such aids is expected to be immediate. Overall, this study shows that foreign aid in terms of official development assistance (ODA) does not reduce the

mortality rate.

Conclusion and Recommendations

The extent to which foreign aid have affected sustainable development in the West Africa Monetary Zone in the light of stated Sustainable Development Goals is the focus of this study. The study examined the effect of two foreign aid variables namely, official development assistance and other official flows on the gross national income index as a measure of poverty reduction/income enhancement and health captured by under-five mortality rate. The study used a pooled data of six West African countries that belong to the WAMZ from 1992 to 2020. Having ascertained the nature of the stationarity of selected variables (mixed) and the presence of long run relationship, the study used two panel autoregressive distributed lag (panel ARDL) to analyze data sourced from the World Bank Development Indicators and the OECD databank.

Two models were developed to examine sustainable development from two goals perspectives – poverty and health. Results from analyses carried out show that in the short run, foreign aid did not significantly affect poverty reduction but significantly reduced child mortality. Furthermore, on the long run, foreign aid significantly aided poverty reduction but had mixed effects on child mortality rate. A comparison analysis shows that in both the short and the long run, there is a marked difference between the effect of foreign aid on poverty reduction and child mortality rate.

This study concludes that foreign aid significantly affected sustainable development in the WAMZ based on the aforementioned findings, hence, the null hypothesis of no significant relationship between the variables cannot be accepted. The study further concludes that the effect of foreign aid variables differs across goal areas. This

researcher observes that despite the misgivings on the sincerity of foreign aid donors, the countries in the West Africa Monetary Zone can still benefit if judicious use is made of such aid flows into the countries. Therefore, a closer monitoring of the disbursement and spending of foreign aid towards set sustainable development goal is advocated in order to correct those aid elements that have unfavourable effects. As noted earlier in the study, poor coordination, corruption and mismanagement have been the bane of foreign aid deployment in many developing countries. Efforts must be made by governments and policy makers in the WAMZ countries to attract more financial aid because of its critical role in addressing the set objectives of sustainable development.

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The Legal Framework of Trade and investment liberalization under EE-CANADA CETA

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ABSTRACT

The European Union (EU) and Canada are two major trading partners. Their economic relations are governed by the Comprehensive Economic and Trade Agreement (CETA) whose provisional application started on 21-9-2017. From the point of view of the EU law, it's a mixed agreement and sets out detailed rules for the liberalization of trade between two traditional forces of the liberal international economic order. The key element that distinguishes it from previous agreements is its multidimensional nature, its global content. The CETA provides for commitments in more areas. All these commitments, regardless of the covered area, are oriented towards the promotion of trade and investment liberalization. Of particular importance is the provision of the CETA regarding special principles and rules that regulate the investment sector as a whole and in particular settle the establishment of investors and their subsequent protection. Provision is made for the liberalization (facilitation) of the initial establishment, i.e. the access of the investors of one contracting party to the territory (market) of the other (establishment of the investors) in order to carry out business activity there. At the same time, it is sought to ensure that, after initial establishment, the investor and his investment will be protected against host state measures. To this end, clear standards of treatment are established to which the public authorities of the State in which the investor of another State has made an investment, must comply. It is particularly important that an impartial, independent and permanent Judicial Mechanism (Investment Court System/ICS) is established to resolve/settle investment disputes arising between the host state and the foreign investor. The goal is to create a safe and predictable investment environment, as the operation of this Judicial Mechanism will ensure the effective enforcement of investor protection rules.

1. Introduction

The CETA Agreement, which has been characterized as a new generation free trade agreement, was signed between the EU and Canada, in 2016, after years of negotiations, and entered into provisional force in 2017. Negotiations began in 2009, on the occasion of a joint study “Assessing the Costs and Benefits of a Closer EU-Canada Economic Partnership” (October 2008), and only finished in 2014.

CETA marks a new era, in terms of regional economic agreements and regional integration; the reason of that, is that we can spot the desire of two large economies to mutually limit part of their national powers, and work together to achieve a common goal.

2. Regional Integration and Regional Agreements

The cooperation of states (usually neighboring ones), with the aim of achieving a mutual goal, has been a very common practice, over time. The first international free trade agreements were the forerunners of today's regional integration agreements. The Cobden-Chevalier Agreement was signed in 1860 between England and France, provided for the abolition of tariffs on essential trade items.³⁶ The first actual period of regional integration can be traced on the end of the Second World War, while the subsequent wave of regional integration took place after the oil and economic crisis of the 1970s. In the 21st century, a new generation of regional integration agreements is trending; these agreements do not regulate only classic trade. In addition to that, they regulate more fields that include commercial interest (investments, copyright, etc.).

The conclusion of such agreements reveals that one or both parties have no other means left to serve or regulate a national issue. In these cases, states decide that there is no better alternative option to achieve their goals, other than regional cooperation with another or other states. This is when, they limit their national powers, transferring them to the regional level.

Of great importance is the voluntary nature of these agreements. Therefore, when a state acts unilaterally in pursuit of its territorial expansion, the geographical annexation of territories and the satisfaction of its imperialist visions, are not considered an attempt of regional integration, since these actions lack the element of the voluntary transfer of part

³⁶ This agreement was signed just a few years after the internal crisis and civil war of Great Britain, which resulted in the repeal of the famous Corn Law (1846), and the liberalization of trade.

of their national powers to the institutions of the new supranational organization. By contrast in these cases, the expanding state seeks to expand its national powers (rather than limit them). Historically, periods of expansionist policy and territorial annexation are usually identified by a tendency towards protectionism. Protectionism has been linked mainly to mercantilist economic models. These political-economic models - protectionism and mercantilism- usually take place through some violent external factor (eg through some unfolding war or economic crisis).

The above clarification is made in order to highlight the difference: imperialism use war and threat as a means to achieve their goal, while regional integration is triggered/reborn due to the fear of states in the face of the re-emergence of such special conditions and situations.

Practically, each wave of regional integration was triggered by external factors, which were seen by the states as threats or as unsolved problems: the first form of regional integration, was spotted in Great Britain, and was triggered after the civil war that broke out, due to harsh protectionism and the famous "Corn Law". The period of regional integration of the 1950s was based on the need of states to maintain security and peace, after the violence of the World War II, but also to contain the feeling of nationalism that had peaked menacingly at that time. The next period of regional integration in the 1980s was born on the need for states to find a mechanism by which to resist or prevent similar future economic difficulties, such as the one caused by the oil crisis that time. Regional integration peaked after the fall of the Berlin Wall and the subsequent end of the Cold War; this was a period when people where in desperate need for peace, security and prosperity. Nowadays, the new generation of regional integration agreements that has been developed, seems to respond to the changing structures of the global economy, and seems to have been triggered by the last financial and fiscal crisis.

External threats are therefore what lead states around the world to cede part of their national powers to a supranational organization. The external threats that lead to the regional integration of states are usually related to economic, political, social conditions. The largest percentage of regional integration agreements are related to trade and investment agreements. Indeed, under the light of the WTO unsuccessful operations and the later unsuccessful attempts of WTO Doha round negotiations, many states are turning to regional integration agreements, as a means of achieving their goals; these goals, which

seemed to have been frozen for many years in the rounds of negotiations of the WTO, are now having a new chance through regional integration.³⁷

2.1.MegaRegional Trade Agreement: Is CETA defined as such?

The term MegaRegional Trade Agreement declares a trade agreement that meets the following three criteria:

- a. is negotiated by at least three countries or a regional groups of countries (a condition which is practically served by CETA)
- b. their members carry out at least 25% of the volume of international trade (a condition which is not served by CETA)
- c. its content goes far beyond the current arrangements of the World Trade Organization, (a term which are fulfilled by CETA)

Under these conditions, technically we cannot categorize CETA as a MegaRegional Trade Agreement. Nevertheless, practically, many analysts classify it directly in this category, due to its great importance. Its categorization as a MegaRegional Trade Agreement is considered justified, given that it is the first new generation trade agreement (New Generation FTA). Moreover, CETA has even been characterized as a "model" agreement for future state agreements or regional integration efforts.

3. Beginning of EU-Canada relations: are these two strategic partners or are there other motivations for signing the agreement?

The previous analysis demonstrates that every regional agreement "contains" a motivation, a personal benefit, for each state that participates in it. This is what defines every state, creating their identity. The Comprehensive Economic and Trade Agreement (CETA) between the EU and Canada, is driven by individual incentives, of both parties.

However, it cannot be denied that these two parties constitute strategic partners, since the founding of the European Union. The size of bilateral trade, as well as investment (mainly FDI), between the EU and Canada is undeniably very important. In 2012 Canada was the EU's 12th largest trading partner, while the EU is Canada's second largest trading partner, after the United States. The close relationship between these two partners on an

³⁷ For example, the US turns to ad hoc negotiations and conclusion of regional agreements, which violates the spirit of the overall liberalization of the world economy, but has faster results, compared to the time-consuming rounds of negotiations of the WTO.

economic and commercial level has been cultivated since the 20th century, through individual bilateral agreements. The official starting point of the two countries' relations, took place in 1958, with the accreditation of the first Canadian Ambassador within the EEC. At that time, when states were still trying to recover from World War II trauma, bilateral and multilateral agreements were mainly ensuring peace.

The 1970s is characterized as the launch period for bilateral economic agreements (mainly investment ones). The "Framework Agreement for Commercial and Economic Cooperation" (1976) can be considered the beginning of economic and trade relations between these two parties. By virtue of this agreement, a Joint Cooperation Committee was established, which was tasked with encouraging and strengthening the relations between Canada-EU. This resulted in the signing of more bilateral agreements between these two parties, in quite a few areas. It is worth noting that, at the same time, Canada sought closer economic cooperation with individual EU member states, concluding to Bilateral Investment Agreements (BITs) with them. To name these states, these were Malta, Poland, Hungary, Croatia, Latvia, the Czech Republic, Romania and Slovakia; these agreements mostly confirmed the rule of concluding BITs between a developed economy and a developing one. The validity of the above agreements would cease with the signing of CETA.

Below, we present a detailed chronological list of all negotiations, consultations and agreements concluded between the EU-Canada and individual member-states-Canada:

- 1958: Credentialing of the first Canadian Ambassador to the EEC
- 1959: Agreement between the Government of Canada and the European Atomic Energy Community (Euratom) for cooperation in the peaceful uses of atomic energy
- 1976: Framework Agreement for Commercial and Economic Cooperation
- 1982: Exchange of Notes between the Government of Canada and the Government of the Republic of Malta Constituting an Agreement Relating to Foreign Investment Insurance
- 1990: Agreement between the Government of Canada and the Government of the Republic of Poland for the Promotion and Reciprocal Protection of Investments
- 1990: *Declaration on Transatlantic Relations* between the European Community and its Member States and Canada
- 1991: Agreement between the government of Canada and the government of the republic of Hungary for the promotion and reciprocal protection of investments

- 1995: Sectoral Agreement on Higher Education and Training
- 1996: Joint Political Declaration on EU-Canada Relations and Joint EU-Canada Action Plan
- 1996: Sectoral Agreement on Science and Technology
- 1997: Agreement between the Government of the Republic of Croatia and the Government of Canada for the Promotion and Protection of Investments
- 1998: Agreement between the European Community and Canada on customs cooperation and mutual assistance in customs matters ('CMAA')
- 2004: Series of negotiations aimed at signing an Agreement to Promote Trade and Investment (suspended in 2005)
- 2004 EU-Canada Partnership Agenda
- 2008: A Joint Study by the European Commission and the Government of Canada Assessing the costs and benefits of a closer EU-Canada economic partnership
- 2009: "Joint Interpretative Declaration on the Comprehensive Economic and Trade Agreement (CETA) between Canada and the European Union and its Member States"
- 2009: Agreement Between the Government of Canada and the Government of the Republic of Latvia for the Promotion and Protection of Investments
- 2009: Agreement between the Czech Republic and Canada for the promotion and protection of investments
- 2009: Start of negotiations for CETA
- 2010: Agreement between the Slovak Republic and the Government of Canada on the Promotion and Protection of Investments
- 2016: Comprehensive Economic and Trade Agreement
- 2016: Strategic Partnership Agreement (SPA) between the EU and Canada

The above prove in detail that the political, social and economic relations between the two parties flow smoothly and harmoniously. The question raised concerns the feasibility of the Comprehensive Trade and Economic Agreement (CETA), and indeed at a time when there is no apparent political or economic threat between the two parties.

3.1.Incentives for Entering into Agreement

3.1.1.Canada incentives

Based on the above, we can note that, the first attempts of negotiations on behalf of Canada for a closer cooperation with the EU, both in the commercial sector and in investments, begun in 1976, with the “Framework Agreement for Commercial and Economic Cooperation”. For Canada, the negotiations of an economic collaboration with EU got beneficial in the 1970s, when Great Britain, (Canada’s second largest export destination) joined the EU, thereby losing preferential access directly to that country. After Great Britain joined the EU, the Union itself is Canada’s second largest trading and investment partner, after the USA. This has been a key motivation for the country to work closely with the EU.

At the same time, Canada is trying to reduce its political and economic dependence on the USA, thus aiming to become a competitive power in North America. Canada anticipates a 20% increase in bilateral trade with the EU and a \$12 billion increase in Canadian GDP as a result of this agreement. Removing barriers from trade and investment between the EU and Canada could free up a lot of capital.

3.1.2. EU incentives

The EU's motivations for signing the Comprehensive Economic and Trade Agreement with Canada could be characterized as both economic and political. Canada is considered a trading partner of the EU, having occupied from tenth to twelfth place. Of course, it should be noted that through the Joint Study on the “Evaluation of the Costs and Benefits of a Closer Cooperation between the EU and Canada”, it is demonstrated that a closer commercial and economic cooperation will be beneficial for both parties.

In addition to the above, CETA constitutes the first trade and economic agreement, which aims at regional integration, and is signed between totally developed economies. In fact, it constitutes the first free trade agreement, of a new generation, which aims to achieve the goals that the previous agreements failed to achieve. Previous attempts by the EU to conclude such an agreement with a developed economy (e.g. with the USA, TTIP) have failed. By signing a new generation of FTAs, the EU aims to strengthen its competitiveness, as this objective has been formulated in the context of the Lisbon Treaty (Article 206 and 207 TFEU).

Lastly, CETA constitutes a lever of pressure, which the EU can use, either to attract developed economies, or to intercept the growing geopolitical and economic threat of the emerging countries of the East.

4. Negotiation process

The negotiation procedures between the two parties for the conclusion of an agreement that would regulate their trade and investment relations had already started since 2004. The above demonstrates not only the close relationship between the EU and Canada, but also their desire to seize the benefits of a successful cooperation. Nevertheless, the negotiations between them were interrupted on the occasion of the new Doha round of negotiations, under the World Trade Organization operations, in which the two parties wanted to give priority, expecting more favorable cooperation conditions for all states.

Since the Doha round of negotiations failed, the two parties restarted their own negotiations, following the initiative of the European Commission in 2008. The official start of negotiations is set for 2009. Public consultations and evaluation consultations were held during this period. One of the public consultations that took place in the meantime concerned the mechanism for resolving disputes between investors and host states (Online Public Consultation on investment protection and investor to state dispute settlement in the TTIP) and although the consultation concerned the Transatlantic Trade and Investment Agreement between EU and US (TTIP), a large chapter of it was devoted to CETA. In a period of just two years (that is from 2009 to 2011) agreement had been reached on most of the issues, a fact which is demonstrated by the report “A Trade Assessment of the Impact on Sustainability of the Negotiation of an Integrated Economic and Trade Agreement between the EU and Canada” (October 2010). In 2016 due to strong public reactions, the two parties agreed to review the investor dispute settlement mechanism, thus introducing the institution of the ICS. By 2016, the legal draft text of the Agreement had been completed, and the text had been signed by both parties. This was followed by the ratification of the Agreement in 2017 by the European Parliament.³⁸ The reasonable question that arises is why the Agreement was put into provisional application and not full force.

At that time, the Treaty of Lisbon, which plans the overall external action of the EU, recording a list of objectives to achieve its competitiveness, was fully in force and

³⁸ But only for the matters that fall under the exclusive competence of the EU. This decision was taken because, as will be analyzed below, CETA is considered a mixed agreement, and must be ratified by the EU itself and by all the member states. Since this agreement deals with and introduces provisions that also fall under the competence of the member states, it cannot enter into full force until it is ratified by all national parliaments.

implemented. In order to achieve the above goals, the EU is granted with the possibility to conclude new generation commercial agreements. These agreements are primarily based on Article 207 TFEU. The revision of the CAP gives the EU the ability to conclude treaties on trade in goods, trade in services, commercial aspects of intellectual property rights and foreign direct investment.

Thus it is understood that, when the Treaties signed by the EU concern areas in which the latter has exclusive competence, no further intervention or ratification by the individual member states is required. If, nevertheless, the agreements signed, include provisions, which cover areas in which the EU does not have exclusive competence, their text should be ratified both by the European Parliament and by the individual member states, so that considered to be in full force. These are the so-called mixed agreements. Because CETA deals with the relations of the two parties in other areas, rather than the ones that fall under the EU's exclusive competence (e.g. investments beyond FDI, transport, etc.), it was put into provisional application after the end of the negotiations of the two parties and the ratification of the European Parliament.

Analyzing the above further, CETA constitutes an agreement, which regulates the relations of the two parties in most areas, mainly aiming in strengthening bilateral trade and investment between the EU and Canada. Confusion therefore arose as to whether the EU had exclusive competence for its conclusion and ratification. An attempt was made to resolve the above issue with the help of Opinion 2/15 of the European Court of Justice, which basically issued a judgment on the Free Trade Agreement between the EU and Singapore. According to this Opinion, the European Court ruled that in terms of the investment sector, there is competence of the individual member states, as well. This resulted in CETA being considered a mixed agreement and requiring ratification by both the EU parliament and individual member states' parliaments. Having not yet been ratified by all the member states, due to some public reactions that are occurring, CETA is still being provisionally applied.

5.CETA: A New Generation Free Trade Agreement

The Agreement between the two parties is classified as a new generation of free trade agreements. Classical trade agreements (FTAs) have received a lot of criticism in the context that in the majority of them, they have not achieved the main goal for which they were signed, that is, they have not managed to eliminate barriers (especially in the agricultural sector). They have also been blamed for the complexity of the rules they

include, for "overlapping" of each FTA with another, for creating additional administrative costs for the contracting parties, for their bias, for the creation of preferential tendencies, which result in the development of a climate of protectionism and for the creation of a multitude of rules, which make it difficult to create new businesses.

On the contrary, the new generation FTAs include provisions that regulate a broader framework of relations between the two countries. In other words, they include provisions that regulate issues of intellectual property, investment, agriculture, competition, etc. And one of the biggest innovations of these agreements is that they provide for their own dispute resolution mechanism. In other words, the issues known as Singapore issues³⁹ or WTO plus, are covered.

For an FTA to be considered a new generation agreement, it must meet the following criteria:

- be more complete, more ambitious and be oriented towards sustainable development
- to include provisions to effectively defeat non-tariff barriers, to contain stronger and more decisive provisions
- be broader, so as to aim at economic integration, through the provision of regulations in a set of sectors, in addition to bilateral trade (e.g. services, investment, intellectual property rights, etc.)
- to provide for evaluation mechanisms (before the start of negotiations), monitoring mechanisms to evaluate their implementation and their results
- to include their own dispute resolution mechanism

CETA seems to meet all the above criteria and can be characterized as a new generation free trade agreement:

- CETA is a comprehensive agreement, which regulates a wide range of relations between the two partners (see section 6)
- Prior to the start of negotiations between the two countries, an assessment was conducted, according to which *"The impact analysis assesses the economic, social and environmental impacts in Canada and the European Union, in three main sectors, sixteen sub-sectors and seven cross-cutting issues. It also assesses the potential impacts of CETA on the US,*

³⁹ Four issues entered the WTO agenda at the December 1996 Ministerial Conference in Singapore: trade and investment, trade and competition policy, transparency in government procurement and trade facilitation.

*Mexico and other countries and regions, including a number of developing countries and the EU OCTs of Saint-Pierre-et-Miquelon and Greenland”.*⁴⁰⁴¹

- In 2006, the European Union issued the act “GLOBAL EUROPE: COMPETING IN THE WORLD”, with which it states that it does not wish to circumvent the negotiations within the WTO, which will continue to remain its priority. What is now sought, with the aim of increasing the competitiveness of the Union, is the conclusion of agreements, which on the one hand will regulate the commercial and investment relations of the parties, and on the other hand, will include regulatory provisions, on sectors, which are outside the influence of the WTO (e.g. intellectual property).
- Lastly, the innovation of an Investment Court System (ICS) should not be mentioned. (See section 8).

6. Content of Agreement

This Agreement constitutes, as its title describes, a comprehensive agreement, which regulates bilateral trade relations, the removal of tariff and non-tariff barriers and the investment presence of one party in the other. In addition to the above provisions, the text of the agreement provides for provisions that regulate subsidies, economic-financial services, international and maritime transport services, telecommunications, electronic commerce, competition policy, state-owned enterprises and monopolies, public contracts, intellectual property, regulatory cooperation, environmental protection, labor, science, while provisions for the resolution of disputes between them are also included.

It should be noted that in the context of the creation of a comprehensive, ambitious agreement, it was agreed to conduct direct negotiations with the individual administrative departments and federal states of Canada. This move, although it extended the duration of the negotiations, was proposed by the EU itself, which in fact aimed to limit any future reactions of the lower self-governing units of the federal state of Canada. Their direct mediation and their participation in the rounds of negotiations would reduce the possibility of creating tensions, during the implementation of the agreement (e.g. when establishing new companies on the territory of Canada).

⁴⁰ https://trade.ec.europa.eu/doclib/docs/2011/september/tradoc_148201.pdf

⁴¹ European Commission (2011: 14)

7. Chapter eight: Investments⁴²

7.1. By whom was CETA influenced during negotiation

CETA has been characterized by many analysts as a "model agreement" or a "golden agreement", as it is considered by many analysts that it can become a model for future "great regionals". It was even proposed as a model in the arduous Brexit negotiations. Until the date of its signature, it was influenced by investment models of other countries. Investment chapter in particular seems to have been influenced mainly by the Canadian FIPA model, and therefore by the American BIT model.

The EU itself also managed to greatly influence the shaping of the text of the agreement, either by introducing EU standards or individual Member States' investment agreement models (German BIT model), or by introducing innovative provisions. The EU texts on which CETA's innovative provisions appear to have been based are:

- The 2010 Commission Communication "Towards a comprehensive European international investment policy" (European Commission, 2015a)
- The Concept Paper "Investments in TTIP and beyond: the path to reform" (European Commission, 2015b).
- The Report Online public consultation on the TTIP on investment protection and investor-to-state dispute settlement (ISDS) in the Transatlantic Trade and Investment Partnership Agreement (European Commission, 2015c)
- The Commission's text "Investment Provisions in the EU-Canada free-trade agreement-CETA" (European Commission, 2013).

7.2. Who was affected by CETA after it was signed

From the date of its signature onwards, it was CETA who greatly influenced international practices. Despite initial protests and strong reactions, many changes in international and national investment policies have been observed since 2016, many of which are even closing towards the CETA model.

⁴² From the chapter of the Agreement concerning investments, only that concerning direct foreign investments is temporarily applied, namely: Articles 8.1 to 8.8,

Article 8.13,

Article 8.15, with the exception of paragraph 3 which states: "Subject to Articles 8.10 and 8.12, no Party may adopt after the date of entry into force of this Agreement a measure or series of measures covered by its schedule which included in Annex II and which directly or indirectly require an investor of the other Party, by reason of its nationality, to sell or otherwise dispose of an investment that existed at the time the measure or series of measures entered into force"; and

Article 8.16

As we know, most countries, especially developed economies, have adopted a standard model for concluding investment agreements, which they use during their negotiations with other states. These models are being updated from time to time, in order to be compatible with current financial status quo. Canada for example has adopted the Model Foreign Investment Promotion and Protection Agreement (FIPA) which was recently updated (in 2021) to be used in future negotiations. It should be noted that one of the international texts that influenced the changes of this model is CETA.⁴³

The new Dutch model BIT, adopted in 2018, largely mimics the CETA approach. Moreover, the new Italian BIT model shows similar influences, while the new Czech BIT model (2016) shows some similarities with CETA.

The EU itself has not issued a standard model for concluding investment agreements. Of course, it seems that in recent years EU has begun to adopt specific standards and patterns which are similar to each other, thus maintaining a uniform attitude in its negotiations. These standards, we have to admit, are quite similar to CETA.

The Convention of the International Center for Settlement of Investment Disputes, along with the Arbitration Rules of the United Nations Commission on International Trade Law (UNCITRAL) determine the procedure for conducting arbitration to this day.⁴⁴ The UNCITRAL rules are also entering a reform phase of the ISDS system, and just a couple of months ago, a session was held to reform the investor-state dispute settlement rules.

7.3. CETA's innovations on investment level

On the very beginning of the investment chapter, CETA specifies the definitions of investment and investor. Obviously influenced by the American BIT model, the definition of investment tries to limit the treaty shopping that has been largely observed in past few years by introducing the "commitment of capital or other resources" term, ensuring a time duration for the investment. The definition of the investor is also following the same path (of the elimination of treaty shopping). On the investor definition, CETA moves away from the American and Canadian investment model, and approaches the model of the German BIT model. This means that no emphasis is placed on technical details such as the nationality of the company, its registration office, registration in a chamber, etc. On the contrary, a substantial attempt is made to limit treaty shopping by introducing the clarification that a legal entity should be incorporated or organized under the laws of the host state, and should carry out significant business

⁴³ Other agreements that have influenced its current form are the Comprehensive and Progressive Pacific Partnership (CPTPP) and the Canada-US-Mexico Agreement (CUSMA).

⁴⁴ The EU has not signed the Convention.

activities. Thus, the possibility of foreign companies, without significant business activity in the country, which try to set up ghost subsidiaries in order to appeal against the host country, is now being limited.

7.4. Fair and equal treatment (FET)

The principle of fair and equal treatment is one of the most important principles of international investment law. It is first noted in the Havana Map, and since then it has been included in almost all investment agreements. The clear determination of the content of this principle has been difficult and laborious in the past. According to Judge Steven Schwebel, this principle includes generally accepted principles such as the principle of good faith, the principle of proportionality, the principle of non-discrimination and the principle of due process. In other words, FET is an umbrella principle, with which a state agrees to comply with all obligations towards foreign investors. FET is also specified as the state's obligation not to place arbitrary or discretionary obstacles in the operation of foreign investment. There is a difference of opinion as to whether the creation of an autonomous standard is required for FET (as in CETA) or simply its equation with the International Minimum Standard of Treatment⁴⁵ (as in the Canadian-Czech BIT 2009, NAFTA) or even treatment subject to international law principles (France-Mexico BIT 1998).

This clause has become some kind of customary law. That results that parties to an investment agreement consider that they can rely on FET even if it is not clearly stated in the provisions of the agreement.⁴⁶ In fact, when the levels of national treatment that a state can offer are lower than those set by international standards, then it is considered that the host state is not released from the obligation to treat the investor according to international standards.

In CETA an attempt was made to define the content of Fair and Equal Treatment much more narrowly, capturing the core of the customary standard. According to article 8.10 *"A Party violates the obligation of fair and equal treatment referred to in paragraph 1 in cases where one of the measures or a series of measures constitutes: a) denial of jurisdiction in civil, criminal or administrative proceedings, b) material violation of due process, including material violation of the principle of transparency, in judicial and administrative proceedings, c) manifest arbitrariness, d) targeted discrimination on manifestly unlawful grounds, such as sex, race or*

⁴⁵ Jurisprudence that interprets the Minimum Standard of Treatment is Neer Claim, Roberts Claim, Hopkins Claim, and British Claims in the Spanish Zone of Morocco and is defined as "arbitrary, grossly unfair, unjustified or peculiar, discriminatory and exposes the claimant to social or racial bias or involves a lack of due process that leads to a result that offends judicial propriety—as could happen with a manifest failure of natural justice in judicial proceedings or a complete lack of transparency and honesty in an administrative process."

⁴⁶ Tudor, Ioana, The fair and equitable treatment standard in the international law of foreign investment, 2008 Oxford University

religious beliefs, e) abusive treatment of investors, such as coercion, pressure and harassment or f) violation of any other elements of the obligation for fair and equal treatment established by the parties in accordance with paragraph 3 of this article." This article also mentions the principle of negation, a principle which is considered an important subcategory of FET, and which is recognized both by jurisprudence and by theory.

In fact, the establishment of a "Specialized Committee for Services and Investments" is being seen as an innovation. This Committee, as described in paragraph 3 (article 8.10), will develop recommendations regularly to the CETA Joint Committee with the aim of further clarifying the right of the Fair and Equal Treatment.

Finally, paragraph 4 of the same article establishes the principle of legitimate expectations, which is considered a subcategory of FET.⁴⁷ In other words, it will be assessed each time by the Tribunal, if the investor state has made "specific proposals and statements", which created "legitimate expectations" for the investor to rely on and implement the covered investment.

7.5. National treatment rule and most favored nation clause

The principle of national treatment and the most favored nation clause constitute two standards of investor protection which complement each other, and together constitute the principle of non-discrimination. Specifically, under the principle of national treatment, the state undertakes not to treat an investment in a different way from domestic investors, while under the most favored nation clause, the host state of the investment treats all foreign investors on the same terms, and no one enjoys an advantage at the expense of another. In this way, it is ensured that all the investors established in a state, will enjoy the same rights, obligations and the same level of protection.

7.5.1. National Treatment Principle

The principle of National Treatment essentially captures the level of the rule of law of a country. A state's guarantee that it will offer to foreign investors the same level of treatment as to domestic investors, constitutes an important factor in attracting foreign investment, as the foreign investors feel safe that the host state will not try to usurp the invested funds and then screw over the new entrant. This, of course, in no way means that the host state must change the applicable law to a more favorable one for foreign investors.

⁴⁷ Panagiotis Glavinis, *International Economic Law, General principles, international trade, foreign investments*, Sakkoula Publications, 2009, Weiler

The principle of National Treatment includes the right of access to the host country but also the right of establishment. Traditionally, the European member states, but also the EU itself, when signing bilateral investment agreements, do not grant access rights to all investors from third countries. On the contrary, the US and Canada, when negotiating and signing BITs, provide (to some extent) the right of access to foreign investment.

CETA appears to approach the Canadian FIPA model in terms of the national treatment clause, including both the right of access and the right of establishment, stating in Article 8.6 *“Each Party shall accord to an investor of the other Party and to covered investment, treatment no less favorable than the treatment it accords, in like situations to its own investors and to their investments with respect to the establishment, acquisition, expansion, conduct, operation, management, maintenance, use, enjoyment and sale or disposal of their investments in its territory”*.

7.5.2. Most Favored Nation Clause

History and general geopolitical tactics of states have proven that nations develop more favorable relations with specific countries, either in the context of good neighborliness or due to other interests.⁴⁸ The most-favoured-nation clause's goal is to protect states from the above preferential practices. This clause first appeared in bilateral or multilateral trade agreements, and was adopted by the investment sector in the 1990s. In this long period of time, a rich jurisprudence, which complements and interprets this principle, has been developed. Thus, it has been argued, jurisprudentially, that in the event that a country has signed bilateral investment agreements, some of which ensure more favorable terms to a specific nation, then the more favorable terms should apply to all investment partners of that state (provided that the agreements present substantial similarities and the difference between the agreements concerns issues that are not particularly important). It has also been jurisprudentially judged - but without being consolidated - that whatever treatment is reserved for third country investors should also be reserved for the more favorable state. This view was expressed on the occasion of the dispute resolution clauses.

Each state seems to have shaped the MFN standard differently over the years: the American and Canadian BITs seem to consider it important to highlight the term "similar conditions", in contrast to the European standard which, although it does not explicitly include this term, considers the comparative analysis self-evident in the case of recourse to an arbitration mechanism. CETA appears to have been influenced by the MFN model

⁴⁸ These are usually neighboring states or traditional partners or former colonies.

by Canada's FIPA model, which explicitly refers to the term "like situations". Thus in Article 8.7 it is defined that *"Each Party shall accord to an investor of the other Party and to a covered investment, treatment no less favourable than the treatment it accords in like situations, to investors of a third country and to their investments with respect to the establishment, acquisition, expansion, conduct, operation, management, maintenance, use, enjoyment and sale or disposal of their investments in its territory"*. In paragraph 4 of the same article it is pointed out that the term "treatment" does not include dispute resolution procedures. The same article emphasizes that substantive obligations introduced in other international investment agreements are not considered subject to "treatment". The provision's aim is to cease importing regulations from other agreements, which would create an interest for the investor who invokes them.

7.6.Expropriations

Expropriations of international investments constitute an issue that has occupied international theory and jurisprudence. CETA has adopted the expropriation conditions provided for in the American BIT model and the Canadian FIPA model: "(a) for a public purpose; (b) under due process of law; (c) in a non-discriminatory manner; and (d) on payment of prompt, adequate and effective compensation."

Expropriations may be distinguished either as direct or indirect, depending on whether the investment is nationalized, or there is a formal transfer of ownership (de jure expropriation) or direct confiscation (de facto expropriation). So, a direct expropriation means that the legal title of the investment is being transferred mandatorily. Direct expropriations are not a very common phenomenon today. In contrast, indirect expropriations, which have an equivalent effect to direct expropriations, are carried out more often (i.e. the investor loses the right to exploit his investment). These indirect expropriations are implemented through government measures (e.g. excessive, arbitrary taxation, deprivation of profits, etc.) and not through the transfer of the legal title or their seizure. Likewise, the characterization given to indirect expropriation in CETA is consistent with the relevant definition provided for in the US and Canadian Model Investment Agreements.

8. The innovation of CETA: Investment Court System (ICS)

CETA caused a wave of public reactions, like any new venture which introduces new standards. The main reactions, that occurred, concerned the protection of investors, as well as the system for resolving disputes that may arise between investors and the host

state of the investment. These reactions were heard, in the effort of creating a comprehensive and effective agreement, resulting in the modification of its content and the alteration of the form of protection offered to investors. In particular, the system provided for in the previous existing trade agreements (the recourse to the ISDS system) was replaced, with a new and improved Investment Court System (ICS).

8.1.What is ISDS?

ISDS consists an arbitration system for the resolution of investment disputes. This dispute settlement system is provided for the protection of investments, under bilateral investment agreements (BITs),⁴⁹ multilateral investment agreements or even Free Trade Agreements (which provide regulatory provisions for investments). Whenever a dispute arises, the conflicting parties make sure to appoint arbitrators in order to resolve the dispute between them. This system does not provide for a permanent and stable court, resulting that, ad hoc arbitration committees are set up each time. Of course, there are not a few cases in which the Investor-State Dispute System Resolution has been accused of a lack of transparency, of bias, of inconsistent and inaccurate decisions, of conflicts of interest on the part of arbitrators, but also of high administrative and financial costs. It has come to be seen today as an anachronistic and ineffective investment dispute settlement system, which is why its initial inclusion in the Comprehensive Economic and Trade Agreement was widely criticized.

8.2.What is ICS?

In contrast, the Investment Court System (ICS), which is provided for in CETA, refers to a comprehensive investment court system, permanent, independent, impartial and transparent, in which there will be a clear definition of the grounds on which an appeal can be made. It is a two-tier dispute resolution, involving independent and professional adjudicators. Until now, it has been a common phenomenon that lawyers undertake the resolution of investment disputes, with the result that a conflict of interests is often created: on the one hand, the accumulation of duties could leave no room for deepening the case, and on the other hand, the lawyer's status who deals with investment law, often left room for bias, bribery or cover-up. The aim of the EU, always in cooperation with Canada and other future trading partners, is to lead the initiative to create an integrated judicial system, which will be able to resolve investment disputes respecting the principles of transparency, impartiality and efficiency.

⁴⁹ A network of nearly 2,750 bilateral investment treaties (BITs) around the world.

The special provision on the transparency of the proceedings consists an innovation, as well. The chapter that ensures the impartiality and independence of judges seems to have been influenced by Canada, which has adopted the UNCITRAL Rules on Transparency in Arbitration arising from Treaties between States and Investors⁵⁰. In fact, Article 8.36 entitled "Transparency of Proceedings" states: *"The UNCITRAL Transparency Rules, as modified by this Chapter, shall apply in connection with proceedings under this Section"*.

Although the largest part of the eighth chapter, and specifically the provisions that provide for the settlement of investor-state disputes, will be implemented after the ratification of the agreement by all national parliaments, work on the completion of the ICS continues. In 2021, the Joint Committee and the Committee on Services and Investments (CSI) issued four decisions related to appeals, interpretation, code of conduct and mediation.

8.3. Reactions to ICS

The Investment Court System (ICS) did not particularly appease public opinion, with the first reactions coming from member states with developed economies. Both Germany and France seem to have strong objections to the legality of the new Investment Court System, while Belgium, specifically the Walloon parliament, has also expressed objections:

8.3.1. The request of Belgium and the No. 1/17 Opinion of the CJEU

Just one year after the signing of CETA, i.e. in 2017, Belgium submitted to the Court of Justice of the European Union a request for an opinion on whether and to what extent the new Investment Court System provided for in the Agreement is in line with primary EU law. This request was filed according to the relevant right provided to the member states by article 218 TFEU, paragraph 11. In fact, according to the specific provision, if the CJEU judges that the agreement is not compatible with the Primary Treaties, it can only enter into force if the text of the treaty is amended, or if the text of the Primary Terms is amended.

On this request, the CJEU Opinion No. 1/17 was issued⁵¹, which adopts the view that this System, and therefore the Comprehensive Economic and Trade Agreement between Canada on the one hand, and the European Union and its member states on the other, are compatible with the European Primary Treaties.

⁵⁰ UNCITRAL Rules on Transparency in Treaty-based Investor-State Arbitration

⁵¹ It should be noted that earlier in the same year, a non-binding opinion of the CJEU prosecutor was issued, which was along the same lines.

Specifically, the Opinion clarifies that the Investment Court System constitutes a hybrid dispute resolution system, which despite its name (Investment Court System), is a combination of the arbitration court and international court.⁵² In other words, the mechanism, despite the name "Court", is built on the foundations of arbitration. In this context, the same Opinion considers the ICS, an alternative way of resolving investor disputes. This means that investors are not obliged by the Agreement to appeal directly to the ICS, as long as the relevant national legal instruments are available.⁵³

It is a fact that the decisions issued during the resolution of investor-state disputes are largely respected. Nevertheless, in practice states that have, for example, been ordered to pay compensation, cannot be forced to pay the relevant amount, or to overturn the decisions of national courts, or even to force the reform of national legislation.

Having said that, the new Investment Court does not have the authority to interpret the provisions of EU law, but to apply them in the context of what CETA defines. This clarification negates all the doubts of the member states, regarding the ability of the European Parliament to legislate freely, and not under the fear and shadow of an external judicial system. In the same Opinion it is even stated that the establishment of the ICS does not negate the effectiveness or the autonomy of the legal order of the EU.

Moreover, the ICS includes provisions that protect the impartiality and independence of judges, provides financial facilitation provisions for small and medium-sized enterprises, and provides for the creation of a code of ethics.

In fact, the Opinion is mentioning the Achmea decision⁵⁴. This decision has become quite infamous in the investment sector, as it considers it contrary to EU law to have and maintain bilateral investment agreements between member states and thus, it excludes access to arbitration tribunals, in these cases. The CJEU, therefore, with its Achmea decision, indicated the supremacy of Articles 267 and 344 TFEU. Because of the Achmea decision, a subsequent Agreement for the termination of Bilateral Investment Treaties between the Member States of the European Union, was signed in 2020, from 23 EU member states. This exclusion is based on the obligation of member states "not to submit a dispute concerning the interpretation or application of the Treaties to any method of settlement other than those provided for therein."⁵⁵

⁵² Paragraph 242, of No. 1/17 Opinion of the CJEU

⁵³ On the contrary, according to paragraph 253 of the 1/17 Opinion of the CJEU, when investors appeal directly to the ICS, they are deemed to have voluntarily waived any national remedy.

⁵⁴ C-284/16 Slovak Republic v Achmea BV

⁵⁵ **Article 344 of the TFEU**

The regulation of recourse to more legal instruments is also important. Parallel recourse to national and international dispute resolution mechanisms is prohibited, in order to avoid issuing conflicting decisions. Article 8.24 entitled *"Where a claim is brought pursuant to this Section and another international agreement and: (a) there is a potential for overlapping compensation; or (b) the other international claim could have a significant impact on the resolution of the claim brought pursuant to this Section, the Tribunal shall, as soon as possible after hearing the disputing parties, stay its proceedings or otherwise ensure that proceedings brought pursuant to another international agreement are taken into account in its decision, order or award."*

The Opinion of the CJEU is consistent with the Press Release issued by the European Commission, a few days before the submission of the relevant request to the CJEU by Belgium. This is the Press Release "The State of the Union in 2017 - Trade Package", in which, among other things, a proposal is made for the establishment of a multilateral investment court, a system that will be empowered to adjudicate appeals between investors and states, who will have accepted his jurisdiction.

8.3.2. The Reactions of France and Germany and the appeal to the Constitutional Courts

It is the first time that an international agreement is discussed in national constitutional courts. Doubts have been raised for the first time about whether, and to what extent, a national parliament can overturn an agreement at EU level. If CETA fails, the future of the EU's ability to conclude trade deals appears to be in doubt.

The Association of German Judges (a professional association of judges and prosecutors) "qualified" CETA unconstitutional. Similarly, an appeal was filed to the German Federal Constitutional Court (by a group of activists) on the grounds of violation of basic principles of the German constitution and the provisions of EU law, arguing that "the presence of the ICS, creates a basis for parallel justice while the temporary application of a Treaty, it should not be a rule. On the contrary, such a thing should be interpreted restrictively against the applicants". The German Constitutional Court nevertheless rejected the relevant appeals, opening the way for the ratification of the agreement by the German national parliament.

Moreover, French politicians appealed to the Constitutional Court, on the grounds that the French constitution is being violated. French Constitutional Article 54 was activated, which rarely does. The Constitutional Court rejected the claims, saying that CETA does

not contain unconstitutional clauses. If this wasn't the Court's decision, the text of the French Constitution would have to be amended, and if this process could not be completed, the ratification of the agreement would cease, and the CETA agreement would be blocked.

9. Epilogue: Positive Developments

Today the Treaty has been ratified by Austria, Croatia, Denmark, Estonia, the Czech Republic, Finland, Latvia, Lithuania, Luxembourg, Malta, the Netherlands, Portugal, Romania, Slovakia, Spain, Sweden, and the United Kingdom⁵⁶. In France, the treaty has been ratified by one of the two chambers. In Ireland, a wave of public reactions against CETA started recently (only in 2021). The Treaty was passed by the Parliament of Cyprus, which did not ratify it, and reserves the right to review it again in the future.

The wave of negative public reactions seems to be gradually easing, as in August 2022, a draft EU-Germany joint statement was announced. This statement's goal is to create a dialogue between these parties, and settle out the investment standards of the Agreement. This is a positive development, for the completion of the ratification of the agreement. The above move seems to distinguish, that today's economy is largely based on investment and financial sector. Therefore, the investment industry needs to be redefined and set on a solid foundation, especially now that the economy is in recession.

After the above analysis, we can notice two pillars, running the economy nowadays: on the one hand, we shall notice regional integration, which has the ability to bring together political and economical stability⁵⁷, and on the other hand we shall notice the investment sector which occupies most of the economy's capitals. It is therefore crucial that the two pillars that drive the threads of international economic development – i.e. regional integration and investment - move in complete balance and harmony, with regulatory autonomy, just as the CETA model strives to achieve.

⁵⁶ It should be noted that after the withdrawal of the United Kingdom from the EU, Canada signed the "Canada-United Kingdom Trade Continuity Agreement" with the United Kingdom, as CETA would cease to be valid after the end of the transition period for its withdrawal of the United Kingdom, Great Britain and Northern Ireland by the European Union and the European Atomic Energy Community, held in Brussels and London on 24 January 2020.

⁵⁷ As the transfer of powers to a supranational organization is a result of the inability of internal actors to impose their vision or their will

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Overview of the reports on the reformation of personal income taxation

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Abstract

Presentation of the reports on the reformation of personal income taxation that have been prepared with a development plan for the Greek economy, that discuss the issue of taxation and point out its important features. The goal is the complete modernization of the tax system, so that it responds more fully to the principles of social justice, contributes to the economic development of the country and is governed by simple and modern procedures, which apply to all tax objects.

The purpose of the study is to deepen the proposals for tax reform based on the peculiarities of the Greek economy, the international trends in this field and the weaknesses of the tax system. The effects of a tax reformation are analyzed and how it should take the form of the reform, which, however, requires a new legislation, which will bring about radical and deep cuts, which respond to the new conditions and the internationalization of the economy. Proposals for a set of structural measures, which are necessary for the country's adaptation to the wider European environment and the elimination of the weaknesses that increase its distance from the other member countries. Citation of the common points of the reports on the reformation of personal income taxation and their adoption by the tax leadership.

Keywords: tax reformation, personal income tax, structural measures

JEL Classifications: H20, H21, H24

Commission 1990

The Minister of Finance with his decision 1056645/1386/0006A/31-7-1990 established a twelve-member committee to submit proposals for the reform of the Greek Tax system and in particular the taxation of the income of natural and legal persons, the taxation of capital (F.M. A., tax on inheritances, donations and parental benefits, etc.), the VAT and other taxes, with the aim of its complete modernization, so that it responds more fully to the principles of social justice, contributes to the economic development of the country and is governed by simple and modern procedures, which apply to all tax objects.

The Committee, after 86 meetings, submitted to the Minister of Finance its report dated October 21, 1991, which includes specific proposals for the reformation and modernization of our tax system, both in direct and indirect taxation. These proposals mainly aim to:

- 1) In the restoration of the constitutional principle of the contribution of citizens to the public burdens, according to their economic powers.
- 2) In the creation of healthy competitive economic units
- 3) In the utilization of domestic savings by businesses
- 4) In the choice by the savers of the best financial investment for the economic development of the country.
- 5) Among the most important proposals of the committee for reforming the tax system are the following:
- 6) Broadening the tax base.
- 7) In reforming the presumptions (living expenses and acquisition of assets) for a fairer determination of the net income of tax evaders. In the determination, in an approximate manner, of the gross and net income from commercial and agricultural enterprises as well as from liberal professions.

- 8) In the readjustment of the value of the fixed assets of the companies so that the balance sheets of the companies are cleaned, and the depreciation is calculated on the current value of the fixed assets. With this measure, the capital market will also be strengthened.
- 9) The abolition of unjustified tax exemptions.
- 10) To increase the capital of joint-stock companies and limited liability companies.
- 11) In the capitalization of tax-free reserves and tax-free reserves that have been formed by businesses since 1955 with various development laws, with certain conditions, without taxation, after the purpose sought by these laws has been achieved. This measure will make it easier for businesses to cover the proposed capital increase and will undoubtedly strengthen the capital market.
- 12) The abolition of the real estate tax and the provision of the possibility for Municipalities and Communities to impose a special fee on the real estate of their area, with a small rate (up to 4% for properties that generate income and 2%0 for properties that do not generate income) to carry out specific projects.
- 13) The increase in tax-free amounts for the acquisition of a first home.
- 14) The significant increase in tax-free amounts, especially in the first category (spouse and children of heirs and ascendants of the first degree) and the complete reformation of the tax scales in order to significantly reduce the tax burden, especially on the heirs of the first degree.
- 15) In the abolition of the high rate (30%) in VAT.
- 16) In the complete reformation of stamp duties by consolidating all rates into one rate, with the exception of the rates applicable to bills of exchange and promissory notes, checks, acceptances, advances and guaranteed credits.
- 17) In the establishment of a single procedure for all tax items to serve both taxpayers and services.

18) Reforming the penalties (surcharges, etc.) so that tax evasion becomes completely unprofitable.

The above proposals of the Commission, which as the Minister of Finance stated at the time when presenting the Commission's report, do not bind the Government and as announced the tax bill would be tabled which would implement the Government's decisions on reforming the tax system.

However, the success of a tax system depends to a large extent on the existence of the appropriate organizational framework, which allows the tax services to implement it in the best way. Because even the best tax system is doomed to failure if the tax services entrusted with its implementation are inadequate.

Tax proposals of a scientific committee in view of the challenge of 1992 and the single European market

In the landmark year 1992, the complete single European act for the unification of the markets of the member states of the EEC came into effect. In the almost seven years that Greece has been a full member of the European Communities, it has been sought to maximize the country's net economic benefit from Community payments. Few steps were taken in the direction of taking those structural measures, which were necessary for the country's adaptation to the wider, European environment of integration and the elimination of the weaknesses that increase its distance from the other member countries (1981 : Greek per capita income 58.4% of Community, 1987 : forecast for 53.7%). 1992 meant the abolition of the last protective provisions for the Greek economy and society and the beginning of a period of full and free competition.

Our country, like the other countries of the European community, moved towards the single market in 1992, at which point the single European act ratified in our country by Law 1681/1987, for the unification of the markets of the member states, is fully valid of

the European community. Faced with this challenge in 1992, many institutional changes had to be made, in order to eliminate as much as possible, the weaknesses of our country, in various fields, compared to the other member states of the European community. Among the most important institutional changes were those that must be made in our tax system. The changes should not have been only those foreseen by articles 95 to 102 and 220 of the Treaty of Rome, the Act of Accession of Greece to the European Economic Community and the guidelines of the Council of the European Communities, but also others, so that our tax system to be able to contribute decisively, among others, to:

- 1) Utilization of domestic savings by businesses through the execution, as much as possible, of greater productivity of fixed capital investments.
- 2) Choice by savers of the best financial investment for economic development.
- 3) Creation of large economic units in order to increase productivity.
- 4) Increasing the competitiveness of Greek products. Furthermore, our tax system should not affect the movement of goods and services, factors of production and the establishment of businesses

As is well known, with Article 2 of the Treaty of Rome, the European Economic Community has as its mission, with the establishment of a common market and the progressive approach of the economic policy of the member states, to promote the harmonious development of economic activities in the area of the Community , the continuous and balanced expansion, the increasing stability, the acceleration of the improvement of the standard of living and the achievement of closer relations between the states which it unites. In order to achieve the above objectives, in accordance with Article 3 of the Treaty, obstacles to the free movement of persons, services and capital should be abolished between Member States. To this end, articles 95-102 and 220 of the Treaty of Rome provide for the harmonization of indirect taxes, general and special, and set rules aimed at creating conditions of full and free competition between the products

and businesses of the member states of the European community. In particular, the above articles set the following rules:

- 1) No member state of the European community shall impose, directly or indirectly, higher taxes on the products of other states than those affecting, directly or indirectly, the same national products.
- 2) It is prohibited to subsidize or grant or aid from state resources in any form and name for certain products or certain businesses (in the form of refunding higher internal taxes on exported products or the imposition of higher taxes on import, granting aid to certain domestic businesses, etc. etc.), in a way that circumvents or threatens to circumvent the rules of free competition.
- 3) In the event that the Executive Committee finds that the existing disparity between the laws, regulations or administrative provisions, distorts the conditions of competition in the common market and is caused, by this fact, a disturbance, which must disappear, it consults with the States concerned, and if the consultations do not result in an agreement, the Council, by decision of the Executive Committee, shall issue the necessary instructions for this purpose.

The act of accession, ratified by Law 945/1979, provides regulations for the technique of the imposed adjustment of materials and tax provisions and further determines the application of the new Community regulations.

The guidelines of the European Community determine the way of harmonizing individual taxes and provide the framework for the amendments to the tax legislation, in order to achieve the required harmonization of our tax system,

According to the guidelines of the European Community, our country has the obligation to harmonize taxation. On the contrary, there is no obligation to harmonize direct taxation, because there is still no common system in both personal income taxation and corporate income taxation. However, the challenge of 1992 requires that the Greek tax system be further modernized, including direct taxation, in the direction that the

community systems are moving, regardless of whether our country has or does not have the obligation to harmonize certain taxes.

The tax system in force in the country is mainly based on the following taxes:

In the personal income tax that has been imposed with the N.D. 3323/1955. This law during the 33 years has been amended by about 100 laws. The main characteristics of this tax are the following:

- 1) The uniform taxation, which means that the tax is imposed on the total net income of each natural person, acquired during the previous calendar or administrative or agricultural year of taxation, from any of the seven categories, in which income is distinguished, depending on the source from which it originates.
- 2) For certain categories of income (salaried services, freelancers, presumptive income from owning a main residence, etc.) there are special reductions, for others there are exemptions up to a certain amount (income from agricultural enterprises, income from dividends of shares of domestic limited companies, mutual funds, etc.), while certain incomes (interest on deposits, profits from the sale of securities, etc.) are exempt from taxation
- 3) For certain categories of persons (disabled, journalists, actors, footballers, etc.) special reductions apply to incomes derived from certain sources (from salaried services, liberal professions, etc.).
- 4) The total net income is taxed according to the progressive tax scale, with rates from 18% to 50%. Income from certain sources (from securities, profits from limited liability companies, etc.) is subject to an additional tax (3%). The amount of tax resulting from the scale is reduced by the tax corresponding to the tax-free amounts recognized for taxable and protected members and certain expenses based on supporting documents and the special reductions of certain incomes (from hired services, etc. etc.). It is noted that the tax for the above amounts is calculated based on the rates that apply to the first steps of the tax scale.

- 5) The total net income of the taxpayer, which will be subject to taxation, can be determined on the basis of his living expenses, which are determined by the expenditure for the purchase of certain movable things, the taxable horsepower of passenger cars I.X. etc., when this is greater than the declared net income.
- 6) The determination of the net profits of the enterprises, when no accounting books are kept, is done by multiplying the purchases or the gross revenues of the enterprises, as the case may be, by a coefficient of net profit, which is unique for each profession, to determine the net profit of certain businesses and liberal professions, the so-called "viability presumptions" apply, under conditions, which means that the taxable persons cannot be less than a certain amount determined by law. Despite the efforts made over the last 30 years to improve the personal income tax system, the expected results have not been achieved, objectively speaking. This is due to many factors, including:
 1. The permanent and in some cases mutually canceling reforms in basic matters of taxation (presumptions, tax-free amounts, determination of income from commercial enterprises, etc.), which do not allow the achievement of the objectives sought by the specific reforms, even in the short term. It is typical that the presumptive method of determining the taxpayer's net income has changed at least ten times with known effects on his performance.
 2. The way of checking and delaying the cases during the last twenty years (submission of supplementary declarations for the unaudited financial years without any penalty and with payment of the due taxes, including the indirect taxes in several installments or with a discount), which results in the lowering tax consciousness to the lowest point, since in this way dishonest taxpayers benefit and are rewarded, with all the subsequent adverse effects on the effort made to reduce tax evasion. This unorthodox and unjustifiable, for honest taxpayers, way of delaying the affairs of dishonest taxpayers is capable of

weakening any measure to curb tax evasion. The 1992 challenge mandates a statutory amendment to personal income taxation in a way that contributes to, among other things:

- In the drastic limitation of tax evasion as well as tax avoidance, which will ensure additional healthy resources in the state budget.
- To the fairest distribution of the tax burden among all taxpayers.
- To increase the productivity of employees' work and create a climate of confidence for businesses to make investments.

In order to achieve the above, the following changes are proposed, which may form the basis for the study of a real reform of income taxation:

A) Broaden the tax base. For this purpose, you must:

1. To abolish all kinds of exemptions, which have been given to various categories of income, including interest on deposits, because it does not contribute to the restoration of tax justice, the taxation of salaries and pensions and the exemption from tax of those who have income from interest on deposits, from profits of sales, securities, etc.
2. To review the special way of taxing certain categories of income (special categories of income from commercial enterprises (article 32 N.D. 3323/1955), dividends from shares, compensation, etc.)
3. To abolish all kinds of reductions provided for certain incomes (from salaried services, etc.) and the exemptions provided for certain categories (farmers, etc.) and instead to establish increased tax-free amounts.

B) To reform the tax-free amounts deducted from the taxable income in order to find the taxable income of each taxpayer. For this purpose, you should:

- To determine a tax-free amount for the taxpayer, the spouse and each protected member
- This tax-free amount should be increased for employees and pensioners, for farmers and for certain categories of persons (disabled, victims of war, etc.) as deemed appropriate and imperative.

- To further deduct certain expenses and contributions based on supporting documents (insurance contributions to insurance funds, hospitalization, donations, life insurance premiums, etc.). In this way, the tax relief for taxpayers, who are currently entitled to special reductions for certain categories of income (from wages, pensions, etc.) will now become fair and effective, since it will be differentiated according to the number of protected members. The tax-free amounts should be deducted from the total net income of the taxpayer, in order to find the taxable income that will be subject to tax, because it is fair that the taxpayers should benefit, with the tax-free amounts, in tax according to their marginal tax rate, since their incomes are taxed on a progressive scale.

C) To reform the system of imputed income determination. To this end, you should:

- To determine a basic amount for the taxpayer and each protected member to cover basic living expenses.
- This amount should be increased, with differentiated rates for those who have one or more passenger cars, pleasure boats or employ domestic workers, etc.
- The amount of living expenses to be further increased by all kinds of expenses for the purchase of real estate and movable things, except for the items for living. The amounts that will result based on the above data cannot be disputed (rebuttable presumption), but the origin of the money to cover the above amounts can be proven in any legal way (rebuttable presumption).

D) To reform the way of determining the net profits of businesses. To this end you should:

1. To change the method of calculating the net profits of businesses that keep books of the first and second category of the Tax Code and to determine, instead of the single coefficient of net profit, which is certain to favor some businesses and unfairly treat others, since they are not taken into account at all the expenses of the business, a unique coefficient of gross profit, with which the gross profit of the business will be determined. From this will be deducted the company's expenses, which will be clearly defined in the law, so that the taxable profits of the companies correspond, as far as possible, to reality.

With this system, the receipt of legal supporting documents for the deduction of expenses will gain substantial content, which will also contribute to the reduction of tax evasion.

2. To reform article 35 of the N.D. 3323/1955, so that based on today's data and the jurisprudence of the courts, the costs that can be deducted from the gross revenues of the companies can be clearly defined. It is not correct not to deduct from the gross revenues of the companies the provisions for the compensation of dismissed personnel when the formation of this provision was imposed by the PD. 409/1986 at the behest of a relevant directive of the European Community. To further determine the costs that burden the tax-free income of businesses. To provide the possibility to businesses to assign to the State the bad debts that the tax office does not recognize for deduction from their gross income, so that, without further procedure, the assigned bad debts can be deducted from the gross income of the businesses.

- To change the way of determining the net profits of technical companies, because the existing system of presumptive determination of net profits favors some companies and wrongs others, and furthermore does not facilitate tax evasion.

E) To further reform the tax scale, by widening the income brackets and establishing a marginal tax rate for taxable income over 10 million drachmas. Further establish that the income brackets shall be indexed every year that inflation exceeds 10%, otherwise every two years.

F) To reform the control procedure and the way of filing tax cases. To this end you should:

i) To define clearly, in view of the jurisprudence of the Council of State, the rights and obligations of the tax collector.

ii) Limit the deadline for the notification of control sheets and result determination acts to four or five years at most. In no country of the European Community is there a ten-year or fifteen-year statute of limitations, which applies in our country, with all the consequent adverse consequences for the interests of the State, for businesses and taxpayers in general, which have pending (unaudited declarations) up to 10 years.

iii) To define clearly, on a new basis, all kinds of sanctions (financial, administrative and criminal), which must be imposed in cases of late submission, inaccurate submission or non-submission of a declaration. Particular attention is needed in determining the penalties, so that, on the one hand, the financial incentives of taxpayers to commit the above violations are neutralized, on the one hand, and on the other hand, they are not destructive and manifestly unfair in cases of typical or trivial violations. Administrative and criminal sanctions to be imposed by the Administrative and Criminal courts respectively.

iv) In the event of an out-of-court settlement of the dispute (compromise), the reduction of the surcharge or fine should be scaled according to the amount and percentage of the tax difference. A similar possibility of reducing the surcharges should also be provided to the administrative courts. It is impermissible to prevent taxpayers from going to court, when they believe they have been wronged, by threatening not to reduce the surcharges.

v) That the state take the appropriate measures for the short, if possible, adjudication of the cases in all levels of the courts.

The above proposals can be taken into account for a systematic tax reform, to be accepted at least by the majority of taxpayers.

The tax reforms that must be made with the aim of modernizing and harmonizing the tax system, in order to have the expected results, must necessarily be accompanied by:

- 1) With full computerization of the tax services in order to be able to provide the necessary information and make the appropriate audit verifications.
- 2) By manning the financial audits with sufficient and suitable staff, who have the possibility to be informed about all tax changes, but also to be paid, depending on the seriousness of the work offered.

Hellenic Society of Tax Law and Fiscal Studies

The Hellenic Society of Tax Law and Fiscal Studies in 1990 published its report with the indicated amendments to the taxation of natural persons. In order to implement the express imperative of Article 4 paragraph 5 of the Constitution, that is, that Greek citizens contribute without discrimination to the public burdens according to their abilities and to restore tax justice, it is necessary to review all tax exemptions, personal and real, as and reductions and deductions from net income and to retain only those that contribute to economic development and are socially justified. The method of calculating the deduction of income reductions and tax-free amounts is complex and socially unfair. It is necessary to reform the way of calculating and deducting the tax-free amounts and reductions, which are deducted from the net income, in order to find the taxable income. To this end a tax-free amount should be determined for the taxpayer, the spouse and each protected member. Tax-free amounts should be increased for employees and pensioners, for farmers and certain other categories of persons (such as the disabled, victims of war, etc.) as deemed appropriate and imperative. In this way, the tax relief for the above taxpayers will now become fair and effective, since it will be differentiated according to the number of protected members. The tax-free amounts should be deducted from the total net income of the taxpayer, in order to find the taxable income that will be subject to tax, because it is fair that the taxpayers benefit in tax by deducting the tax-free amounts, depending on the marginal tax rate, since the income is taxed on a progressive scale. The system of presumptions is complex and does little to reduce tax evasion. It is necessary to define a new system of presumptions that is simple, helps to reduce tax evasion without affecting honest taxpayers. The new evidence system should work as follows:

- To determine a basic amount for the taxpayer and each protected member, which is necessary to cover their basic living needs. This amount should be multiplied by

differentiated coefficients, for those who have one or more passenger cars, pleasure boats or employ domestic workers, etc.

- The amount of living expenses is increased by the expenses for the purchase of real estate and movable things, except for the items for the taxpayer's living.
- The taxpayer must be able to prove in any legal way the origin of the money in order to justify the eventual difference that will arise between taxable income and the presumptions (rebuttable presumption).

The current tax scale (income brackets, tax rates) is unfair as it overtaxes middle income earners. It is advisable to reform the tax scale in accordance with the real economic data which form the basis for the balanced achievement of the two main purposes, the coverage of public revenues and the development promotion of the country in view of 1992. In the new tax scale, the marginal tax rate to apply to taxable income over ten million drachmas.

As long as the real estate tax exists there is no reason to burden income from real estate with an additional tax. For this reason, the additional tax of 2% to 4% levied on real estate income must be abolished.

The method of determining the net profits of companies that keep first and second-class books, i.e. by multiplying purchases or sales with a single net profit coefficient, is unfair, since it favors some companies (those that make larger profits) and unfairly treats others (those that make less profits and losses), as long as their business conditions and expenses are not taken into account. To avoid this unfair and unscientific way of determining the net profits of businesses, the alternative ways are proposed:

- a) To determine a unique gross profit coefficient, which will be determined by multiplying the purchases or sales, the gross profits of the business, from which the costs of the business will be deducted, which will be clearly determined by law, so that the final financial result, which can be positive (profit) or negative (loss) corresponds as much as possible to reality.

b) Determine two net profit coefficients (lower and upper) and the higher coefficient should not exceed 50% of the lower coefficient. These coefficients will be possible to increase or decrease on a case-by-case basis when it is proven that the company made more or less profits than those obtained with the highest or lowest net profit coefficient, on a case-by-case basis, it will be possible to use a negative coefficient in case it is proven that the business made a loss.

In the above two ways, the receipt of supporting documents for the expenses incurred by the businesses that keep first and second-class books will gain substantial content.

The provisions of article 35 of the N.D. 3323/1955, which determine the expenses that can be deducted from the gross income of businesses, have created many interpretative issues. In addition, they do not contradict the recent amendments made with the P.D. 409/1986 in Law 2190/1920 (deduction of provisions for compensation of dismissed personnel, deduction of establishment, organization and first establishment expenses, etc.). It is therefore necessary to clearly define, in view of the existing jurisprudence of the Council of State, the expenses that can be deducted from the gross income of businesses. The amount of expenses that will be charged to the tax-free income of businesses should be determined, because on this issue there is a dispute and fluctuating jurisprudence of the Council of State that has plagued businesses for 25 years. They should also be deducted from gross income:

- a) The loss from the sale of securities, when this is not covered by a reserve formed from the profit from the sale of securities. The current provision that stipulates that this loss is transferred to the assets of the balance sheet contradicts the general principles of accounting and the Greek General Accounting Plan.
- b) The loss from the sale of real estate that is not used by the company, since the corresponding profit is taxable.

The special way of determining the net profits of certain businesses (technicians, etc.) and the net income of certain freelancers (civil engineers, architects, etc.) by multiplying the

gross income by a fixed (uniform) rate of net profit, is unfair and unscientific, since it favors some (those making more profits) and wrongs others (those making less profits and losses). Furthermore, for these categories of businesses and freelancers there is no incentive to request legal supporting documents for the expenses they make, with the result that these businesses and freelancers facilitate the tax evasion of those who do business with them.

To review the special method of taxation of certain incomes (capital gains, rights, compensations, etc.) because the existing regime is not fair since it has been determined in a piecemeal manner and without justifying the independent taxation, which in some cases is unfair and in others extremely favorable.

The provisions of article 36 of the N.D. 3323/1955 which determine the accounting method of determining the net profits of companies that keep inaccurate or insufficient books, in view of their generality and their general and partial vagueness, have created many interpretative problems and have contributed to the issuance of contradictory decisions by all the courts. The result of all this is that there is a constant dispute between tax authorities and businesses, with all the adverse consequences that follow. For these reasons, it is necessary, in view of the jurisprudence of the Council of State, to amend the relevant provisions and to define in the clearest possible way the non-accounting determination of the net profits of businesses

The basic depreciation rates by which businesses calculate their depreciation have remained unchanged since 1973, even though since then there have been many technological advances in business equipment. It is therefore necessary to determine the basic depreciation rates of fixed assets with the greatest possible specificity. It is further stipulated that in the event that certain fixed assets are idle, depreciation should be calculated with rates reduced by 50%, because even in this case the value of the assets decreases due to technological progress, etc. With the provisions in force, depreciation is not recognized on fixed assets that are idle.

It is advisable to reform the tax scale according to the real economic data, which form the basis for the balanced achievement of the two main purposes, the coverage of public revenues and the development promotion of the country in view of 1992.

Commission 2002

According to the report of the Tax System Reform Commission 2002 under the president Theodoros Georgakopoulos on personal income taxation, it is found that the tax burden in Greece as a ratio of total tax revenue to GDP has increased significantly in recent years and is approaching the average of the countries of the European Union. Tax legislation is constantly changing with continuous and piecemeal provisions with negative effects on economic activity. The functioning of the tax system acts as a brake on the undertaking of economic activities. The distribution of tax burdens does not correspond to the principles of horizontal and vertical equality. These findings led the Commission to proposals for a broad reform of the tax system, which covered both the institutional framework of taxation and the procedures for applying taxes in practice. The uneven distribution of tax burdens on employees and pensioners is a given, caused by the bureaucratic nature of the current income tax, the unsatisfactory operation of the tax and audit services and the large exposure of tax evasion and tax avoidance by professionals and businesses. The consequence of this is the lack of tax awareness and consequently the lack of social consent to take structural measures, which will have a beneficial effect on the development of the economy and consequently on the horizontal expansion of the tax base and the collection of more public revenue.

Association of businesses and industries (SEV) proposals 2004

In 2004 the Association of businesses and industries (SEV)_ positions on tax reform were:
The tax system must be understandable and simple, specifying:

- Replacement with a single real estate tax in lieu of all taxes and fees borne by real estate.
- Simplification in a systematic manner of contradictory and unclear provisions that facilitate challenge and transaction.
- Codification on a systematic basis of tax legislation without scattered, difficult to understand tax provisions in unrelated bills.
- Removal of the Books and Items Code
- Use of International Accounting Standards to calculate tax for businesses that keep books and data kept and published based on International Accounting Standards with the aim of avoiding double bookkeeping with significant operating costs.
- Exploitation of technology through the crossing of data with the TAXIS system.
- Introduction of VAT in the building and abolition of the transfer tax especially on the first transfer.
- Taxpayers have access to all the circulars and case law of the tax legislation through the website of the Ministry of Finance.
- Not to issue circulars late and contrary to the spirit of the Law.
- Issuance of Presidential Decrees and Ministerial Decisions in a timely manner provided for under tax laws.
- The taxpayer should be able to calculate the relevant tax.

The tax system must be fair, specifying:

- To have a broad tax base and leave no room for tax evasion.
- Harmonization with International Accounting Standards.
- Non-prevention of wealth creation, employment, business risk taking.
- Low tax rates for natural and legal persons and progressive according to those of EU member countries.

- Facilitation of recourse to Justice by abolishing or significantly limiting the advance payment of 25% of the difference between fines and tax.
- Tax violations committed with intent should be a criminal offense.
- Non-dependence of the recognition of production costs on compliance with the obligations or procedures deriving from other legislations of insurance funds, advertisements, etc.
 - It should not be formulaic but objective.
- Mandatory response from the Ministry of Finance within one month to questions created by the tax legislation, for the audit authorities with a binding nature.
- Strict observance of the three-year statute of limitations.
- To predetermine the deductible expenses.
- Targeting the fight against corruption.
- Non-imposition of fines for formal violations of the Code.
- Refund of VAT immediately. of exports to those taxpayers who have a clean record.
- Tax evasion by guilds and organized groups should not be allowed.
- To carry out audits of large and listed companies on an annual basis.
- To recognize bad debts without requiring time-consuming court procedures and the possibility of recognizing bad debts by assigning bad debts to the State.
- Do not leave room for transactions and disputes of controls.
- Interest-free and hassle-free return of outstanding payments.
- To satisfy the social feeling and to be socially acceptable.
- Recognition of business expenses for group insurance premiums up to 12% of wages paid.
- Extensive use of the internet and technology.

The tax system must attract foreign investments by specializing:

- To recognize the rights for trademarks and industrial methods (royalties).

- Possibility of taxation at the level of a group of companies and not of each legal entity as in other EU countries, Germany.
- To recognize the costs for services provided by foreign parent companies with participation in the cost of centers created to provide indirect services from the foreign group to its subsidiaries.
- To be able to reject expenses aimed at accounting differences that significantly increase the actual tax rate, only after a written warning has been given about the specific way of handling the expense by the tax office in a previous audit.

The tax system must upgrade the tax administration, specializing in:

- Delivery of tax justice at a rapid pace. Tax cases should be heard by the Council of State within three years from the appeal to the Court of First Instance.
- To create a special judicial body of tax judges.
- Recruit and train tax judges in depth in tax law as well as accounting.

The tax system must proceed with the abolition of taxes in favor of third parties, specifying:

- Abolition of taxes that yield minimal revenue to the State.
- Imposition of taxes, levies, fees, duties by the local government without prior approval of the central government.
- Local taxes and fees should be purely remunerative in nature.
- Abolition of the 0.6% levy on loans of Law 128/75 which increases the cost of financing businesses in Greece by up to 20% compared to European ones.
- Non-burdening of businesses with property taxes for the real estate they use for the operation of the business.
- Abolition of the remaining stamps and F.K.E. in insurance contracts, financial services and loan contracts.

The tax system must facilitate the creation of strong business units, specializing in:

- Removal of disincentives in the tax treatment of dividends of profits and losses of subsidiaries of Greek companies abroad (EU and third countries).
- Tax incentives for mergers.
- To equalize the taxation on the transfer of listed and non-listed companies at 0.6%.
- There should be a highly competitive framework for holding companies with offsetting losses abroad with profits in Greece
- Avoiding double taxation of profits by concluding agreements to avoid double taxation with all countries.

The tax system must be internationally competitive and developmental, specializing in:

- Through regional subsidies
- Stimulation of competition in Greece and the EU.
- Abolition and limitation of all taxes in favor of third parties.
- Subsidies to new technology, research, and innovation.
- Tax burden on businesses in direct taxes and excise taxes so that Greece is among the 3 lowest countries in the EU.
- Reduction of tax on retained earnings which will allow for retained earnings and the phasing out of tax-free reserves.
- Encouraging investments with the widest application of tax-free reserves and the recognition of depreciation chosen by the investor on a case-by-case basis.
- To define the special taxes on the consumption of petroleum products that burden the transport of goods to the minimum allowed by the EU. levels, in order to partially address the costs created by the distance of Greece from the European markets and of the region from Attica.
- To implement the EU directive. which provides for exemption from excise duty on petroleum products consumed in production. There needs to be the lowest possible cost of production to create jobs and attract investment and tax only the profit.

IOBE proposals 2004

The tax reform is taking place in the country at a time when the domestic and international economic situation is not better. The high rate of growth of the Greek economy, which was achieved thanks to the large public projects carried out in the country in recent years, influenced mainly by external factors, began to decline. The upward trend in primary surpluses experienced in recent years has been halted, while primary expenditure has remained stagnant if not on an upward trajectory. The rate of inflation began an unstable and rather upward course and the country became a member of the Economic and Monetary Union enjoying the benefits that it entails. The state was forced, in order to reduce the budget deficits of the general government, to significantly increase the tax burden, without at the same time restraining public spending. The increase in the tax burden at a time when the international situation was negative came to worsen the competitiveness of the Greek economy. The goal of reforming the tax system was to not affect tax revenue, meaning any changes had to be made so as not to result in a change in tax revenue. The changes carried out led to a restructuring of the existing structure of the tax system and the radical changes of the system, which would affect tax revenues, were ruled out in advance. The main burden of the tax reform was focused on the simplification of the tax system which took various forms, such as the reduction of the number of taxpayers who submit a tax return, the reduction of the number of periodic VAT returns, the abolition of certain taxes in favor of third parties. These simplifications improved the image of the tax system and led to a reduction in administration and compliance costs for taxpayers, especially small and medium-sized enterprises. Simplifying the tax system in some cases may lead to a reduction in tax revenue. One such example is the abolition of the stamp. This means that in order not to affect the total revenue, according to the basic principle of the reform, the burden of some other taxes should be increased. However, the increase in the burden of some taxes would

certainly have negative effects. The Georgakopoulos Committee proposed as a last resort for this purpose, the increase of the VAT rate by one percentage point.

A radical reform of the tax system would lead to a decrease in tax revenues. In the long run, it would lead to an increase in tax revenues, but economic theory and experiments carried out in some countries of the European Union showed that a reduction in the tax burden by one percentage point would lead to an increase in employment by 750,000 people. The experiences of some countries that reduced the tax burden, confirmed the above position, since their tax revenues had an initial reduction obtained by implementing this policy and then increased, with important examples such as the countries of Ireland and the United Kingdom Basilio. UK SMEs are taxed at a rate of 0% to 10%, allowing these businesses to experience high growth rates and face increasing competition within and outside the UK. Businesses with profits of around £150,000 were not taxed at all. Tax reform should be combined with a broader consolidation of the fiscal system. The course of the primary expenditure of the public debt, the insurance system and more generally the size and functions of the public sector should be considered. In order to satisfy the Maastricht criteria, Greece moved in the opposite direction, increasing the tax burden in a period of intense tax competition within the European Union.

The tax reform should be designed based on the peculiarities of the Greek economy, the international trends in this field and the weaknesses of the tax system. To be part of a wider economic policy, which will aim at the fiscal consolidation of the Greek economy, taking into account the structure and amount of public expenditure, the contribution to the financing of the insurance system and the reduction of public debt. International practice dictates the expansion of the tax base by reducing tax rates and abolishing unjustified exemptions. Adoption of this practice will lead to a reduction of the distortions caused by the tax system in the economy, but therefore to greater rates of growth, to the reduction of the incentive for tax evasion and in reducing inequalities in the distribution of income. The tax reform should take the form of the reform, which,

however, requires a new legislation, which will bring about radical and deep cuts, which respond to the new conditions created by the country's inclusion in the EMU and the internationalization of the economy. Such tax reform should take the form of revolution and overturn and cannot be done by amending and supplementing existing tax legislation. The Greek experience of amendments and additions may have corrected, cured occasional problems, but it did not help in making the big leap in the Greek economy. The reduction in tax revenue that can be promoted in the short term will lead to an increase in deficits. It cannot be an inhibiting factor for the adoption of bold measures, as long as we get rid of the political cost syndrome. The international trend is in the direction of expanding the tax base, with the revision of some elements that make it up. The need to fight the shadow economy, tax evasion and corruption is imperative. The measures taken in other countries for this purpose vary according to the conditions prevailing in each one, but also the size and forms of the phenomena. These measures can be grouped into the following 3 categories.

- Measures that contribute to reducing the demand for corruption from the private sector.
- Measures referring to political government choices and priorities of political will.
- Measures that contribute to reducing the supply of corruption by public sector officials.
- The measures concerning controls and penalties.

Some of the measures that can contribute to the reduction of corruption are the objectification of many variables of the tax system. The reduction of personal contacts between taxpayers and the tax authority and their electronic communication. The country, following the example of other countries, should gradually integrate the informal economy into the official economy. To this end measures should be taken to prevent individuals from being outside the formal economy. To create incentives for integration into the formal economy. To undertake efforts to identify those involved in the underground economy. To make the advantages of joining the formal economy widely known. Those who commit repeated offenses should be severely punished.

Fluctuations in the tax burden should not be the dominant element in a tax reform. The issue of tax administration is the most important and must be the basis on which the edifice called the tax system must rest. The first priority must be to consolidate a relationship of trust and mutual respect between state and citizen. This initiative belongs to the state. He should tell the citizen that he respects him and that he does not consider him a tax evader in advance and then ask him to comply with the tax law. The citizen should then be convinced that the state manages his money correctly. Secondly, every taxpayer should pay the amount of tax that is attributable to him. To suffer severe penalties if he violates the tax legislation.

For the state to pass on the above messages to the citizen, it should create a stable tax system, clear, transparent and reliable with the minimum possible existence of tax exemptions. Tax rates must be valid for a certain period. To abolish retroactive taxation. To close all the "windows" that the tax legislation has. Abolish banking secrecy. To create a special land register. To make the operation of Taxis efficient. To adopt a uniform tax policy, regardless of the legal form of businesses. For the locality barrier to apply to D.O.Y. workers. and not to work for more than 5 years in the same D.O.Y. The selection of supervisors and department heads should be based on merit-based criteria. To create flexible D.O.Y. with a small tax number for a small number of tax returns and specialized D.O.Y. (medical engineers). Abolish the granting of pardons. The leadership of the Ministry of Finance should practice politics and not administration. To treat the taxpayer as a customer. This means that the tax return should create the "Map of Taxpayers" and create performance indicators in customer service - taxpayers, such as speed of reply to letters, waiting time at tax office counters. The "Charter of Taxpayers" should refer to the obligations and rights of both parties. Removal of certificates and their replacement with responsible declarations.

The reform of the tax administration is successful and lasts when it is characterized by the following elements:

- Tax administration to be staffed by competent and hard-working people.
- Continuous training of the staff in the subject they deal with
- To follow a very well defined and appropriate strategy
- Appropriate utilization of the productive resources it has
- Changes in incentives for both taxpayers and managers.
- Clear and sustainable political will.

The globalization of the economy combined with the developments in modern technology have created new data for the future course of taxation. Among the factors that created these developments are the increase in cross-border sales, the increase in tax havens, the substitution of bank accounts with electronic money, the increase in tax havens, the increase in trade between multinationals.

There has been interest in these issues, both at the OECD and European Union level, with the aim of providing solutions to the tax competition that has occurred in recent years and to the effects of e-commerce on taxation. The effects of the introduction of the Internet refer to 4 main areas, taxation of agreements, internal pricing of multinational enterprises, tax administration and taxation of expenses. In matters of taxation, expenditure taxation may need to be redesigned, while corporate taxation should be significantly redesigned. The need for governments to exchange information on tax matters is important and new and other forms of cooperation should be sought. The European Union's position on tax policy should focus on the following:

- The reforms should consider the need to protect the environment and protect the health of the consumer.
- Further harmonization of indirect taxes, excise duties and VAT, because the deviations that exist between Member States distort competition.
- In the field of business taxation, the aim of the European Union should not be, nor can it be, the imposition of uniform tax rates, but all taxes that hinder cross-border activities must be identified and abolished.

-Tax reforms need to lead to a sustainable reduction of all tax burdens, combining tax cuts with investment in public services and support for fiscal consolidation.

Based on the social, political and economic conditions prevailing in the country, the current structure and characteristics of the tax system, the rich experience gained, especially in the last decades in the field of taxation, should create a medium-long-term tax policy program. This will set objectives, define the means needed to achieve them and prioritize. This program will be closely linked to the course of public expenditure. Safety valves should be put in place which will ensure the progress of these two sides of the budget, which are expected to play an important role in the exercise of economic policy at the national level, after the transfer of competence

- Spasmodic moves that create reactions and reflect the state's inability to capture taxable income in its entirety, while fragmenting the systematicity of tax law, resulting in legal uncertainty.

-The lack of stability and predictability of the tax system which creates deterrent mechanisms in attracting foreign investments.

- The complexity and continuous change of the tax provisions that create interpretive anchorages and obstacles to the creation of a stable development regime.

To reform the tax system, it is deemed necessary:

-To improve the relationship between direct and indirect taxes, either by reducing indirect taxes, which are the most unfair, or by abolishing taxes that do not keep pace with today's economic and social needs and cause a high tax burden

-To maximize the degree of integration of the underground economy into the legal economy since both tax evasion and the underground economy increase and feedback on the unequal distribution of tax burdens.

- To make use of all the possibilities of the control mechanisms to combat tax evasion

- To protect incomes that are below the limit of tolerable living, as well as incomes at the family level.

Proposals of the Panhellenic Federation of Taxpayers 2004

Some proposals of the Panhellenic Federation of Taxpayers are:

- The increase of the tax-free limit to 12,000 euros for all taxpayers, with the parallel establishment of an additional tax-free limit for employees and pensioners in the amount of 1,000 euros, provided that the income comes exclusively from wages and pensions and is below 18,000 euros.
- The establishment of a family tax-free income of 18,000 euros, in cases where one of the two spouses does not earn income.
- The increase of the tax deduction for one child to 300 euros, to 400 euros for each child, when he has up to two dependent children, and to 500 euros for each child when he has up to three children.
- The abolition of the granted deduction of family expenses for the purchase of goods and services with receipts.
- The simplification of the personal income tax declaration form, so that the average citizen is able to know the tax he has to pay based on the declared incomes.
- Reduction of tax rates for new businesses, in industries with high added value and for businesses operating in selected areas and with a specific activity.
- The abolition of the 55% withholding tax for the first three years of operation of new businesses and its gradual reduction to 25% for the remaining businesses.

Finally, the establishment of a committee to study the decisions of the European courts and to seek solutions for the settlement of the problems arising from the improper application of the provisions of the conventions to avoid the imposition of double taxation.

IOBE 2018

In the April 2018 IOBE study on income taxation in Greece, a comparative analysis was made and tax reform proposals were presented. The study was carried out under the auspices of the DiaNEOSIS Research and Analysis Organization and resulted in the following proposals:

- Reduction of top and intermediate tax rates that will strengthen and provide incentives for employment, promote business activity through investments in Greece and limit tax evasion and avoidance, as well as the accumulation of overdue debts.
- Limiting the number of marginal rates to one or two would make the system simpler and reduce the tendency for tax shifting and tax avoidance.
- Broadening the tax base by reducing tax deductions would serve the redistributive role of taxation.
- The gradual abolition of subsistence presumptions for the determination of the taxable base, in order to make the tax system more efficient, to consolidate economic justice and equality and to simultaneously have tax audits through electronic systems.
- The imposition of new extraordinary and additional taxes on declared incomes is not proposed, because it does not promote economic justice and undermines taxpayers' confidence in the system.

- To limit tax evasion and restore economic justice in personal income taxation, the use of plastic money and electronic business invoicing must be further spread, combined with the intensification and special targeting of tax audits.
- Faster resolution of tax disputes and imposition of strict penalties.
- There should be an evaluation of the tax legislation. This will be achieved by annual planning of the legislative work and simplification of the tax legislation by publication of reports of what happened on a six-monthly basis and mandatory analysis of the effects of each tax bill and each amendment and an evaluation of the implementation of the tax legislation when it comes into force and after.
- In the context of economic efficiency, the number of personal income tax brackets should be reduced to one to two at most.
- Taxation redistribution mechanisms must be promoted through public spending and not through taxation.
- It is proposed to strengthen and administratively reorganize tax authorities by staffing them with a sufficient number of employees in tax control.
- Creation of electronic tax administration by modernizing tax administration through information systems. The performance of the tax collection mechanism is an important factor for the efficiency of the tax system.
- The reduction of compliance costs, the faster service of taxpayers and the improvement of the efficiency of the tax authorities, the limitation of corruption incidents, the strengthening of the trust of citizens in the tax system will be achieved through the reorganization of the tax administration.

Pissarides Committee

The report of the Pissarides committee regarding the development plan for the Greek economy discusses the issue of taxation and points out its important features. It examines the period from 2010 to the present day and reports that during this period there has been a gradual percentage increase in tax revenue from 32% to 38.9% with 2012 figures on the ever-shrinking GDP relative to the Eurozone average. There is a disproportionate tax burden on labor, energy products and real estate. This burden is cumulative, and it should be taken into account that the disproportionate burden on real estate is added to labor and these are added to the excess on energy products and indirect taxation. This disproportion in the structure of tax revenues creates and not only reflects the chronic distortions of the Greek economy. The chronic distortions of the Greek economy are the large number of self-employed, the high shadow economy, low productivity and added value, the small percentage of the economically active population linked to high tax rates on declared work and high unemployment and high dependence on consumption. Among the proposals of the Pissarides committee we can summarize that they are the following:

- The simplification of the tax system
- Its transfer to the local level, i.e. to the level of municipalities
- The harmonization of tax burdens, rates in the individual sources of income, reformation of the rates and income tax scales with a proportional adjustment to the average of the Eurozone counterparts
- The most favorable taxation for mechanical equipment investments
- The establishment of a stable tax framework
- The restriction on the smuggling of fuel and tobacco
- The reduction of taxation on energy products
- Strengthening the incentives for shrinking the shadow economy and
- The strengthening of savings in households and
- The removal of disincentives for the purpose of expanding companies

These proposals include the rationalization of tax burdens on real estate, the simplification and security of the tax regime, the stimulation of middle incomes and to give new possibilities to the development of the Greek economy. The administrative courts that adjudicate tax disputes must also be uncongested. It is fundamental to modernize the tax administration so that it can respond with competent executives to the service of the public interest and the removal of obstacles to the development of the private economy. It is also important to legislate favorable and safe tax frameworks to become incentives for attracting venture capital.

Reports of International Organizations

According to the report published by O.O.S.A. entitled "Tax Policy Reforms 2018" which explores the period 2007-2016, in Greece taxes increased by 7.4% as a percentage of GDP. and for the period 2015-2016 the tax burdens increased by approximately 3%. That is, almost half of the tax burdens of the time 2007-2016 occurred in the time period 2015-2016.

Income tax as well as insurance contributions are the most significant burdens cumulatively in Greece. In the field of real estate taxation, Greece occupies one of the five positions in the ranking of the countries with the highest burdens.

Conclusions – suggestions

Successful steps have recently been taken to increase tax compliance and are reflected in higher revenues. However, tax evasion is still considered very high, and the government must make continuous and decisive efforts to strengthen the tax mechanism.

Issues	Tax System Reform Committee 2002	Bar Association 2010	IOBE 2018	Current essay	Comments
Tax modernization	Tax simplification	Unified progressive tax scale for all incomes, e-invoicing, e-government in tax audit and electronic interconnection of state authorities and market players	Reduce the number of income tax scales to a maximum of two. Further spread the use of plastic money and electronic invoicing. Simplification of tax legislation	A single tax scale should be prepared for each year for all incomes of persons, with the differentiation of certain incomes, from paid services and pensions, from agricultural enterprises and from real estate	Common recommended for simplification of the tax system legislatively and with the use of new technologies
Exemptions / discounts / tax free	Abolition of a series of exemptions, deductions from income	Reduction of expenses with receipts at a rate of 100% of the expense. Maintaining most exemptions of a diplomatic or social nature	Reduction of tax deduction for personal income to be acquired in 2020.	Deduction of medical hospital expenses and certain expenses in whole or in part. Assessment of existing exemptions, discounts, tax incentives and removal of unnecessary	Review of the framework of exemptions, reductions

Imputed determination of income	Elimination of all imputed off-balance sheet and special ways of determining taxable income	Extend the system of evidence, to act as evidence of expenditure and not of income and to be in line with the system of issuing evidence-based expenditure	Gradual abolition of living presumptions for the determination of the tax base through the improvement of the efficiency of tax audits, which will be implemented on a large scale by electronic means	Establishment of a special scientific committee to study the presumptions of living. The phasing out of the evidence should proceed with a comprehensive application of electronic payments in all categories of personal income	Common recommended for changing the operating framework of living criteria
Tax rates	Reduction of nominal tax rates	Review by a competent committee	Reduction of marginal tax rates	Reduction of tax rates	Joint proposal to reduce tax rates with beneficial effects on the economy

The following measures are proposed:

- 1) The tax (economic) scale, to be prepared for each year uniform for all incomes of individuals, on a scale, with the differentiation of certain incomes, from paid services and pensions, from agricultural enterprises and from real estate. In the general tax scale, the income scale will range from 5,000 euros to 45,000 euros and a tax rate of 5% to 45% for each step.
- 2) The taxpayers are entitled to deduct from the balance of the above profits the following expenses based on the legal supporting documents:
 - a) medical and hospital expenses with restrictions depending on the type and amount of net profits that may be reimbursed.
 - b) For certain expenses (private cars, plumbers, electricians, repairs of private houses, shops, etc.), which are not easy to determine, it is necessary to allow the deduction of these expenses, in whole or in part, based on legal documents, from the net profits of the persons who pay these expenses. In this way the payer of these expenses will be deducted in whole or in part from the net profits or net income, by reducing the income tax due and the issuer of the legal documents of the expense will increase the gross income and will reflect the real result. This will show the actual taxable income and the income tax due, and the taxable income generator will show the actual results (gains or losses).
 - c) The protected members for each person, which will be scaled starting from the paid services, pensions, agricultural enterprises, and other incomes.
- 3) A special committee should be set up with a chairman and members, who will have tax knowledge and experience in tax matters. It will assess the impact of the

tax system on economic activity, propose measures for fairer income redistribution and plan a comprehensive tax reform.

4) A drastic way to tackle tax evasion is the reduction of tax rates, the introduction of an effective system of sanctions for violators of tax provisions, the evaluation of existing exemptions, discounts, tax incentives and the abolition of unnecessary, the reform and simplification of tax legislation.

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The Impact of ERP Information System in the Internal Audit of the Company

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ABSTRACT

The majority of the companies. Although the necessity of the ERP system, the examination of the impact in the company's internal audit, is limited. This paper examine the impact of an ERP system from the internal audit of a company, and especially the quality of the ERP system improves the quality of the effectiveness of internal audit. Based in a survey for Greek companies, the results indicate that the quality of the information system has positive effect on the effectiveness of the internal control system of the organization. On the other side, appears that the service quality provided by the ERP supplier has a negative relationship with the quality of the internal control functions of the ERP

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KEY WORDS

ERP System, Accounting Information Systems, Internal Audit, Audit, Accounting

JEL CODES

L86, M42, M41

Introduction

From the beginning of the 90s, information systems began to be introduced into the business environment. Their contribution seemed important since it came to replace the manual notification of the Management about the transactions, reducing the time and also the risk of incorrect or incomplete information.

Of course, even today, the working environment, and in particular the accounting and financial sector of a company, does not fully utilize all the capabilities of an ERP system, for fear of feeding the system with incomplete data and thus making wrong decisions. In addition, changes in accounting practices do not allow ERP systems to be adapted immediately and easily.

In particular for the control department of the company, the gathering of information in an information system, will provide full and direct access to the information required, so that they can implement their role more directly and seamlessly. By simply entering a transaction from the accounting department, the information is available directly to the production-sales-marketing department and also to the internal control department.

The complexity of these systems, combined with changes in accounting practices, often leads to incorrect registrations of transactions and therefore to incorrect information received by the internal control department, often leading to incorrect decisions

Literature Review

According to Saharia Koch and Tucker (2008), the internal auditors perceive a reduction in financial and operational risk and an increase in technical risks. These effects are somewhat mitigated by their ability to assess and manage these risks. Also, the internal audit departments satisfied their needs for ERP skills not by outsourcing but by providing staff with in-house training. Although various information technologies have been studied using the technology acceptance model (TAM), the study of acceptance of specific technology features for professional groups employing information technologies such as internal auditors (IA) has been limited. For that reason, Kim, Mannino and Nieschwietz (2009) extended the TAM for technology acceptance among IA professionals and tested the model using a sample of internal auditors provided by the Institute of Internal Auditors (IIA) and the result was that technology features were accepted by internal auditors in different ways..

Chen et al (2012) with evidence from the Republic of China (Shanghai, Beijing and Taiwan), studying the impact of ERP system on the role of accountants, found that besides compiling data and preparing financial statements the ERP system improve the auditing of the company, strength the internal control and reinforce its corporate governance. Similar results with empirical evidence for Taiwanese firms, found Tsai et al (2015). Their study suggests that a firm can improve through the ERP System, the performance for internal audit, while at the same time, the performance of the IAD can also contribute significantly to the company. Similar results, from Greece, indicates Kanellos and Spathis (2013). This empirical study, (175 accountants and 96 Information Technology's Companies from 193 Greek companies), found that the ERP Systems have Σύμφωνα με τα ευρήματα της έρευνας, τα συστήματα ERP have a positive effect on the accounting process.

Among the resulting accounting benefits is the improvement of internal control, which has a positive impact on the entire organization.

Hsiung and Wang (2014) study, also with evidence from Taiwan Stock Exchange, indicates that the factor of system and information quality, service quality, and internal control quality influence the internal control benefits of an enterprise include various ERP quality variables.

Elbardan et al (2015), formulate a conceptual framework that explains the reciprocal interplay between the macro external governance pressures, micro internal institutional logics inscribed in the ERP systems and their effect on IAF practices and structure within organisations.

Elbaran, Ali and Ghoneim (2016) examine how the internal audit function maintains its legitimacy when enterprise resource planning systems are introduced and find that enterprise resource planning systems impose an institutional logic of control based on interlinked assumptions. These assumptions motivate changes in the practice and structure of the internal audit function to become an integrated and comprehensive function to maintain its legitimacy. Elbardan, and Kholeif (2017) attempts to establish new claims to knowledge provide valuable opportunities to study the processes through which such claims are linked with attempts to expand and maintain the legitimacy of professional jurisdiction. Altschuller (2018), examines some ways to mitigate the risks associated with accounting information systems (AIS). A survey for the Portugal by Silva and Marques (2020), try to define, the combination for two themes ERP systems and maturity in Internal Audit. In order to assess the existence of a relationship between the adoption of these systems and the levels of maturity in internal auditing, their survey was conducted through a questionnaire to internal auditors in Portugal. Sar and Garg (2022), empirically

identified and verified four dimensions of risks related to ERP implementation, which are human risk, managerial risk, technical risk, and organisational risk and found that these factors contribute to 72.64% of the associated risks.

Methodology

The survey examines the usefulness of ERP Information Systems for the Internal Audit Department. The sample, was 61 companies, with Internal Auditors in Greece.

DeLone and McLean (2003), with the success model information system (D&M), support that the quality of an ERP Information System, effects the benefits from the ERP System, as well as the quality of services that the supplier of ERP System provides.

For that reason the following hypotheses proposed to examine :

H1 : The quality of ERP Information System has positive correlation with the improvement of effectiveness of Internal Audit and

H2 : The quality of services from the supplier of the ERP System, has positive correlation with the improvement of effectiveness of Internal Audit.

According to Wright and Wright (2002), although the orientation of an ERP system, it is possible to underestimate or “underfunction” the full benefits of the system, if the internal audit department, didn’t fully understand the functions or if there is no effective communication with the supplier of the ERP System. Therefore, an effective model of communication, that will help to raise the fidelity and the confidence will be helpful for the internal auditors, in order to implement their

knowledge. For this reason, the ERP System will help to implement the internal audit. The next hypothesis proposed to examine is :

H3. The quality of communication with the supplier of ERP Information System, has positive correlation with the implementation of the result of Internal Audit Department

According to Hsiung and Wang (2014) it is important for the ERP System to be equipped with internal auditing mechanisms in order to improve its effectiveness. So, the final hypothesis to examine is :

H4 : The quality of functions of ERP System's internal audit, has positive correlation with the improvement of effectiveness of Internal Audit Department.

To test our hypotheses, we collect with questionnaires the sample, and use the statistical program IBM SPSS. For testing of normality, the test Shapiro-Wilk has been used, suitable for small samples.

For the test of correlation between the variables, spearman correlation coefficient used, which is non-parametric statistic measure.

Finally we use regression for find relationship and mathematical models for the variables.

The used variables are :

SYSTEMQ : The quality of ERP System

SERVQ : The quality of services from the supplier of ERP System

COMMQ : The quality of communication with the supplier of ERP System

INCQ : The quality of functions of ERP System's Internal Audit

Shapiro-Wilk Test of Normality

As we noticed, Shapiro-Wilk test, is suitable for small samples. If p value (Sig) > 0.05, then the variables follow normal distribution. But if p value (Sig.) <0.05, the variables do not have normal distribution

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Shapiro-Wilk Test of Normality Variables	Statistic	Sig.
SYSTEMQ	,789	,000
SERVQ	,792	,000
COMMQ	,772	,000
INCQ	,660	,000

Correlations

For testing the correlation between the variables (positive or negative) and how strong they are, and because there is no normal distribution, the Spearman Rank Correlation Coefficient Ps is used. Prices for Ps are always between -1 and 1. Prices near -1 or 1, means strong correlation. For the Sig (2-tailed) or else p value, that indicates statistically significant, the price for this indicator (p value) must be <0.05.

The following table, appear the correlations between the quality of ERP System with the effectiveness of Internal Audit Department.

	EFFECT	SYSTEMQ	SERVQ	COMMQ	INCQ

EFFECT Correlation Coefficient	1,000				
Sig. (2-tailed)					
N	51				
SYSTEMQ Correlation Coefficient	,344*	1,000			
Sig. (2-tailed)	,013				
N	51	51			
SERVQ Correlation Coefficient	,275	,741**	1,000		
Sig. (2-tailed)	,051	,000			
N	51	51	51		
COMMQ Correlation Coefficient	,433**	,576**	,801**	1,000	
Sig. (2-tailed)	,001	,000	,000		
N	51	51	51	51	
INCQ Correlation Coefficient	,102	,512**	,321*	,217	1,000
Sig. (2-tailed)	,477	,000	,021	,126	
N	51	51	51	51	51
*. Correlation is significant at the 0.05 level (2-tailed).					
**. Correlation is significant at the 0.01 level (2-tailed).					

From the above results, , only the quality of ERP System (SYSTEMQ - variable) and the quality of communication (COMMQ variable) has positive correlation and significant correlation with the Effectiveness of Internal Audit Department (Ps = 0.344 and 0.433 while the p value are 0,013 and 0,001 for each of the variables).

Furthermore, the quality of ERP System (SYSTEMQ-variable), appears strong positive correlation and significant correlation with the quality of services from the supplier (SERVQ-variable), the quality of Communication with the supplier (COMMQ-variable) and the quality of functions of Internal Audit (INCQ-variables) (with Ps=0.741, 0,576 and 0.512 while the p value is 0.000 for all the variables).

The quality of services from the supplier (SERVQ-variable), appears strong positive and significant correlation only with the quality of Communication with the supplier (COMMQ-variable) and the quality of functions of Internal Audit (INCQ-variables) (Ps=0.801 and 0,321 and P value 0.000 and 0.021)

Regression models

The Regression model for the analysis, proposed to be the following :

$$EFFECT = \beta_0 + \beta_1 SYSTEMQ + \beta_2 SERVQ + \beta_3 COMMQ + \beta_4 INCQ$$

The results, appears in the table below.

Table II: Regression

Model	Unstandardized Coefficients		Standardized Coefficients Beta	t	Sig.	Collinearity Statistics	
	B	Std. Error				Tolerance	VIF
1(Constant)	2,327	,694		3,355	,002		
SYSTEMQ	,459	,222	,448	2,064	,045	,363	2,755
SERVQ	-,445	,264	-,442	-1,687	,098	,249	4,023
COMMQ	,521	,229	,490	2,276	,028	,369	2,711
INCQ	-,183	,179	-,156	-1,017	,314	,722	1,385

Dependent Variable: EFFECT

F = 3,126 R square = 0,214 Adjusted R square = 0,145

The model appears good adjustment (F=3,126, p value = 0.023) and explains the 21,4% (R2= 0.214) of effectiveness variability of Effect. Also, the tolerance and VIF multicollinearity control measures have been calculated. Values for VIF >5 are considered as an indication of multicollinearity so we do not observe such a thing. From the results of the regression test we conclude the following relationship between the dependent and independent variables

$$EFFECT = 2,327 + 0,459 SYSTEMQ - 0,445 SERVQ + 0,521 COMMQ - 0,183 INCQ$$

As a result, the Quality of the ERP system (SYSTEMQ) has a positive effect on the Effectiveness of the EFFECT ($\beta_1 = 0.459$, p value = 0.045) so hypothesis H1 is supported. This result agrees with the research result of Hsiung and Wang (2014).

Service Quality (SERVQ) has a negative effect on the Effectiveness of the ESS ($\beta_1 = -0.445$, p value = 0.098) so hypothesis H2 is not supported. This result does not agree with the research result of Hsiung and Wang (2014). The Communication Quality (COMMQ) has a positive effect on the Effectiveness of the CEE ($\beta_1 = 0.521$, p value = 0.028) so hypothesis H3 is supported. This result agrees with the research result of Hsiung and Wang (2014). The Quality of Internal Control Functions (INCQ) has a small negative effect on the Effectiveness of the ESS ($\beta_1 = -0.183$, p value = 0.314), so hypothesis H4 is not supported. This result does not agree with the research result of Hsiung and Wang (2014). SYSTEMQ and COMMQ variables are statistically significant while the others (SERVQ and INCQ) are not.

Conclusion

Regarding the quality factors of the ERP system that influence the effectiveness of the Internal Control System, initially a moderate positive relationship was found between the Quality of the ERP system (SYSTEMQ) and the Effectiveness of the Internal Control System (EFFECT). This means that the quality of the information system, i.e. when it is effective, easy to use, with many features, etc., positively affects the effectiveness of the EMS within the company. On the contrary, a moderate negative relationship was found between Service Quality (SERVQ) and

EFFECT. This means that the quality of the services offered by the ERP system provider, such as the provision of technical corrections or customized features on the ERP system, negatively affects the effectiveness of the ERP system.

Subsequently, a high positive relationship was found between the Quality of Communication with the provider (COMMQ) and the Effectiveness of the EE (EFFECT). Good communication with the ERP system provider can significantly improve the effectiveness of the EMS as it helps internal auditors understand the functions of the system so that they can use it in the most efficient and beneficial way for their work. In addition, a small negative relationship was found between the Quality of Internal Control Functions (INCQ) and the Effectiveness of the ESS (EFFECT). From this relationship we conclude that having the system equipped with internal control mechanisms has little negative effect on the effectiveness of internal control.

Finally, it was found that the differences in the use of the ERP system, the perceived usefulness and the perceived ease of use according to the gender and the level of education of the respondents are not statistically significant, so they do not affect these variables.

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BUSINESS PROCESS IMPROVEMENT (BPI) IN THE BANKING SECTOR UNDER THE PRESSURE OF A GLOBAL PANDEMIC

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INTRODUCTION: The COVID-19 pandemic has drastically affected the business context of all business organizations worldwide, regardless of their sector or size. In order to survive, organizations need to think strategically about their performance during and after pandemic periods, which necessarily involves improving their business processes. Thus, the pandemic brings rapid and unexpected opportunities to revisit routine operations and combine them with digital transformation and innovation. In terms of the lifecycle of a particular business process affected by the pandemic, organizations are forced to think creatively and innovatively, that leads to an escape from established practices and standards.

It is exactly that need to combine new knowledge and traditional activities that predetermines the consideration of any business process in the context of organizational ambidexterity, which implies equally good handling of conventional operations together with new knowledge and digitalization. This context implies that business process improvement should be fully integrated with the notion of constructive or positive deviance from routine operations, namely, voluntary behavior that deviates from organizational norms but stems from positive intentions and/or has positive consequences.

The pandemic has therefore not only forced changes, but also has provided the organizations with the opportunity to experiment by combining traditional operations and innovative digital actions. After the pandemic, this opportunity could be used to evaluate periods of change in order to build a more refined business process and find more flexible ways to model, execute, measure, and optimize the business process instead of automatically reverting to traditional procedures. The latter can help organizations emerge stronger from crisis and drastic change and meet future challenges with greater preparedness. Therefore, there is a close link between improving a commercial bank's business processes and achieving meaningful success in adapting to a rapidly evolving technological

competitive environment and under pressure from factors such as the global pandemic and increasing sustainability-related requirements and regulations.

By achieving process-oriented management and business process improvement, not only is the bank's organizational and operational efficiency enhanced, but also the opportunity to develop digital innovation in each of its business processes. The implementation of an organizational ambidexterity that includes an equally strong handling of both routine well-secured operations and IT innovations appears to be a key factor in the success of the bank's process-oriented management and in the ability of its management to meet global challenges.

AIMS OF THE RESEARCH: The research aimed at studying the business processes in a Bulgarian commercial bank during pandemic based on deep theoretical research in the context of ambidexterity seen as a combination of factors that facilitate the improvement of business processes. This context allows organizations to use both exploration and exploitation processes equally in improving their business processes. In every banking business process, there is a need to look for opportunities for the new knowledge and digital transformation to be in balance with the flow of the routine banking process itself. In this regard, there is also a focus on organizational learning and on the processes through which members of an organization acquire new knowledge related to its environment, functions and culture.

RESEARCH HYPOTHESIS: Based on profound theoretical study and holistic observation, bank documentation, strategical papers and internal analysis exploration, the author examines three possible hypotheses, as follows:

- In the course of a business process improvement in a commercial bank under the pressure of a global pandemic the level of routine operations and security requisites (exploitation processes) is much higher than the level of the digital transformations and innovations (exploration processes).
- In the course of a business process improvement in a commercial bank under the pressure of a global pandemic the level of digital transformations and innovations (exploration processes) is much higher than the level of routine operations and security requisites (exploitation processes).
- In the course of a business process improvement in a commercial bank under the pressure of a global pandemic the level of digital transformations and innovations (exploration processes) is almost equal with the level of routine

operations and security requisites (exploitation processes) and the exploration and exploitation processes are very well balanced.

THEORETICAL BACKGROUNDS - BUSINESS PROCESS IMPROVEMENT: In order to meet the challenges of competition and the pandemic, as well as customer expectations for digitalization, banks are changing and improving their business processes. Business process and the process approach are a much-developed topic in the academic literature and in practice, and authors such as Roeser & Kern (2015) highlight the steadily growing academic and practitioner interest in business process issues over the last ten years. A company's competitiveness and profitability is highly dependent on its business processes (Lientz & Rea, 2001), and solving business process problems can lead to increased customer satisfaction and reduced time and costs (Madison, 2005). Business process improvement is a good scientific and practical basis for business improvement (Siha & Saad, 2008). Processes should be executed efficiently and effectively and managed in an effective manner (Rummler et al., 2010). Business process management plays a central role in creating competitive advantage as an approach to achieving organizational goal through the improvement, management and control of core business processes (Jeston & Nelis, 2006), and empirical research confirms the positive relationship between management and business process improvement and business success (McCormack et al., 2009).

Information technology-based solutions are key to business process improvement initiatives. With the traditional focus on process analysis (e.g., statistical process control) and process modeling, IT solutions related to business process management are increasingly manifesting in the form of process-aware information systems (Dumas et al., 2013). Process awareness means that the software has an explicit match to the process to be executed. Such process awareness may be the result of input data in the form of process models or may be more implicitly embedded in the form of hard-coded processes, as in traditional banking or insurance applications.

Business process management can be defined as a systematic approach to improving an organisation's business processes (including their design, implementation, control, analysis and optimisation) that combines management methods and techniques with IT tools. Collaboration between IT experts and business users in this area is aimed at developing applications that provide effective integration of people, information and other resources, subordinated to the task of

organizing the organization's processes to support the achievement of strategic goals.

Business process management has its own lifecycle including five main stages - planning (design), modelling, implementing (deployment), controlling (monitoring) and improving (improvement). The framework to be identified should comprehensively structure these elements of the process management lifecycle, following a holistic understanding of business process management, i.e. as an organisational capability and not just the execution of tasks during the lifecycle of an individual process. This requires an organisation-wide perspective and identification of the key areas that are relevant for successful business process management.

IT solutions for process design and modelling include (semi-) automated support that enables the extraction of process models from log files (process mining), as well as instrumental support for business process modelling and analysis such as process animation or process simulation. IT-supported process implementation and execution focuses on the automated transformation of process models into executable specifications and the subsequent workflow-based execution of processes. This also includes related solutions such as business rule engines or systems management. This whole category of software is often referred to as "information tailored to processes and in systems" (Dumas et al., 2013). The recent increase in information processing capacities of PAIS, e.g. through in-memory databases, enables the application of new process design principles, including real-time and context-aware process management (vom Brocke et al., 2014).

THEORETICAL BACKGROUNDS - ORGANISATIONAL AMBIDEXTERITY:

An organization is considered ambidextrous when there is a balance and relatively equal emphasis on both exploration and exploitation processes (O'Reilly, 2011). However, exploration processes, which involve new knowledge, digital transformation, innovation, etc., are fundamentally different from routine operational processes. Therefore, the simultaneous implementation of both types of processes becomes a challenge for the organization (He, 2004).

The above considerations point to the need for a new approach to management in which the focus shifts from the individual to organizations as complex adaptive systems that allow for the continuous creation and capture of knowledge, the use of generative organizational activities can lead to both exploratory and exploitative knowledge processes (Vera, 2004).

Such views allow and encourage individuals to make their own judgments about how to divide their time between conflicting demands of compliance and adaptability (Tushman, 1996). The major dilemma facing organizations in this context is finding mechanisms that allow sufficient operability to ensure its current viability and at the same time devote sufficient energy to exploration to ensure its future viability (He, 2004). They suggest, for example, that managers should allow employees to exercise their own judgment and need for new knowledge. To address this challenge, some authors have argued that such a balance can be achieved by using accumulated knowledge and routines in parallel and simultaneously with the acquisition of new knowledge (He, 2004). The different combinations of factors that facilitate the exploration and use of knowledge represent different types of knowledge corridors. Such corridors potentially allow employees to change the way they interpret their perceptions and create new knowledge, using both exploration and exploitation of new information, skills and processes to do so (He & Wong, 2004).

The ambidexterity context is seen as a combination of factors that facilitate positive workforce behaviours, such as openness to creative ideas, valuing healthy communication with colleagues and management, and a management style that values all employees and their contributions (O'Reilly, 2008). This context allows organizations to use both exploration and exploitation processes equally.

To this end, managers must actively develop an ambidextrous context that maintains a balance between exploration and exploitation (Cegarra-Navarro, 2007). An ambidexterity context that aims to foster organizational learning should promote knowledge sharing throughout the organization by encouraging different types of learning processes (Cegarra-Navarro, 2007). In this way, by supporting continuous learning, dialogue and team learning, organizations are able to strike a balance between flexibility in terms of organizational procedures and increased participation in decision-making, promoting values such as risk-taking and personal involvement. This specific type of context allows managers to achieve their goals and encourages continuous improvement of existing processes.

Ambidexterity manifests itself through attributes such as well-informed and motivated staff, which calls for employees to make choices between alignment-oriented and adaptation-oriented activities in their daily activities (Birkinshaw, 2004). From the employees' perspective, they benefit from the ambidexterity context by having access to better knowledge structures, by enjoying support from management when needed, and by feeling that their work is meaningful and valuable to the company.

There is consensus on the importance of maintaining an appropriate balance between new knowledge and traditional functionalities in order for organisations to succeed in the current socio-economic context (Birkinshaw, 2004). Different combinations of factors that facilitate knowledge exploration and use represent different types of knowledge corridors. Such corridors potentially allow employees to change the way they interpret their perceptions and create new knowledge, using both exploration and use of new information, skills and processes to do so (He, 2004). In this sense, the knowledge corridor concept emerges as a valuable prerequisite and opportunity for knowledge sharing within the organisation. The term "knowledge corridors" refers to structures or procedures that provide employees with mechanisms and therefore the opportunity to explore new perceptions, new knowledge, and the possibility of rejecting or accepting them (Martelo-Landroguez, 2014).

This suggests that ambidextrous organizations are companies capable of both leveraging existing routine processes and competencies and exploring new opportunities (Tushman, 1996). On the other hand, the context of ambidexterity at the organizational level refers to cultural factors that enable firms to balance the potentially conflicting demands of simultaneous knowledge exploration and exploitation processes (Birkinshaw, 2004).

Applied to business process management, ambidexterity theory (O'Reilly, 2011) postulates that the organisation should balance research and executive business processes, with the dual approach leading to increased business efficiency. Exploratory processes include things encompassed by terms such as exploration, variation, risk-taking, experimentation, play, flexibility, discovery, and innovation. Process execution includes things like refinement, selection, production, efficiency, selection, execution. Therefore, ambidexterity emerges as an organization's dynamic business process improvement capability that embodies a complex set of routines including decentralization, differentiation, purposeful integration, and the ability of senior management to orchestrate the complex trade-offs that the simultaneous pursuits of exploratory and executive business processes require (O'Reilly, 2011).

In view of the practical application of ambidexterity theory, one can consider, for example, its application in the context of the COVID-19 pandemic. In terms of managerial aspects, ambidexterity helps organisations to take a long-term view by trying to get more business value from the effects of the pandemic. For example, teleworking intuitively strengthens employees' self-management skills, including those for whom it may seem less obvious at first glance. Organizations can build on

this experience to provide more formal training for these skills and simultaneously promote lifelong learning. Organisations are also becoming more familiar with the full potential of communication tools. Given the social isolation due to the pandemic, the use of video chat has increased tremendously, both in personal and professional life. While such a population-wide adoption of an innovation would normally take several years, COVID-19 forced the change in just a few months to less than a year. Social technologies have opened the way to virtual community for everyday processes such as communication, attending events or webinars, and consuming services such as career advice or keeping appointments. Furthermore, social media can build on these applications for reasons of co-creation, namely to generate ideas from employees but also from external stakeholders and especially customers. Quite rightly, co-creation is central to innovation management and design thinking (De Koning, 2016).

The process of exploitation activities, on the other hand, is understood as accumulated procedural traditional knowledge that is essential to support processes such as the development, decision-making, production, efficiency, selection, implementation or execution of new services (Fernandes, 2014). The use of knowledge contributes to understanding and predicting the effects of knowledge already acquired by the organization and often implemented in the form of routine procedures.

Based on the above definitions, it can be said that "exploratory activities" facilitate the use of available information to explore new opportunities in customer relationships. In addition, 'exploitation activities' allow members of the organisation to analyse, interpret and understand the information available for internal use. It can be argued that organisations need to actively develop both process exploration activities and process execution activities to facilitate organisational learning and therefore the achievement of their strategic objectives (Fernandes, 2014).

Through the exploration process, the transfer of new ideas and knowledge from the employee to the organisation is ensured. At the same time, the new knowledge gained by the organisation flows back to the employee, influencing the way HR thinks and acts. In this dynamic process, not only does learning occur over time and at different levels, but also a tension is created between the ability of individuals to acquire new knowledge (feed-forward) and the use of what has already been learned (feed-back). In this organizational learning process, tensions arise when employees' use of existing knowledge impedes their ability to learn new knowledge, or vice versa. This tension occurs not only at the individual level but also at the

organizational level and this has been demonstrated by researchers through the concept of ambidexterity (Tushman, 1996; He, 2004).

BPI IN BANKS UNDER THE PRESSURE OF PANDEMIC AND THE FOLLOWING RAPID DIGITAL TRANSFORMATIONS: Although the above presented theoretical backgrounds have been applied in various fields such as information technology compatibility or knowledge ambidexterity, for the purpose of this study the focus is on ambidexterity in management and business process improvement in a commercial bank. Balancing knowledge exploration and use is crucial for ambidexterity in business process management, which can also lead to tensions or conflicts regarding convergent and divergent thinking. For example, balancing efforts are necessary when different goals are being transcended, such as standardization versus flexibility, following different business trends, or integrating different process variants and different technologies in commercial banks, especially during global pandemic or in cases of merges and acquisitions.

A successful digital transformation encompasses several elements that the bank follows. First and foremost, these are innovations that are not created by a few people in the organisation working in an isolated lab. A truly innovative company embeds the spirit of innovation throughout the organization. It's a mindset shift for the entire company. Innovation is driven by technology. But technology alone is not enough. It's only relevant when it helps make our lives easier. That's why useful applications of technology that reconcile several different solutions simultaneously - such as mobile interfaces with artificial intelligence - that's the thing that creates added value and utility in banks that need to compete severely in post-covid surroundings.

Secondly, a transformation is successful strategically when a banking institution is relevant to its customers by focusing on its core business, i.e. providing excellent and impeccable banking services. But when the bank sees that customers have no problem buying banking products from the big technology players, then the bank has to make sure that it in turn also increases its relevance to its customers by offering them services from outside banking. Services that are important to customers and that they would be happy to get from their bank with a single contact. There is no doubt that banks are competing with fintech companies in this transformation. But partnering with fintech can even become a success, for the banking industry, for fintech companies and ultimately for customers.

Third is security - in this transformation to digital channels, the bank works for the trust of customers and pay close attention to the security of their personal data. A key driver going forward is the advisory role in branches and contact centres, while mobile apps and digital services remain and even move beyond banking. But all these services are data driven. Being there for your customers also means offering the right services at the right time through the right channel. Delivering such personalised services in an increasingly digitised world can only be done by knowing the customer, and that is driven by data and its proper use.

Information technology refers to the software, hardware and information systems that enable and support process activities. As indicated, the evaluation of IT as one of the key elements of business process improvement is structured in a similar way and also relates to the life cycle stages of processes. Like methods, IT components focus on the specific needs of each business process lifecycle and are evaluated from perspectives such as adaptability, appropriateness of automation, and integration with complementary IT solutions, e.g. social computing, mobile applications, cloud computing, business rules engines. Additional evaluation criteria cover the complexity, suitability, accessibility and use of specific IT within each stage.

Process control and measurement solutions facilitate (semi-)automated processes, process improvement management, exception handling, performance visualization (i.e. dashboards) and process control. There is a high demand for these types of solutions to be integrated into the corporate landscape (e.g. through a balanced scorecard of system performance indicators). Process improvement and innovation tools provide (semi-)automated support for creating improved business processes. These can be solutions that provide flexible (i.e. self-learning) tools that continuously adjust business processes based on contextual changes. Project management tools and process management programs facilitate the overall management of various types of business process improvement initiatives.

Human capital is among the most important factors for successful digitization in the bank. Automation, digitalisation, remote banking are cutting the branch network and radically changing the requirements for staff. There has been an increase in the demand for "non-banking staff" for banks. The reason for this is not only the vaults themselves, but also the high-tech centres that are being created around them on our territory. Digitalisation is replacing the traditional counter work, which conventionally speaking required specialists who graduated in Finance and Credit. However, working remotely with customers places new demands on the education and qualifications of staff. Banks are looking for people with an IT background, a degree in telecommunications, a degree in administrative services, and an

understanding of human resources. Traditional banks are already heavily influenced by internet banks and are trying to emulate them because they may be the future. Revolut and PaySera are already working in Bulgaria and Bulgarian banks will emulate them.

BPI AMBIDEXTERITY IN BANKING: In the context of a commercial bank, for example, knowledge exploration potentially provides branch network employees with new opportunities that are identified as a result of sharing customer information. In addition, the multitude of services offered by banks, combined with the wide variety of their customers' needs, make the processes of research, exploration and discovery of new knowledge an important mechanism to help identify and adopt appropriate financial products and alternative solutions to meet their customers' requirements.

It should also be noted that the banking business is very complex and requires intensive use of such activities to operate competitively. Individual members of banking institutions, both at the staff and management levels, need access to relevant and up-to-date knowledge in their efforts to effectively deal with a number of business challenges, including increasing complex customer demands, global competition for deposits, loans and underwriting fees, shrinking profit margins and the need to be adaptable to new technologies. In addition, banks need expertise in providing services to different categories of customers, which include individuals, associations, businesses and community organisations, each with different service requirements, including money saving, money transfer, loans and foreign trade services.

In the context of digitalization and rapid transformation of banking services and products, there is a need to combine the execution of traditional banking operations with the adoption of a large volume of new knowledge, without which bank employees at almost all levels could not continue to perform their work commitments.

In every banking business process there is a need to look for opportunities for new knowledge, research and innovation to be in balance with the flow of the routine banking process itself. In this regard, it is important to pay particular attention to organisational learning and to the processes through which members of the organisation acquire new knowledge related to its environment, functions and culture. Organizational learning is also a tool used to support collaboration among employees by requiring assessment along the following two critical dimensions:

- employees in the organization who explore new facts or procedures, and
- employees who use and apply knowledge already available in the organisation.

Furthermore, such a balance becomes imperative when changes are undertaken in the organisation and the aim is to stimulate employee activism to support these changes. Improving employee commitment to an organization and its vision is a key challenge for managing and improving business processes, especially in the banking sector. In a sector that is under pressure from multiple directions, human resources (e.g., assistant managers, finance managers, and branch managers) cannot always "manage" the tension between exploring new practices, accumulating new knowledge, and leveraging old operations (Birkinshaw, 2004).

Furthermore, the benefits of emerging technologies such as artificial intelligence and robotics can prove their usefulness and ease of use (i.e. two determinants of IT adoption) more smoothly. Machine-based but also intelligent robots can help reduce the need for close human contact and thus reduce the likelihood of virus transmission, while providing high quality services (e.g. in hospitals for patient monitoring, in nursing homes for physiotherapy exercises, at customer service desks for quick responses to customer concerns and in warehouses for intelligent inventory management). While artificial intelligence has already proven its value for customer differentiation reasons, COVID-19 may bring about the necessary mind-shift (or digital mindset) towards faster adoption of such technologies due to the fact that people are getting used to rapid change, remote working and the support capabilities that IT can offer. As AI applications are likely to advance further in the near future, organisations will be better able to cope with ever-increasing high customer expectations.

CASE-STUDY: Under research is the Business process improvement in the innovative web-based Trade Finance Portal platform of a leading Bulgarian commercial bank. It includes business process improvement through:

- a. Enabling online banking transactions via QES
- b. Ability to upload supporting documents online
- c. Ability to use the portal as a communication channel with the bank's experts

Description of the Improved Business Process: Through an innovative web-based platform, fully online, the bank's business segment customers can submit orders for letters of credit, bank guarantees, collection and other instructions in connection

with documentary transactions signed with Qualified Electronic Signature (QES). The bank examined in this paper is the first bank on the Bulgarian banking market to offer such a solution to its corporate clients in order to streamline trade finance processes known to be time-consuming and related to physical document exchange. The Trade Finance Portal is an eIDAS compliant platform whose intuitive design facilitates quick completion and submission of orders, applications and other documents for bank guarantees, letters of credit, documentary collections. The customers can upload the documents accompanying the transactions (copies of contracts, pro forma invoices, agreed texts of bank guarantees and letters of credit) or use the portal as a communication channel with the responsible experts of the Bank's Trade Finance. All business customers of the bank who use e-banking have access to the portal. In order to guarantee the security of the clients, the developed electronic orders are in full compliance with the current rules of the International Chamber of Commerce Paris and international SWIFT standards. The Trade Finance Portal is fully protected by the bank's security systems and incoming information is kept strictly confidential in accordance with legal requirements.

The Trade Finance Portal is part of the overall concept of digital solutions for business developed by the bank. The bank has also introduced a process for digital signing of documents related to loans to business customers from SME and Corporate segments. The process allows fully remote exchange of both unilaterally signed documents by business customers (requests, declarations, etc.) and bilaterally signed documents with the bank (contracts, annexes, supplementary agreements). Through it, users can store information about their regular transactions in the field of trade finance; access it quickly and reliably, saving time for submitting orders for letters of credit, bank guarantees, collections and other instructions in connection with documentary transactions signed with a Qualified Electronic Signature (QES).

Following the intuitive design of the Trade Finance Portal, the new functionality enables customers to upload documents accompanying transactions (copies of contracts, pro forma invoices, agreed texts of bank guarantees and letters of credit) or use the digital portal as a communication channel with the responsible Trade Finance experts of the bank. Access to the portal and the "Templates" functionality is available to all business customers who use e-banking and who have created a profile for their company in the Trade Finance Portal.

In order to guarantee the security of the customers, the access to the functionality "Templates" is carried out with personal identification of the users. The portal is

fully protected by the bank security systems and incoming information is kept strictly confidential in accordance with legal requirements.

Evidence of the successful refinement of this business process is the fact that every third instruction for an Trade Finance product is initiated through it. The dynamics of communication and the increased interest of users, supported by their positive feedback, are the reason for the creation of new functionalities to improve the customer experience on the platform. The Trade Finance Portal is part of the bank's overall concept of digital solutions for business.

Through direct observation of this process improvement, interviews with participants in the process improvement and bank's documents and analysis the levels of routine operations and security requisites (exploitation processes) and the level of the digital transformations and innovations (exploration processes) were examined.

FINDINGS: In examining a particular Business process improvement in a commercial bank it was observed exactly this need to combine new knowledge and traditional activities that predetermines the consideration of any business process in the context of organizational ambidexterity. Especially at the phase of improving the business process all the participants in it experienced the necessity of equally good handling of conventional operations and the acquisition of new knowledge and skills.

The application of ambidexterity theory for the purpose of this study to business process improvement in the banking sector is a significant contribution of the author, as well as in terms of the use of ambidexterity analysis capabilities in the methodology of banking business process improvement.

The success of achieving a balance and alignment of business process research and execution in business process improvement is highly dependent on the success of the process improvement itself and ultimately achieving increased business efficiency, quality and customer satisfaction.

The application of organisational ambidexterity theory to business process improvement is of particular relevance and importance in the context of the COVID-19 pandemic and growing challenges facing the banking sector of various kinds. Once the global pandemic is over, organizations will need to rethink their future work, where efforts to balance research and business process execution are likely to become even more significant. Efforts to continue and accumulate more and more new knowledge and research in the course of work are likely to clash with the desire to return to traditional pre-pandemic operations and business processes, and a clash

is possible between openness and reluctance to work remotely, or between having primarily real-life social interactions versus digital connectivity. Senior managers will need to make strategic decisions about which business models they wish to implement through improved business processes and apply change management accordingly to spread the appropriate organisational culture among employees. The aforementioned examples also illustrate that to explore business processes and their management and improvement, both scholars and practitioners will feel the need to generate new knowledge to overcome the uncertainty created by the pandemic and to respond to new challenges.

The three proposed processes are described below.

- Continuous learning structures are factors that provide employees with opportunities to explore, reject, or accept new or modified knowledge structures. That is, they allow employees to consider alternative interpretations of information available in the organization. This potentially allows individuals to change the way they interpret their perceptions and create new knowledge.
- Organisational structures facilitate exploration and dialogue. An example of this is how organizations facilitate the adoption of new individual habits in situations where individuals are both aware of the need to change existing habits, but are also insufficiently motivated to change their old habits and routines.
- Finally, team learning thrives when employees respect each other's views. In this way, they will be able to collaborate and share ideas to create a new shared understanding that will become new knowledge for the organization.

LIMITATIONS: The research is basely theoretical and provides mainly a theoretical tool in some of aspects of business process improvement. The empirical limitations come from the restricted opportunities to explore some of the business processes in the banks due to their specifics. Although completed mainly through the methods of observation and documentation, the results provide a vast range of possible practical implementations mainly on a managerial level.

Although ambidexterity theory is beginning to find its way into the management and business process improvement literature, it is still applied in a rather abstract and scientific way rather than in a concrete and practice-oriented way, being less accessible to managers and therefore less likely to be implemented in large-scale organizational practices. Furthermore, as knowledge of digital process innovation and emerging technologies advances research success factors need further investigation.

CONCLUSIONS AND RECOMMENDATIONS:

And here comes the application of the theory to a Bulgarian commercial bank. The COVID-19 pandemic changed the banking sector in a huge way. The traditional approach to banking products and services, to traditional jobs and processes, is being seriously challenged. Adjusting to the new reality created by the pandemic has led to a number of changes in the business processes of banks - the increased digitalization of products, services and organizational relationships, the challenge to the traditional workplace and human resources, and most of all the rise of personalized, customer-centric solutions that now have much higher demands on all services and products, including financial ones. For bank customers, the change has been drastic - from branch banking to remote banking, moving to communicating with banks through digital channels or contact centers. This process was accompanied by major changes, which for a traditionally conservative sector such as banking was indeed a major organizational, technological and psychological transformation.

The theory of organizational ambidexterity and business process ambidexterity can find significant application in business process improvement in view of the fact that in the improvement of any business process there is a need for new knowledge, research and innovation to be in balance with the flow of the routine, traditional executive process itself.

Once the global pandemic is over, organizations will need to rethink their future work, whereby efforts to balance research and business process execution are likely to become even more significant. For example, tensions are likely to emerge between efforts to learn and unlearn, between being open or fighting against remote working, or between having primarily real-life social interactions versus digital connectivity. Senior managers then need to make strategic decisions about which business models they wish to implement through their business processes and implement change management accordingly to spread the same culture among their employees. The aforementioned examples also illustrate that to explore business processes and their management and improvement, both scholars and practitioners will feel the need to generate new knowledge to overcome the uncertainty created by the pandemic. Finally, building a process-oriented knowledge and research structure is perhaps one of the biggest steps in the ambidexterity of business process improvement because it formally impacts the heart of the organization. Nevertheless, this formalization is also a strong and clear signal to all employees that the philosophy and management approach of the business process ambidexterity is taken seriously and should be followed by all involved. However,

exploration processes, which involve new knowledge, innovation, etc., are fundamentally different from routine operational or exploitation processes. Therefore, the simultaneous implementation of both types of processes becomes a challenge for an organization. Describing research and operations activities as a dichotomous choice, some argue that when an organization invests in enabling its workforce to explore new knowledge, it must accept that they are less likely to fully exploit existing knowledge. By achieving process-oriented management and business process improvement, not only is the Bank's organizational and operational efficiency enhanced, but also the opportunity to develop research and innovation in each of its business processes.

The implementation of an organizational ambidexterity that includes an equally strong handling of both operations and innovations appears to be a key factor in the success of the bank's process-oriented management and in the ability of its management to meet global challenges. The pandemic has therefore not only forced, but also given organizations the opportunity to experiment by combining traditional operations and innovative research. After the pandemic, this opportunity should be used to evaluate periods of change in order to build a more refined business process and find more flexible ways to model, execute, measure, and optimize the business process instead of automatically reverting to traditional procedures. The latter can help organizations emerge stronger from crisis and drastic change and meet future challenges with greater preparedness.

KEYWORDS: Business process improvement; Banks; Organizational ambidexterity

JEL CLASSIFICATION CODES: M12; M15; G21; O30

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Widening Disparities Across Euro Area Core and Periphery Economies: Reflections on Aspects of Social Protection in Greece

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The provision of social protection is related to the existence of social risks and needs. We adopt a core-periphery dependency approach and comparatively explore the trajectory of specific social protection indicators in the aftermath of the 2008 socioeconomic crisis and the implementation of Economic Adjustment Programmes (EAPs) in Greece, Ireland, Portugal and Cyprus. Outcomes for the euro area periphery are contrasted to the euro area average and two core countries, Germany and France

Findings suggest that despite variations, disparities in aspects of social protection across the core-periphery spectrum are widened at the expense of the periphery and of vulnerable groups of the population. Such aspects include social protection expenditure and benefits in euro per inhabitant, unemployment and old age expenditure in euro per inhabitant. Greece, has severely regressed in terms of per capita social protection indicators, an outcome related to structural programmatic reforms. This tendency signals increasing risks for parts of the society which need to be addressed.

Keywords: Euro area, social protection disparities, Greece, economic adjustment programmes, core-periphery, structural reforms

JEL classification codes: European Integration (EUI18), Development Economics (DE13), D63: Equity, Justice, Inequality, and Other Normative Criteria and Measurement, H53: Government Expenditures and Welfare Programs, I38: Government Policy • Provision and Effects of Welfare Programs

1. Introduction

High current account deficits in the Economic Monetary Union (EMU) periphery (the cornerstone indicator of the EU regulation on the prevention and correction of macroeconomic imbalances) are considered excessive and as such they demand treatment via “supply-side, structural policies” (Tamborini, 2018, p. 5). Such “remedies” may include the modification of policies related to nominal unit labour costs inducing further flexibility of labour markets in order to enhance competitiveness. This type of structural policies or structural reforms may in turn aim at increasing the “allocation of productive resources of capital and labour under the doctrine of profit maximization and thus enhance efficiency translated into return” (Rodrik, 2017). Crucially, this course “inherently challenges social protection” (Dymski and Kaltenbrunner, 2021).

Following the international capitalist crisis, a set of structural changes in the functioning of the EMU, interconnected to the philosophy led down at its inception, was put in force (see Lapavistas, et al., 2018; Tamborini, 2018; Costantini, 2017; Gouliamos, 2014; Zeitlin and Vanhercke, 2014; Marzinotto et al., 2011;).⁶³ The approach of structural reforms endorsed through the “vehicle” of Economic Adjustment Programmes (EAPs) to the countries of the periphery in the EMU⁶⁴ namely Greece, Ireland, Portugal and Cyprus primarily focuses on increasing price flexibility and competition (De Grauwe and Ji, 2020) including, despite variations dependent on country specificities, some common denominators for all financed countries. The latter comprised, among other, of fiscal consolidation under a new budget framework, price and wage adjustment, structural reforms to the labour and product market and rigorous privatisation. Ensuing labour market reforms may encompass new measures influencing social protection such as “relaxing job protection, cuts in unemployment benefits” (De Grauwe and Ji, 2020, p.1). In Greece

⁶³ Which among other included a thorough reform in the direction of “...developing and strengthening the internal market, nurturing international trade and competitiveness, strengthened coordination of economic and budgetary policies (European Semester), an effective framework for preventing and correcting excessive government deficits (the Stability and Growth Pact, SGP), a robust framework for preventing and correcting macroeconomic imbalances, minimum requirements for national budgetary frameworks, and enhanced financial market regulation and supervision, including macro prudential supervision by the European Systemic Risk Board” COUNCIL REGULATION (EU) No 1177/2011 of 8 November 2011 amending Regulation (EC) No 1467/97 on speeding up and clarifying the implementation of the excessive deficit procedure <https://eur-lex.europa.eu/legal-content/EN/TXT/HTML/?uri=CELEX:32011R1177&rid=1>

⁶⁴ “If indispensable to safeguard the financial stability of the euro area as a whole and of its Member States, the ESM may provide stability support to an ESM Member subject to strict conditionality, appropriate to the financial assistance instrument chosen. Such conditionality may range from a macro-economic adjustment programme to *continuous respect* of pre-established eligibility conditions”. TREATY ESTABLISHING THE EUROPEAN STABILITY MECHANISM, T/ESM 2012-LT/en 27

alone, conditionalities and revisions agreed (firstly) under an EFSF umbrella (a temporary crisis resolution mechanism by euro area) and subsequently under the permanent European Stability Mechanism (ESM), involved 3,958 policy reforms labelled as structural, focusing on the fiscal, labour market and product market sectors (out of total 4.543) as categorised by the European Stability Mechanism (ESM) itself.⁶⁵ Therefore, it should be acknowledged that important conditionalities are bound to influence, reshape or impede key institutions and policies of concerned countries welfare systems by “imposing the adoption of measures that have an impact even on the provision of basic services in the field of social protection, education and healthcare” (Costamagna, 2021) for the sake of the financial stability target as was actually the case for all four countries of the periphery where social protection was restructured and expenditure reduced.

The conventional definition used for the scope of social protection encompasses “all interventions from public or private bodies intended to relieve households and individuals of the burden of a defined set of risks or needs, provided that there is neither a simultaneous reciprocal nor an individual arrangement involved” (European Union, 2019, p.8). The list of risks or needs that may give rise to social protection is, by convention, as follows: Sickness/Health care, Disability, Old age, Survivors, Family/children, Unemployment, Housing and Social exclusion not elsewhere classified”.⁶⁶ As elsewhere shown, social protection at the epicenter of policies is able to generate a buffer shield to income loss through income redistribution (Fritzell & Ritakallio, 2010). The income condition for workers depends among other factors “on social protection spending” which in turn “supports their disposable income and protects them against unexpected risks” (Koratzanis, 2021). The European Union (EU) provides that the promotion of social protection in relation to economic and social cohesion, is among the tasks of the Union (European Union, 2019, p.4). Furthermore, the quantity and quality of social protection takes on increasing importance in conditions where monetary policy, particularly in times of crisis (of booms and busts endemic to capitalism, De Grauwe, 2013) exacerbated by the EMU (Parker & Tsarouhas, 2018), would produce wealth inequality. What is more, the levels of such inequality are conventionally managed through the means of fiscal transfers and taxation (Creel and Herradi, 2019). In fact, the legacy of the crisis and policies followed in the euro area may well

⁶⁵ ESM. Programme Database. Conditionality <https://www.esm.europa.eu/financial-assistance/programme-database/conditionality>

⁶⁶ Social protection (spr) Reference Metadata in Euro SDMX Metadata Structure (ESMS) Compiling agency: Eurostat, the statistical office of the European Union https://ec.europa.eu/eurostat/cache/metadata/en/spr_esms.htm

have produced a deep divergence between the economies of the core and periphery (Laffan, 2016).

This paper investigates and reflects on aspects of social protection developed in Greece during the post-crisis period, which was marked by consecutive Economic Adjustment Programmes (since 2010). Furthermore, it seeks to identify the extent of social protection disparities in comparison to (a) the rest of the euro area, (b) core countries and (c) periphery countries across the post-crisis time span. A comparative approach which conceptualizes core and periphery countries across uneven development patterns between a centre of highly developed countries and a periphery of less advanced countries is employed (See Parker and Tsarouhas 2018; Amin, 2019; Petras and Weltmeyer, 2007) assuming that such uneven development and heterogeneity is more than ever manifested in the Monetary Union (see also Lapavistas, 2019; Laffan 2016). By using the core and periphery contrast, we mean highly developed core countries exploiting a less developed periphery (Wallerstein et al., 2013) in conditions where an EU structural reconstitution of capitalism is endeavoured — with hegemonic capitals as motors — a state of play which is enforced to the interior of unevenly developed states or even regions (Gouliamos 2014) where social inequalities continue to rise (Denk and Cournède, 2015), or become exacerbated by the crisis and newly institutionalised policies (Magone et al., 2016).

Developments in the domain of social protection in Greece, specifically the “level of pension fund cuts, the extend of privatizations, reforms of the social welfare systems” were deemed unacceptable even by ex-Commissioner for Economic and Financial Affairs P. Moscovici (in Georgakopoulos, 2018). Social Protection in Greece can be more clearly assessed when compared to countries in similar context and position, that is euro area periphery countries subjected to Economic Adjustment Programmes during the post-crisis period, such as Ireland, Portugal and Cyprus, and simultaneously contrasted to relevant developments in core euro area advanced economies such as Germany and France in order to identify latent disparities in an environment where arguably “national welfare states compete – and adapt their policies – to attract or retain mobile capital” (Van Apeldoorn, April 2012). To schematically locate a country across the core- periphery spectrum, social protection and welfare level analysis are critical, though not the sole criteria. Moreover, it is appropriate to examine social protection in the framework of reduced incomes, earnings and wages. As reminded by WHO (European Region, 2016), policies which aim at diminishing the risk of poverty and help to secure better incomes, simultaneously contribute to better public health. The combination of

more extensive social rights such as in the labour market, family and old age, plays a crucial role vis-a-vis public health.

2. Methods and Measures

Comparative data on social protection categories and/or functions constructed are estimated by following ESSPROS (European system of integrated social protection statistics ESSPROS — 2019 edition) and cover the following aspects: social protection expenditure in euro per inhabitant; General government social protection expenditure as percentage of total general government expenditure; General government social protection as percentage of gross domestic product (GDP); Unemployment expenditure in euro per inhabitant; Old age expenditure in euro per inhabitant; Social protection benefits in euro per inhabitant. Data are presented mostly in the form of consecutive three-year time span, starting from the onset of the crisis, 2008 until 2019 (in cases data were available only for 2010 and onwards). Data analysed reflect euro area average comparisons between core (Germany and France) and periphery countries (Greece, Ireland, Portugal and Cyprus) in order to arrive to illustrations of social protection disparities across time and across the development spectrum of the two conceptualised groups of economies, the core and periphery, with special emphasis in Greece. Finally, data presented and analysed exclude the pandemic period which impacted budgets due to additional financial burden, which may bias the purpose of the study. Therefore, analysis concentrates to available data until 2019.

3. The Context for Social Protection: Income, GDP and Government Expenditure

To better relate social protection policy trajectory to developments in respective countries in the years that followed the socio-economic crisis and the implementation of EAPs in the EMU periphery some initial thoughts are necessary.

Firstly, it was formerly stated that social protection is, among other, a shield to income loss which crucially was an obvious effect of the crisis and the EAPs. Median equivalised disposable income (MENI) is important in the sense that it takes into account price-level differences between countries via measuring income through the lenses of Purchasing Power Standard (PPS).⁶⁷

⁶⁷ The Purchasing Power Standard (PPS) is an artificial reference currency unit that eliminates price level differences between countries. Thus one PPS buys the same volume of goods and services in all countries. This unit allows meaningful volume comparisons of economic indicators across countries.

Table 1. Median equivalised net income in Purchasing power standard (PPS) EU-SILC and ECHP surveys [ILC_DI03__custom_3346926]

TIME	2008		2010		2013		2016		2019	
GEO (Labels)										
Euro area - 18 countries (2014)	:		:		:		:		19,138	
Germany (until 1990 former territory of the FRG)	18,007		17,573		19,478		21,152		22,693	
Ireland	18,169		16,837		16,732		18,397		19,775	
Greece	12,032		12,599		9,046		9,048		9,765	
France	17,493	b	17,782		19,193		20,621		20,471	
Cyprus	18,241	b	18,026		17,165		16,173		18,590	
Portugal	9,504		9,728		9,820		10,805		11,602	

Source: Eurostat. Authors' own Calculations

Evidence presented in Table 1 shows that in the course of the crisis and after the formal termination of the EAPs, MENI expressed in PPS was not reduced in the core EMU countries (with a single exception for year 2019, in France). In contrast, during the formal macroeconomic adjustment period in the cases of Ireland, Greece and Cyprus, MENI was notably reduced while Portugal, despite some progress, ultimately remained in the worst position in relation to all countries. Out of the four countries of the periphery, only Ireland exceeds the euro area MENI average, while it appears that disparities in comparison to the core axis (Germany and France) have increased for all countries of the periphery. Greece was the sole case where MENI, from 2008 to 2019, fell by 19%. Therefore, expanding social protection should have been a reasonable social policy option to follow, particularly for Greece.

Secondly, when comparing different social protection categories and data as percentage of Gross Domestic Product, it is useful to take into consideration that GDP was severely reduced in the post-crisis period, particularly for the countries of the EMU periphery, contrary to Germany and France. In Greece, GDP (output, expenditure and income) from 2008 to 2016 dropped by 28% whilst in 2019 it stood

at 24% lower than in 2008. The euro area GDP was, in 2008, 39 times bigger than the GDP of Greece, but in 2019 it expanded to 65 times the GDP of the country. A similar, albeit lesser decrease is identified for Cyprus and France, while Irish GDP was growing again by 2016. In sum, disparities in terms of GDP are increased within the euro area hence under these circumstances it was reasonable to assume that welfare risks and needs were increasing.

Table 2. GDP and main components (output, expenditure and income) [NAMA_10_GDP__custom_3422761]

TIME	2008	2010		2013		2016		2019
GEO (Labels)								
Euro area - 19 countries (from 2015)	9,620,164.2	9,533,212.6		9,935,493.8		10,816,378.4		11,984,518.8
Germany (until 1990 former territory of the FRG)	2,546,490.0	2,564,400.0		2,811,350.0		3,134,740.0		3,473,260.0
Ireland	187,283.0	167,391.4		179,457.6		270,205.3		356,704.6
Greece	241,990.4	224,124.0	b	179,884.4		174,494.2		183,250.4
France	1,992,380.0	1,995,289.0		2,117,189.0		2,234,129.0		2,437,635.0
Cyprus	19,009.6	19,410.0		17,995.0		18,929.3		23,009.9
Portugal	179,102.8	179,610.8		170,492.3		186,489.8		214,374.6

Source: Eurostat Source: Authors' own Calculations

Government expenditure development as percentage of the GDP after the eruption of the capitalist crisis differed across the spectrum of core-periphery countries in the euro area (Table 3.). A moderate increase of government expenditure is observed for core countries, Germany and France, and fluctuations are observed in the euro area trajectory. A fluctuating decrease, albeit at different levels, is demonstrated for the periphery, Greece, Ireland, Portugal and Cyprus. Government expenditure for Greece as percentage of the GDP though exceeds all other countries in both axes in conditions of declining growth.

Table 3. Total general government expenditure as Percentage of gross domestic product (GDP)

GEO/TIME	2008	2010	2013	2016	2019
Euro area - 19 countries (from 2015)	46.8	50.9	49.9	47.7	46.9
Germany (until 1990 former territory of the FRG)	44.2	48.1	44.9	44.4	45.0
Ireland	41.6	64.9	40.6	28.1	24.2
Greece	50.8	53.0	62.8	49.9	47.9
France	53.3	56.9	57.2	56.7	55.4
Cyprus	38.4	41.8	43.0	37.5	38.4
Portugal	45.3	51.9	49.9	44.8	42.5

Source: Eurostat. Authors own Calculations

3. Social Protection at a comparative glance: euro area, core and periphery EMU countries

Social protection in the form of Euro per inhabitant⁶⁸ from 2008 to 2019 has decreased exclusively in Greece (by 14%) while it increased from 26% to 48.5% in the euro area (average), France and Germany as was the case for the rest of the countries of the periphery (Table 4). However, the pace of increase for the rest of the countries of the periphery under Economic Adjustment Programmes, Ireland, Cyprus was significantly lower, with the exception of Portugal (26%) which in any case has also seen the distance to the euro area average and to Germany extend. It appears then, that the gap in the level of social protection measured as expenditure in euro per inhabitant was extended and disparities widened against the periphery group in contrast to the euro area and core EMU countries where it rose at almost double the rate than in the periphery (Portugal showed a similar increase).

⁶⁸ Expenditure per inhabitant is a widely accepted indicator for social protection, see Jessoula M., Pavalini E., Raitano M., Naliti M. Financing social protection // Italy. Brussels: European Commission, 2019. Lafleur JM and Stanek M (2017) Restrictions on access to social protection by new Southern European migrants in Belgium. In: Lafleur JM and Stanek M (2017) South–North Migration of EU Citizens in Times of Crisis. Dordrecht: Springer, 99–121. Benos, N. (2009). Fiscal Policy and Economic Growth: Empirical Evidence from EU Countries. <http://mpira-ub.uni-muenchem.de/19174>.

**Table 4. Annual Total Social Protection expenditure Euro per inhabitant
Expenditure: main results [SPR_EXP_SUM_custom_3163285]**

TIME	2008		2010		2013		2016		2019		
GEO (Labels)											% chan ge
Euro area - 18 countries (2014)	7,711 .01		8,365. 86		8,832. 74		9,337. 24	p	10,162 .27	p	31.8 0%
Germany (until 1990 former territory of the FRG)	8,471 .53		9,416. 91		10,193 .96		11,269 .90		12,580 .14	p	48.5 0%
Ireland	8,723 .64		9,259. 46		8,938. 84		9,074. 57		9,814. 32		12.5 0%
Greece	4,987 .91		5,264. 56		4,352. 04		4,284. 91		4,283. 70	p	- 14.1 2%
France	9,565 .82		10,217 .79		11,023 .72		11,484 .39		12,106 .22	p	26%
Cyprus	4,242 .63		4,368. 05		4,802. 11		4,322. 72		4,725. 93		11%
Portugal	3,966 .34		4,386. 00		4,496. 16		4,531. 42		5,002. 12		26%

Source: Eurostat. Authors' own Calculations

It was previously shown (Table 3) that total general government expenditure as percentage of GDP for the group of the periphery demonstrated, throughout the post-crisis environment examined, a downward trend. Notwithstanding this, with particular emphasis on social protection, France and Germany in 2019 continued to beat the euro area social protection average as percentage of total general government expenditure, while in all three units, an increase is demonstrated (Table 5). Despite higher than the euro area average pace in the rise of social protection expenditure, all four countries of the group of the periphery continue to lag behind the euro area and core countries average. Cyprus and Ireland (both appear with worst performance and the distance from core and euro area average is increased)

saw higher and enduring divergence from the euro area average for social protection (as percentage of government expenditure). In Greece (and Portugal) the social protection budget rose by 7.8% in a smaller though than the pre-crisis levels budget, focused on achieving fiscal consolidation.

Table 5. General government expenditure by function (COFOG) [GOV_10A_EXP_custom_3164065] Annual Percentage of total General government Social protection Total general government expenditure

TIME	2008		2010		2013		2016		2019	
GEO (Labels)										%change
Euro area - 19 countries (from 2015)	38.7		39.3		40.7		42.1		42.2	3.5
Germany (until 1990 former territory of the FRG)	42.6		41.7		42.3		44.0		43.6	1
Ireland	36.4		26.9		37.0		35.5		36.2	-0.2
Greece	33.5		35.8		31.3		41.4		41.3	7.8
France	41.0		41.6		42.7		43.1		43.0	2
Cyprus	26.6		29.0		31.5		35.4		31.3	4.7
Portugal	33.5		33.5		38.9		40.3		39.7	6.2

Source: Eurostat. Authors' own Calculations

The sharp drop of social protection in Ireland is clearly illustrated once again in Table 6. Social protection in Ireland (2019) as a component of the GDP dropped by more than 6% since 2008, thus disparities from the core and the rest of the countries increased. The rest of the periphery group demonstrated a rise in social protection vis a vis GDP but, with the exception of Greece, this trend did not suffice to significantly reduce the distance from the core and the euro area average. Again, to put this into context, it must be pointed out that social protection rose in Greece as a percentage of a shrinking GDP and declining government total expenditure (see Tables 2 and 3).

Table 6. General government expenditure by function (COFOG) [GOV_10A_EXP_custom_3164122] General government Social protection. Annual Percentage of gross domestic product (GDP)

TIME	2008		2010		2013		2016		2019	
GEO (Labels)										%change
Euro area - 19 countries (from 2015)	18.1		20.0		20.3		20.1		19.8	1.7
Germany (until 1990 former territory of the FRG)	18.8		20.1		19.0		19.5		19.6	0.8
Ireland	15.1		17.5		15.0		10.0		8.8	-6.3
Greece	17.0		19.0		19.7		20.7		19.8	2.8
France	21.8		23.7		24.5		24.4		23.8	2
Cyprus	10.2		12.1		13.5		13.2		12.0	1.8
Portugal	15.2		17.4		19.4		18.1		16.9	1.7

Source: Eurostat. Authors' own Calculations

Unemployment expenditure is classified as a function of social protection. In order to arrive to conclusions on the development of unemployment expenditure per inhabitant during the EMU economic governance reform stage and the implementation of economic adjustment programmes in the periphery, three measures were applied, their results illustrated in Table 7. First measure compares the level of country expenditure in relation to the euro area expenditure per inhabitant at two points of time, 2010 and 2019. This allows for the identification and measurement of the extent of possible gaps and disparities between the group of countries under MOU and the rest of the euro area economies, therefore discussing the latent association of the MOUs to developments in unemployment expenditure. Second measure calculates the actual change of expenditure across time in a respective economy, comparing results to the rate of change of actual unemployment. This allows for reflections on the necessity of changes in expenditure due to corresponding change in unemployment rates. Lastly, changes are compared across individual countries within and outside the core-periphery spectrum.

In the period from 2010 to 2019, unemployment expenditure per inhabitant in the countries of the periphery in comparison to the euro area was gravely reduced,

resulting at a greater gap in convergence. Such an outcome designates the impact of the crisis and of respective, successive Economic Adjustment Programmes (Table 7.). While in Greece unemployment expenditure per inhabitant in 2010 stood at 58.3% of the unemployment expenditure per inhabitant in the euro area, in 2019 it stood at 34.4%, signaling a sharp fall of 24%. The reduction of unemployment rate in Greece during the period under discussion was 35%, but unemployment expenditure reduction was higher, at 48%. The severe cut in expenditure designates a deeper decrease than the rate of decrease in unemployment. It also shows a growing distance from the rest of the euro area, countries not under Economic Adjustment Programmes. Results may suggest that austerity, fiscal consolidation, public debt sustainability were the crucial features behind the hampered rationale for social protection as far as unemployment expenditure is concerned (see discussion section).

In 2010, unemployment expenditure in Portugal was at 46% of the average unemployment expenditure in the euro area while in 2019 it stood at 29% of the euro area expenditure, a reduction of 17%. Overall in Portugal, unemployment was reduced by 61% and expenditure per inhabitant by 42%.

The unemployment expenditure per inhabitant in Cyprus in 2010 in comparison to expenditure in the euro area, stood at 53.5% while in 2019 a 4.5% decrease is observed, to 49% of the euro area money spent on unemployment per capita. Cyprus saw a reduction of 56% in unemployment rates and a 23% of unemployment expenditure cut.

Ireland in 2010 exceeded the euro area unemployment expenditure per inhabitant by 118%. This was followed by a 100% drop until 2019 in relation to the euro area unemployment expenditure, or a 53% reduction of actual unemployment expenditure with a decrease in unemployment rates of 68%.

In 2010, expenditure in unemployment per inhabitant in Germany was equal to 93.5% of the average euro spent in the euro area. In 2019, the analogy was reduced to 81.7% while actual expenditure was reduced by 26% and unemployment levels by 55%. Lastly, France in 2010 was spending 7.5% more than the average unemployment expenditure per inhabitant in the euro area, followed by a significant shift until 2019 at 45% more than the euro area average expenditure per inhabitant. This trend developed in conditions of decreasing unemployment by 18%.

Table 7. Unemployment Expenditure (Euro per inhabitant): EMU-Core and Periphery Comparisons

TIME	2010	2013	2016	2019	% Expenditure Change	% of Unemployment rate change ⁶⁹	Unemployment % change (reduction)	% Change of Country expenditure in relation to the euro area	Country standing as per the Euro area Unemployment expenditure (2010-2019)
Euro area - 18 countries (2014)	551.89	546.06	489.29	468.62	p - 15%	-4.1	-37%	-15%	
Germany (until 1990 former territory of the FRG)	516.02	400.37	381.00	383.00	p - 26%	-3.6	-55%	-11.8%	93.5%-81.7%
Ireland	1,203.28	1,053.83	803.05	556.15	- 53%	-9.5	-68%	-100%	118%-18%
Greece	322.19	219.98	156.48	167.58	p - 48%	-9.9	-35%	-24%	58.3%-34.4%
France	592.74	638.02	663.06	683.32	p +15%	-1.9	-18%	+37.5%	107%-145%
Cyprus	295.56	541.86	287.44	229.26	- 23%	-9	-56%	-4.5%	53.5%-49%
Portugal	235.62	291.24	166.47	136.22	- 42%	-10,5	-61%	-17%	46%-29%

Source: Eurostat. Authors' own Calculations

Old Age Pension

Old age expenditure (related to pension) is classified as a function of social protection, the needs and risks of which need to be addressed. From the onset of

⁶⁹ For reasons of better and more accurate comparisons with the percentage change in unemployment expenditure, within the time period of 2010-2019 the year with the highest percentage unemployment rate was selected to find percentage change in unemployment until 2019 and compare with expenditure change also until 2019. Years of highest unemployment may differ among countries.

the crisis until the year 2019, Greece remained the sole country of the periphery which had seen a real decrease of Euro per inhabitant old age expenditure (-5%). Expenditure per inhabitant was already in 2010 at a noticeable distance from the EMU average, less by -20%. In 2019 though, the gap had further widened to -40% from the euro area average. The distance in expenditure for old age population between Greece on the one side, and Germany and France on the other side, has similarly grown wider. Comparisons to Germany demonstrate a regression from -18% in 2010 to -41% in 2019 and to France from -35% in 2010 to -49% in 2019.

The gap between Ireland and the euro area, and specifically Germany and France, was also stretched albeit at a lesser degree, that is by -2% from the euro area mean, by -6% from Germany, while from France the distance was sustained to -35%. In Portugal, old age expenditure per inhabitant was by -40% less in comparison to the eurozone average and this gap was entrenched throughout the crisis and the EMU restructuring period. The expenditure gap of Portugal vis a vis the core EMU countries of Germany and France was sustained in the ten-year period close to -40% from Germany (from -38% to -39%) and close to -50% from France (from -51% to -48%). As far as Cyprus is concerned, findings show a small regression from -43% from the euro area to -45%, from -42% from Germany to -46% and a sustaining divergence from France to -54%. Lastly, despite a noticeable increase of old age expenditure in the course of the period under study, the gap to the level of protection in Ireland in comparison to core countries and the euro area has further widened. Therefore, the data presented show deterioration of the social protection conditions gap of old age persons in the periphery in comparison to core countries, the latter exceeding the euro area mean old age expenditure per inhabitant.

Table 8. Annual Old age Expenditure (Euro per inhabitant): EMU-Core and Periphery Comparisons

TIME	2010	2013	2016	2019	%Change
GEO (Labels)					
Euro area - 19 countries (from 2015)	3,035.36	3,279.90	3,510.38 p	3,838.60 p	+26.5%
Germany (until 1990 former territory of the FRG)	2,971.15	3,170.13	3,503.85	3,919.06 p	+32%
Ireland	2,434.80	2,586.20	2,675.14	2,983.63	+22.5%
Greece	2,427.42	2,260.83	2,387.15	2,309.62 p	-5%
France	3,745.08	4,115.52	4,304.57	4,560.58 p	+22%
Cyprus	1,738.82	2,021.12	2,014.55	2,119.26	+22%
Portugal	1,841.61	2,072.72	2,175.52	2,375.91	+29%

Source: Eurostat. Authors own Calculations

Another indicator for the estimation of the overall position of social protection in each respective country is social protection benefits (SPB), in the form of euro per inhabitant. For this purpose we have constructed a table based on Eurostat data. At the starting point of the comparison period (in 2010 before the initiation of the Economic Adjustment Programmes), with the exception of Ireland, in the rest of the countries of the periphery SPB (in the form of Euro per inhabitant) was close to 50% of the average level of benefits in EMU countries. Hence, a significant gap preceded the reform period. By the end of 2019, it appears that the ratio of disparities has generally extended within the group of the economies of the periphery.

During the 2010-2019 period, Germany substantially increased SPB performance distance in relation to the euro area average and all countries of the periphery. France also widened the gap of social protection in comparison to the periphery. In sharp contrast to the above evidence and at a time when macroeconomic structural reforms were unfolding, the distance of social protection benefits in all four countries of the periphery in comparison to Germany and France has substantially increased, therefore disparities in terms of social protection benefits per inhabitant in the periphery currently stand at a worse level, both compared to the period before the EAPs and to core euro area countries. More specifically, in Ireland, SPB per inhabitant growth was less and the distance from the euro area, Germany and France increased by 10%-20%. For Portugal, despite moderate increase (16%) in SPB, the distance from the euro area, Germany and France has moderately increased as well. The distance in SPB of Cyprus vis a vis the euro area, Germany and France increased by a range of 4%-10%. Lastly, by 2019, in Greece, the distance of SPB per inhabitant to euro area average, Germany and France, had deepened by almost 20% since 2010 signaling the largest divergence.

Table 9. Annual Social protection benefits (Euro per inhabitant)

TIME	2010		2013		2016		2019		%Change	+/- Euro area	+/- From Germany	+/- from France
GEO (Labels)										% Gap prior and after EAP		
Euro area - 18 countries (2014)	7,975.22		8,419.19		8,924.77	p	9,720.45	p	+21%			
Germany (until 1990 former territory of the FRG)	8,998.08		9,744.40		10,801.26		12,068.09	p	+34%	12% - 24%		- 5.5% - (+)7%
Ireland	8,902.59		8,604.15		8,700.40		9,412.85		+5%	11% - (-)3%	-1% - (-)22%	- 7% - (-)17%
Greece	5,168.76		4,246.78		4,232.29		4,235.38	p	-18%	- 35% - (-)56%	-43% - (-)65%	- 46% - (-)63%

France	9,53 7.23		10,26 8.20		10,72 0.96		11,30 3.86	p	+18.5 %	+20 %- 16%	5%-(-)7%	
Cyprus	4,29 6.27		4,368. 84		4,224. 81		4,622. 83		+7%	- 46% -(-)52. 5%	-52%- (-)62%	- 55% - (-)59 %
Portugal	4,14 5.26		4,243. 66		4,330. 27		4,808. 95		+16%	- 48% -(-)51 %	-54%- (-)60%	- 56% (-)57. 5%

Source: Eurostat. Authors' own Calculations

Discussion

This study adopted a core-periphery dependency approach and comparatively explored the trajectory of specific social protection indicators in the aftermath of the 2008 socioeconomic crisis and the implementation of Economic Adjustment Programmes (EAPs) in Greece, Ireland, Portugal and Cyprus. Outcomes of social protection until 2019 in the countries of the euro area periphery under EAPs were contrasted to the euro area average and two core EMU countries, Germany and France. Special emphasis was attributed to the case of Greece in determining the course of social protection expenditure in conditions of structural macroeconomic reforms.

Comparative lenses on core-periphery groups of euro area countries offer new perspectives in analysing data seen from a different angle so as to identify social protection patterns in times when structural changes challenge the latter. It appears that disparities in categories and functions of social protection between the euro area group of periphery countries and the group of core countries have increased. Specifically, disparities in unemployment expenditure and old age expenditure in the group of periphery countries, namely Greece, Ireland, Cyprus and Portugal, in comparison to the euro area average and core countries in the period from 2008 to 2019, have widened due to the reduction of corresponding expenditure in the periphery and /or a considerably higher increase in expenditure in core countries and euro area average. Additionally, the growth rate of total social protection expenditure and total social protection benefits per inhabitant in core euro area countries was significantly higher than the periphery under adjustment, while social risks and needs were higher in the periphery. Hence, the gap in social protection has widened between the two groups of countries in comparison to the pre-crisis period, prior to the implementation of Economic Adjustment Programmes. This is a

common feature identified in all units-countries among the two groups at least to some extent. These tendencies developed and deepened in conditions of structural adjustment in the fiscal, labour and product market domains of the periphery, as well as against the backdrop of notable reduction of median equivalised net income and GDP growth, at least for the first years after the initiation of the macroeconomic adjustment programmes, when social protection was more urgently required.

Based on the evidence shown, Greece demonstrates the sharpest fall in specific categories of social protection, despite a social protection increase, albeit in smaller budgets, thus extensively diverging from the euro area average, core countries and the periphery.

Welfare and social protection expenditure and direction cannot be disassociated from the context created by the implementation of consecutive economic adjustment programmes for Greece. From the onset of the first programme for Greece, the medium-term (programme) objective was to improve competitiveness and alter the economy's structure towards a growth model that favoured more investments and exports. A socially suppressive context where institutionalised obligations (derived from consecutive economic adjustment programmes) targeted the accumulation of as high as 5% of GDP in primary surplus (p.46)⁷⁰ through reforms including pension systems, VAT and income tax, as well as a wide range of labour and product markets reforms in parallel with a thorough privatisation programme (p.2). All these structural changes combined have paved the way for a context of social protection regression, similar (despite country variations) to the rest of the periphery under EAPs and in contrast to the rest of the euro area, particularly core countries, Germany and France.

The severe social regression of old age expenditure in Greece, and rather depressive comparisons to core country and euro area average or even (to some extent) to the rest of the periphery countries, comes as no surprise if one considers the following: firstly, a structural pension reform was among the initial measures agreed to bring the growth in pension expenditure below the euro area average; secondly, as formally announced at the time, such a thorough reform would affect public finances for the next two decades (p.24); and thirdly, overall the pension system was from the beginning of the MOU considered unsustainable and somehow insolvent.⁷¹ In particular, pension benefits would be reduced by 6 percent per year for people entering retirement between the ages of 60 and 65 with a contributory period of less than 40 years (p. 23). This policy choice, aimed at contributing in setting the debt-GDP ratio on a declining path, has shaped a decade of increasing divergences and disparities instead of convergence to the euro area.

⁷⁰ GREECE Memorandum of Economic and Financial Policies May 3, 2010 p. 46 in European Commission Directorate-General for Economic and Financial Affairs The Economic Adjustment Programme for Greece EUROPEAN ECONOMY Occasional Papers No. 61

⁷¹ European Commission Directorate-General for Economic and Financial Affairs The Economic Adjustment Programme for Greece EUROPEAN ECONOMY Occasional Papers No. 61

Furthermore, in the context of expenditure and revenue measures, specifically on the pension reform under the EAP, the age of retirement was increased by 2 years (1 January 2013)⁷² while cuts in the main, auxiliary and lump sum pensions were enforced, and the list of heavy and arduous professions was reduced to 10% of employment.⁷³ In addition, a comprehensive review of social welfare and social protection spending was undertaken in order to increase the effectiveness of social welfare spending. Under the title “Sustainable social welfare” and in view of establishing expenditure savings of more than 1% of GDP, a new pension reform was proposed, with an eye to strengthening the link between contributions and benefits. Such drastic structural measures included the elimination of solidarity grant, freezing pension benefits and a series of other austerity in orientation components.⁷⁴ Within the same line of approach, the so-called rationalisation of social benefits (other than pensions) was engineered to generate savings of EUR 300 million or 0.2% of GDP in the years between 2013-2014 (European Union, 2012 p.27)⁷⁵. This included reduction of unemployment benefits targeted to specific geographical areas through the elimination of seasonal benefits for workers in industries with seasonal employment patterns (Memorandum of Understanding on Specific Economic Policy conditionality p.251). Structural labour market reforms designed to promote business and job creation, decentralisation of wage negotiations and flexible forms of employment were envisioned to cut unemployment. The EAPs provided for an impressive reduction of the cost of unemployment of 36% by 2015, including cuts in unemployment benefits.⁷⁶ It also included measures which challenge the dignity of long-term unemployed persons, introducing a €200 per month “benefit”. Moreover, with a view to changing the labour market conditions, the minimum notice period for dismissal was reduced, and an upper limit to statutory severance pay was set, both measures taking more burden off the shoulders of employers and, conversely, increasing risks and needs for households and individuals.⁷⁷ It is argued therefore, that such supply-side, structural

⁷²European Commission Directorate-General for Economic and Financial Affairs The Second Economic Adjustment Programme for Greece First Review December 2012 EUROPEAN ECONOMY Occasional Papers 123

https://ec.europa.eu/economy_finance/publications/occasional_paper/2012/pdf/ocp123_en.pdf#page=219

⁷³ Assessment of compliance with the Memorandum of Understanding on Specific Policy Conditionality (fourth update, 2 July 2011)

https://ec.europa.eu/economy_finance/publications/occasional_paper/2011/pdf/ocp87_en.pdf#page=148

⁷⁴ Supplemental Memorandum of Understanding 16. 06. 2016 p.p. 14 – 16

https://ec.europa.eu/info/sites/default/files/economy-finance/ecfin_smou_en1.pdf#page=14

⁷⁵ European Commission Directorate-General for Economic and Financial Affairs The Second Economic Adjustment Programme for Greece First Review December 2012 EUROPEAN ECONOMY Occasional Papers 123

⁷⁶ European Commission Directorate-General for Economic and Financial Affairs The Economic Adjustment Programme for Greece Fifth review - October 2011 EUROPEAN ECONOMY Occasional Papers 87 p. 98

⁷⁷ European Commission Directorate-General for Economic and Financial Affairs The Second Economic Adjustment Programme for Greece First Review December 2012 EUROPEAN ECONOMY Occasional Papers 123, p. 223

reforms tend to explain the previously illustrated social protection regression in Greece and increasing disparities between the Greece, the euro area (average) and core countries.

Inasmuch as structural reforms are actually institutionalised (by law and by EU legislation on current account deficits considered excessive for the periphery under EU regulation on the prevention and correction of macroeconomic imbalances) this practice may result into a twofold long-term tendency in social protection. On the one hand, a tendency for growing homogeneity (despite some variations) of social protection expenditure cuts within the group of periphery countries. On the other hand, increasingly divergent development patterns, including functions of social protection, between the euro area core and periphery groups.

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Inequality, Manufacturing Industry and Spatial Dependence in the Districts of India

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Abstract

The relationship between the manufacturing industry and the consumption expenditure inequality is examined for the period 2005-2012. Two sets of models are used in the estimation, viz. standard panel fixed effects model and the spatial models. We find that there exists U-shape association between the measures of manufacturing industry and inequality which indicates that inequality first decreases and then increases following the manufacturing industry growth. This association is robust to the alternative measures of manufacturing industry and the measures of inequality. The relationship is primarily driven more by the indirect i.e. spill-over effect than the direct effect. The results of the spatial models show that the estimation of the coefficients is biased in the absence of spatial parameter. The spatial dependence tests suggest that the spatial error model is the most appropriate model in our case and its result shows that there exists the effect of spatial dependence of the nuisance type. The overall development within the district has positive association with inequality of that district however, the overall development in the neighbouring district has negative association with the inequality of the focal district.

Keywords: manufacturing industry, inequality, spatial models

JEL codes: I320, O140, O150

Note: This is a work in progress and not a final draft.

1. Introduction

The debate on the relationship between economic growth and inequality has been going on for long and had gained momentum after the seminal work of Kuznets (1955). The growth of manufacturing industry is an important component of economic growth. Growing manufacturing industry indicates increasing productivity which contributes to the economic development. The standards of living depend on the economic growth and invariably on its component - productivity growth in the manufacturing sector. The manufacturing sector interacts with the standards of living via two effects: Direct and indirect. The direct being the changes in employment in the manufacturing sector following growth in it. Indirect effect is generated through the spillovers of manufacturing growth in terms of employment in other sectors due to increased demand from the former for goods and services from the latter. Given this, it is important to know the nature of relationship between inequality and manufacturing industry. This paper is an attempt to examine the relationship between inequality and the manufacturing sector using panel data for the period of 2005-2012. In that endeavour, we use data on manufacturing plants and employment from Annual Survey of Industries (ASI) to define the measures of manufacturing industry. The inequality measures are defined over real consumption expenditure, data for which is obtained from National Sample Survey (NSS). The other control variables come from different sources discussed in the coming sections. We estimate the relationship between inequality measured by Gini and various measures of manufacturing industry using two sets of models – standard panel fixed effects model and spatial models. We are also interested in investigating if there are spatial effects present in our standard fixed effects model due to spatial dependence. Income and other

development outcomes are likely to spill over across districts via trade, transfer payments, network and social capital and pecuniary, technological, and information externalities. In the presence of such spatial dependence, the coefficient estimates are biased.

We examine this relationship at the district level. There are only a few studies that have examined inequality at the district level, primarily due to the unavailability of data. We overcome this problem by creating a panel representative at the district level. This is a novel contribution of this study. Moreover, there are very few studies that have examined the relationship between manufacturing growth and inequality in India. This paper contributes to that scanty literature. The results show that there exists non-linear relationship of U-shape type between inequality and the manufacturing industry. The overall development indicator variable on the other hand has a positive association with inequality. These results hold both in standard model and in the spatial models. There is also a clear evidence that the standard models give biased estimates in the absence of incorporation of the spatial process in the model. The rest of the paper is organized as follows: Section 2 discusses the relevant literature, section 3 presents the methodology, section 4 presents the data and descriptive statistics, section 5 discusses the results and section 6 concludes.

2. Literature Review

Increased interest in the study of inequality in India is associated with liberalization of Indian economy in 1990s. India experienced high economic growth in the post-liberalization period compared to the earlier period and along with it rose the inequality of various outcomes. The liberalisation seems to have induced

skill-biased technical change, which resulted in disproportionate benefits to the highly educated (Cain et al., 2010). There is extensive evidence that consumption inequality, earnings inequality, income inequality and the inequality in wealth increased after liberalization (Azam and Bhatt, 2018; Pawde et al, 2022). Apart from a general enquiry about the causes and determinants of inequality, studies have attempted to investigate the impact of liberalization, infrastructure, human capital, financial sector development on inequality. Topalova (2007) investigates the impact of trade reforms on poverty and inequality in Indian districts during the period 1987-1997. They regress the measures of inequality and poverty on measures of exposure to international trade and other control variables. They find negative relationship between the measures of poverty and exposure to trade in rural areas but there is no such relationship between inequality and exposure to trade either in rural or urban areas. Bajar and Rajeev (2015) analyse link between physical infrastructure and inequality and determine the nature of this relation. They regress Gini of expenditure on the measures of physical infrastructure such as electricity consumption, surfaced road density, rail density, teledensity along with other state specific characteristics. They find that some components of the infrastructure such as power and roads tend to increase interpersonal inequality at the state level. Aggarwal (2021) examines the impact of climate shocks, measured as temperature and precipitation variability, on real monthly per capita consumption expenditure and inequality of Indian households over the 1988–2012 period. She finds evidence of an increase in inequality of consumption across sectors due to climatic shocks. Arora (2012) examines implications of banking reforms on spatial consumption and income inequalities at the state level in the post-reform period in India. By regressing Gini of consumption expenditure on various financial and credit market

indicators the author finds that financial development is associated with a reduction in inequality in urban areas of India. Ang (2010) examines how finance impacts income inequality in India using annual time series data for the period 1951-2004. They regress Gini on measures of financial development and financial liberalization and other control factors. The results show that financial development reduces income inequality but financial liberalization seems to exacerbate it. Underdevelopment of financial systems hurts the poor more than the rich, resulting in higher income inequality. Subramaniam et al (2021) examine the impact of microfinance on poverty and inequality in 34 developing countries. They find that the microfinance helps reduce inequality.

Studies have also attempted to examine the spatial inequalities. Mukhopadhyay and Urzainqui (2018) impute consumption expenditure using night-light luminosity data and estimate the within-group and between-group inequality. They find that inequality increase between and within villages in rural India as a whole have been negligible, but rising inequality within and between urban blocks has been driving an increase in total urban inequality. Gradin (2018) attempt to identify the main sources of the variability in within-state earnings inequality in India. They use the methodology of RIF based decomposition of inequality, wherein inequality indices are regressed on demographic, economic and locational characteristics. They find that there exists positive correlation between inequality and earnings across states. Inequality is strongly associated with demographic factors and composition of workers. Azam and Bhatt (2018) examine income inequality in rural and urban India in 2011 separately with the objective of understanding the role played by spatial factors. They use the hierarchical within-between group decomposition methodology. They find that in 2011 about one-fifth

of the total income inequality in both urban and rural India can be attributed to between-district mean differences in income. In rural India, most of the between-district inequality is accounted for by mean income differences across states. In urban India, it is the within-state district differences that contribute significantly to the between-district inequality. Lolayekar and Mukhopadhyay (2019) examine the regional income convergence using the spatial models such as SAR lag, SAR error and SARMA. They find that there is a significant influence of neighbouring states' growth on per capita income of Indian states. Lee and Rodríguez-Pose (2012) investigate the link between innovation and inequality in US and Europe during the period 1996-2009. They regress Gini on the measures of high skills, population density, income, unemployment, migration, wage coordination and innovation. They find that innovation drives inequality although with significant differences in US and Europe. Wheeler (2007) examines the connection between total employment and the wage earnings inequality in the US for the period 1970-1990. They regress inequality on measures of industry localization and various covariates. He finds that wage dispersion falls significantly as industry employment expands.

The literature has also examined the spatial distribution of manufacturing activities. Desmet (2015) note that Spatial evolution of India continues to favor districts with high levels of employment density, especially services. India has higher agglomeration of employment than US. The possible reasons are that costs of congestion in India are either much smaller than in the United States, the agglomeration forces are much larger than in the United States, or that there are some frictions, policies, and a general lack of infrastructure in medium-density cities that prevents them from growing faster, therefore favoring concentration in high-density areas. Ghani et al (2014) analyze the spatial determinants of

entrepreneurship in India in the manufacturing and services sectors. They find evidence of agglomeration economies among manufacturing industries. In particular, supportive incumbent industrial structures for input and output markets are strongly linked to higher establishment entry rates. Ramaswamy (2016) shows that there has been increase in the spatial concentration in Indian manufacturing particularly after 1995. Employment in manufacturing and services sector are found to get increasingly concentrated in relatively better-off states in terms of per capita SDP.

The literature on the one hand has shown that there has been increase in inequality in India in the recent past. On the other hand, the literature has documented that there has been increase in the concentration of the economic activities such as manufacturing and services. It is plausibly to examine the link between inequality and the growth of manufacturing.

3. Methodology

3.1 Manufacturing industry and Inequality

The growth of manufacturing industry is expected to influence the inequality in outcomes. The existence of manufacturing units provides the employment opportunities in that district. Apart from the direct employment in the manufacturing industry, there are spillover effects of the industry growth. For example, the service sector growth accompanies the manufacturing sector growth which further has implications for the employment and labour markets and subsequently influences the income distribution. The growth of manufacturing enhances the productivity in that region. However, this productivity growth is

seldom spread evenly across all of the region. The processes such as the ones outlined by Kuznets (1955), Lewis (1954) and Harris-Todaro (1970) predict that the process of growth brings uneven benefits in the economy. Those workers who move to the manufacturing earn higher than the others and hence increases the inequality. In the latter period others catch up and inequality falls. Conversely, it can also happen that the initial growth in manufacturing is equalising given that it provides incomes to the surplus labour and then disequalising as the production becomes more capital intensive. Invariably, the impact of manufacturing growth on inequality is an empirical question.

3.2 Standard Panel Fixed Effects

Our estimation strategy involves two sets of models: standard panel fixed effects model and spatial models. Our standard fixed effects model is as follows:

$$\log(Gini)_{it} = \delta_i + \delta_t + \beta_1 Ind_{it} + \beta_2 Ind_{it}^2 + \gamma X_{it} + \epsilon_{it} \quad (1)$$

Where *Gini* is our measure of inequality, *Ind* represents our measure of manufacturing industry that enters in regression as a level term as well as a squared term, *X* is the vector of district specific observable characteristics such as service sector employment, measure of overall development, literacy rate, graduate and above educated population, villages with access through pucca roads, villages with power supply, number of bank branches, number of primary, middle and secondary schools, number of higher secondary schools and colleges, percent of urban population, total population, migration rate, percent of SC/ST population and percent of habitable land in total available land. The *i* indexes district, *t* indexes year, δ_i and δ_t are two fixed effects which will pick up unobserved differences across districts and years, respectively. Finally, ϵ_{it} is the error term.

We are also interested in investigating if there are spatial effects present in our standard fixed effects model due to spatial dependence. Income and other development outcomes are likely to spill over across districts via trade, transfer payments, network and social capital and pecuniary, technological, and information externalities. In the presence of such spatial dependence, the coefficient estimates are biased. There is a possibility of endogeneity arising from the reverse causality. To overcome this issue manufacturing industry variables are lagged by two years. So, in all estimations, district level traits are predetermined for the inequality that was measured as the outcome variable.

3.3 Spatial Models

Inequalities are not necessarily randomly distributed in space and therefore, there might be spatial autocorrelation in inequalities across locations. This might happen as the planned expenditure in the districts is determined by the fixed pool of resources of the state governments. So, the spending in one district affects the pool available for the other districts. This generates spatial correlation between the districts. Also, there can be spatial dependence due to factor mobility and dependency on the raw materials. Furthermore, as structure of income and its distribution change very slowly, inequalities may have geographical persistence. So, there may exist some kind of spatial dependence in the inequality in outcomes. The spatial models deal with substantive and nuisance spatial dependence related to the interregional externalities. The spatial models deal with stochastic processes in space. There are two main processes - spatial autoregressive (SAR) process and spatial moving average (SMA) process. Autoregressive meaning a variable regressed on itself. The values of a random variable at a location may depend on the values of the same random variable at neighbouring locations. This leads to having

the same variable on the left and the right-hand side of the equation, hence autoregressive. The moving average method is different and can be thought of as the smoothing of the location specific innovations. To the spiky random effect of a location we add average of the random effect of the neighbours which smooths the spikes down. The neighbours in both SAR and SMA processes are identified by the weights. The spatial weights are used to get an average and since the spatial weights are mostly row standardized, a straightforward average is achieved. There exist different types of spatial models. When the spatial lag of the dependent variable is included in the model, it is called SAR lag model. If the spatial lag of the error term is included, the model is called the SAR error model. When both, spatial lag of the dependent variable and the lag of the error term (SMA) is included, the model is called the SARMA model. In the SAR lag model, the SAR parameter indicates the extent of interregional interactions, and in the SAR error model, the error parameter expresses the intensity of spatial correlation between regression residuals (Rodriguez-Pose and Tselios, 2009).

The spatial lag model is the most substantive model (Anselin and Rey 2014). This is a formal model for spatial interaction. There are theoretical and behavioral motivations behind the lag model. Theoretical motivation is based on the spatial reaction function where a decision variable is a function of the other decision variables. For example, a worker's labour supply is a function of the labour supply of others in the labour market. On the other hand, behavioral motivation can be seen as a spillover function where the actions of the other economic agents enter into the utility function of some other agent. For example, negative externalities of the pollution caused by others. If there is interaction going on and that interaction is not controlled for then the estimates are biased. The spatial lag model is given as

$$\mathbf{y} = \rho \mathbf{W} \mathbf{y} + \mathbf{X} \boldsymbol{\beta} + \mathbf{e}$$

(2)

where $\mathbf{W} \mathbf{y}$ is the spatially lagged dependent variable with associated autoregressive coefficient ρ . The existence of the lag term on the RHS induces endogeneity. This violates the OLS assumption that $cov(X, u) = 0$. To get rid of this problem *spatial* 2SLS is used for estimation which is similar to the general 2SLS, however the properties of S2SLS follow from special laws of large numbers and central limit theorems. In such an estimation, the lagged term is instrumented and spatially lagged explanatory variables are used as instruments. In the context of the present study, the SAR model indicates how inequality in a district is affected by the inequality in the neighbouring regions. Equation (1) in the SAR lag model form becomes

$$\log(Gini)_{it} = \delta_i + \delta_t + \rho \mathbf{W} \log(Gini)_{jt} + \beta Ind_{it} + \beta_1 Ind_{it}^2 + \gamma \mathbf{X}_{it} + \epsilon_{it}$$

(3)

In the model in equation (3), the inequality in a district is a function of inequality in the neighbouring districts.

The SAR error model captures the nuisance spatial dependence and not the substantive one unlike the lag model. In the standard OLS model, the error term is supposed to be random noise. However, there might be present some spatial pattern in error term due to omitted random factors. In such a situation the error term is modelled. Some structure is imposed on the error term in such a way that the structure is filtered out and what is left is pure noise. This model does not have substantive interpretation. However, it enhances the efficiency of the estimates albeit the estimates of regression parameters remain unbiased. If SAR error term is ignored, although the estimates are correct, the standard errors are wrong leading to wrong significance and wrong fit.

The SAR error model is given as

$$\mathbf{y} = \mathbf{X}\boldsymbol{\beta} + \mathbf{e} \quad \text{with} \quad \mathbf{e} = \lambda \mathbf{W}\mathbf{e} + \mathbf{u} \quad (4)$$

where $\mathbf{W}\mathbf{y}$ is the spatially lagged error term. The structure of the SAR error model is very similar to the lag model given in equation (2). However, the spatially lagged term here pertains to the error term instead of the dependent variable. The reduced form of the SAR process is

$$\mathbf{u} = (\mathbf{I} - \lambda \mathbf{W})^{-1} \mathbf{e} \quad (5)$$

Substitution of equation (5) back into the original regression specification given in equation (4) yields

$$\mathbf{y} = \mathbf{X}\boldsymbol{\beta} + (\mathbf{I} - \lambda \mathbf{W})^{-1} \mathbf{e}$$

which further simplifies to

$$(\mathbf{I} - \lambda \mathbf{W})\mathbf{y} = (\mathbf{I} - \lambda \mathbf{W})\mathbf{X}\boldsymbol{\beta} + \mathbf{e} \quad (6)$$

Equation (6) shows that premultiplying both sides of equation (4) by the spatial filter removes the spatial autocorrelation. This is known as Cochrane-Orcutt transformation. However, this transformation does not remove heteroskedasticity if present. If the lambda was known the following could be defined: $\mathbf{y}_s = \mathbf{y} - \lambda \mathbf{W}\mathbf{y}$ and $\mathbf{X}_s = \mathbf{X} - \lambda \mathbf{W}\mathbf{X}$. Equation (6) becomes

$$\begin{aligned} \mathbf{y} - \lambda \mathbf{W}\mathbf{y} &= \mathbf{X}\boldsymbol{\beta} - \lambda \mathbf{W}\mathbf{X}\boldsymbol{\beta} + \mathbf{e} \quad \text{or} \\ \mathbf{y}_s &= \mathbf{X}_s\boldsymbol{\beta} + \mathbf{e} \end{aligned} \quad (7)$$

This provides the motivation for the use of spatially weighted least squares. However, the λ is unknown and hence an estimate of λ is needed. This estimate is obtained from the solution of a system of moment equations expressed as functions

of parameter and residuals. In that process, in the first step, OLS/2SLS is estimated to obtain the residuals \hat{u} , which go into the moment equations of the general form $\mathbf{m} = \mathbf{g} - \mathbf{G} \begin{bmatrix} \lambda \\ \lambda^2 \end{bmatrix}$ such that an initial estimate of λ , say $\hat{\lambda}_1$ is obtained as a nonlinear least-squares which provides a solution to these equations. In the second step, the initial estimate $\hat{\lambda}_1$ is used in SWLS to estimate final β with the associated vector of residuals. The residuals from the second step are then used to construct a set of moment equations which are solved by the means of weighted non-linear least squares procedure which produces new estimate of lambda which then is used to construct an asymptotic variance-covariance matrix. Thus, after achieving the estimate of lambda, the SAR error model of the type given in equation (7) is implemented using SWLS.

Finally, the SARMA model combines the features of the SAR lag model (equation (2)) and the SAR error model (equation (4)). Substitution of the reduced form of the SAR process (equation (4)) in equation (2) yields

$$\mathbf{y} = \rho \mathbf{W} \mathbf{y} + \mathbf{X} \beta + (\mathbf{I} - \lambda \mathbf{W})^{-1} \mathbf{e} \quad (8)$$

Equation (8) shows that the SARMA model is a spatial lag specification with an error variance-covariance as for the spatial error model. The spatial correlation in the model given in equation (7) can be eliminated, $\mathbf{y} - \rho \mathbf{W} \mathbf{y} = \mathbf{X} \beta + (\mathbf{I} - \lambda \mathbf{W})^{-1} \mathbf{e}$ or $(\mathbf{I} - \rho \mathbf{W}) \mathbf{y} = \mathbf{X} \beta + (\mathbf{I} - \lambda \mathbf{W})^{-1} \mathbf{e}$. Premultiplication by $(\mathbf{I} - \lambda \mathbf{W})$ yields $(\mathbf{I} - \lambda \mathbf{W})(\mathbf{I} - \rho \mathbf{W}) \mathbf{y} = (\mathbf{I} - \lambda \mathbf{W}) \mathbf{X} \beta + \mathbf{e}$ which simplifies to $\mathbf{y} - \lambda \mathbf{W} \mathbf{y} - \rho \mathbf{W} \mathbf{y} + \lambda \rho \mathbf{W}^2 \mathbf{y} = \mathbf{X} \beta - \lambda \mathbf{W} \mathbf{X} \beta + \mathbf{e}$; upon rearrangement becomes

$$\mathbf{y} = (\lambda + \rho) \mathbf{W} \mathbf{y} - \lambda \rho \mathbf{W}^2 \mathbf{y} + \mathbf{X} \beta - \lambda \mathbf{W} \mathbf{X} \beta + \mathbf{e} \quad (9)$$

SARMA model in equation (9) suffers from identification issues as there are sum and product terms. Therefore, it necessitates the use of GS2SLS which employs the principles of S2SLS to obtain the estimates of ρ and employs the principles of GMM approach to obtain the estimates of λ .

In the spatial models, the preferred approach is not to use Maximum Likelihood (ML) estimation for two reasons: First, it is very difficult to maintain that all the variables on the RHS are actually exogenous. In the case of presence of endogenous variables, instruments are needed and this can't be done in ML. secondly, heteroskedasticity is generally prevalent and ML ignores that. Therefore, the preferred approach is to use Generalized Method of Moments (GMM) estimation.

3.4 Spatial Weights

Spatial dependence is about the interaction among spatial units. This interaction data is not available and hence it becomes difficult to model such interactions. In such a situations spatial weights are used and it is a short cut necessitated by the unavailability of the interaction data. The weights (\mathbf{W}) are the essential component in the models of spatial dependence. They characterize the neighbour structure. Weights are nonzero for neighbours and zero otherwise. By convention the self-neighbour relation is excluded so the diagonal of the \mathbf{W} matrix is zero. Each spatial unit is represented by a row i and its neighbours by column j , $i \neq j$. The weights are conventionally binary: 1 if neighbour and 0 if not a neighbour. There are multiple ways of assigning weights but the two are most famous: first, based on contiguity and second based on distance. Contiguity weights are

appropriate for aerial units or polygons data. Distance weights are appropriate for point data. In this analysis queen contiguity weights are used in a row standardised form wherein each weight in a row is divided by the sum of all the weights in that row. In this way, the sum of all (row standardised) weights (in all the rows), $S_0 = n$, i.e., the number of observations in the absence of isolates. With a neighbour structure defined, the spatially lagged variable such as Wy in equation (2) is a weighted average of the neighbouring values for that variable. The spatial lag of y is designated as Wy . Therefore, for observation i , the spatially lagged variable of variable y is $[Wy]_i = w_{i1}y_1 + w_{i2}y_2 + \dots + w_{in}y_n = \sum_{j=1}^n w_{ij}y_j$. The matrix W can be considered to be the spatial lag operator on the vector y .

3.5 Tests for Spatial Dependence

Choosing appropriate spatial model from the three spatial models discussed above is a crucial part. There exist various tests that aide in identifying the presence of spatial dependence and furthermore guide in selecting the appropriate spatial model. These tests are grouped into two broad sets: diffused tests and focused tests. The most important diffused test is the Moran's I test for regression residuals. It has power against misspecification, autocorrelation and heteroskedasticity. Therefore, rejection of the null does not support a specific alternative of spatial lag or spatial error model. However, having information only about the presence of spatial autocorrelation is not sufficient and it is important to know the form of such spatial autocorrelation so as to be able to model it. Here comes the role of focused tests. There are 5 focused tests important to us: Lagrange Multiplier (LM) lag test, LM error test, LM SARMA test, LM robust lag test and LM robust error test. The expressions of these spatial dependence tests are given in the Appendix B.

4. Data and Descriptive Statistics

Our analysis is based on all the districts in 19 major states⁷⁸ of India. These states cover approximately 97% of India's total population as per the 2011 census. There were 593 districts in India in 2001 out of which 503 districts belonging to the 19 states constitute the sample size in this study. We use the data on consumer expenditure from the quinquennial NSSO surveys⁷⁹ for years 2004–05, and 2011–12 (2005, 2012 henceforth) to achieve district level estimates for two variables: average monthly per capita consumption expenditure (MPCE) and two measures of inequality, Gini and 90/10 ratio calculated over MPCE. We have used consumption expenditure from the 30–day recall period across the survey rounds. Gini is scaled up by multiplying by 100. It enters in the log form in the regression. Similarly, the 90/10 ratio enters in the log form. The real MPCE of the above two years is expressed in 2005 prices (whenever we refer to MPCE in the following analysis, it is strictly in real terms). The CPI-AL is used to deflate rural consumption expenditure and CPI-IW is used to deflate urban consumption expenditure. NSSO, the data collecting agency made the NSS surveys representative at the district level 2005 onwards by the stratification. We utilize this fact to estimate district level inequality, which was not possible in the absence of representative data. For a measure of overall development of the district, we have used the first principle component achieved from the principle components analysis by combining three variables: real MPCE, real monthly earnings and night lights data from SHRUG. A better indicator

⁷⁸These are as follows: Himachal Pradesh, Punjab, Uttar Pradesh, Haryana, Rajasthan, Bihar, Assam, West Bengal, Orissa, Madhya Pradesh, Gujarat, Maharashtra, Andhra Pradesh, Karnataka, Kerala, Uttarakhand, Jharkhand, Chhattisgarh and Tamil Nadu.

⁷⁹As pointed out by (Cain et al., 2010), there are errors probably due to data entry, particularly severe in the year 1993-94. The observations recorded in the high skills occupations have consumption levels and characteristics matching with those engaged in agriculture. As done by (Cain et al. 2010), we also proceed by dropping such observations.

would have been income per capita⁸⁰ but the data is not available. Therefore we use the first principle component as a proxy instead.

We are interested in investigating the association between inequality and total number of manufacturing plants (and associated normalized measures) in a district⁸¹. The measures of manufacturing industry are similar to Ghani et al (2014). To that end, we use data on total number of plants in a district from Annual Survey of Industries (ASI) pertaining to the years 2002-03 and 2009-10 i.e. the number of plants data is lagged by two years compared to the expenditure data from NSS. ASI provides unit (factory) level data on the manufacturing industry in the organized sector. The plants that employ more than 10 employees are covered in the survey. ASI follows two schemes of data collection: census scheme and sample scheme.

⁸⁰ District GDP data is available for few states but not for all.

⁸¹ We have also attempted to examine if the concentration of manufacturing sector has association with inequality or not. To that end we defined the Location Quotient and Hirschman-Herfindahl indices based on no. of plants. These exercises yielded insignificant results.

Table 1. Description of Variables

Variable	Description
Gini (log)	Is a continuous variable calculated over real household MPCE in a district. It is multiplied by 100 and then log is taken.
Plants	Is a continuous variable that represents the total number of manufacturing plants located in a district.
Squared plants	Is a squared term of plants.
Ind norm Plants	Is a continuous variable which is a ratio of total number of plants in a district to total number of plants in India in that year. This is multiplied by 100.
Squared plants Ind norm	Is a squared term of Ind norm plants variable.
Pop norm plants	Is a continuous variable which is a ratio achieved by dividing total number of plants in a district by total population of that district in a year. This is multiplied by 10000.
Squared plants pop norm	Is a squared term of pop norm plants.
India Norm Service Emp	Is a continuous variable which is the ratio of total service sector workers in a district to the total service sector workers in India.
First Princ. Comp.	Is a continuous variable which is the first principle components achieved from the principle component analysis.
Literacy rate	Is a ratio of total literate population to total population in the district.
Graduate & Above (Log)	Is a the log of population that is graduate or above educated.
Villages-Pucca Roads (%)	Is a percent of villages having access through pucca road.
Villages-Power (%)	Is a percent of villages having power supply.
Bank Branches (Log)	Is a log of bank branches in a district.
PMS schools (Log)	Is a log of number of primary, middle and secondary schools in the district.
HSC & Colleges (Log)	Is a log of number of higher secondary schools and colleges in the district.

Urban Population (%)	Is the percent of population residing in urban areas.
Total Population (Log)	Is the total population of the district.
Migration rate	This is a continuous variable that represents the number of persons migrated in a district during past 4 years.
SC/ST Population (%)	Is a percent of SC/ST population in the district
Habitable/Tot Land (%)	Is a continuous variable that represents the ratio of total habitable land to total area in the district. The habitable land is calculated as total area of district minus the forest area and the barren land area, all measured in 10000 hectares.

The Census scheme is implemented for (i) all units belonging to the 6 less industrially developed states/UT's viz. Manipur, Meghalaya, Nagaland, Tripura, Sikkim and Andaman & Nicobar Islands; (ii) units having 100 or more workers; (iii) all plants covered under Joint Returns (iv) states with 4 or less units. Sample scheme is implemented for the remaining units excluding census.

ASI provides information on the location of the plants, organizational and ownership characteristics, information of fixed and working capital, information on employment and labour cost, information on expenses and income sources, information on inputs and output. There are three variables designed to capture the impact of concentration of plants on inequality in a district: The first is a simple total number of plants in a district. The second is the total number of plants in a district divided by total number of plants in India. We call this India level normalized plants, which is in a ratio form. The third is the total number of plants

in a district divided by total population of the same district. We call this population normalized plants, which is also in a ratio form.

To control for district specific characteristics, we use variables that come from the literature and are detailed in table 1. These variables are as follows: Physical and infrastructure traits: Electricity is a variable that represents the no. of households in a district for which electricity is available. This is a measure for physical infrastructure⁸². Habitable land represents total habitable land available in a district. It is calculated as total area of district minus the forest area and the barren land area all measured in hectares. This variable represents the natural constraints put forth if any on the expansion of the manufacturing industry and other economic activities in general. Development traits: first Princ. Comp, schools and colleges and bank branches. Demographic traits: Literacy represents the total literate population in the district. This variable is related to the human capital. Migration variable represents the number of persons migrated in a district during past 4 years. Urban population represents the population residing in urban areas. All of these variables enter the regression equation in log form. The information on the households availing banking services, the households to whom the electricity is available, information on literacy, migration and urban population is obtained from the Census pertaining to the years 2001 and 2011. The information on the habitable land is obtained from Biophysical data module of International Crops Research Institute for the Semi-Arid Tropics (ICRISAT) database. Table 2 presents the summary statistics. We observe that there has been annual growth of around 5.6% in average MPCE across India during 2005-2012. We can see that there is large variation in the average

⁸² The road density data would have been a better measure of physical infrastructure but the data is not available for all the districts considered in this analysis.

consumption expenditure. Table 3 shows that in 2005, Banka district of Bihar had the lowest MPCE of 398.68 Rs while the Mumbai district had the highest MPCE of 1872.57 Rs. In 2012, Malkangiri district of Orissa had the lowest MPCE of 528.82 Rs while the Kollam district of Kerala had the highest MPCE of 3924.52 Rs. The high differences in average MPCE across district point towards high overall Inequality. The average Gini was 32.65 (31.71) in 2005 (2012). Although it seems that the average Gini reduced marginally during 2005-2012, the overall Gini increased marginally

Table 2. Summary Statistics

Variable	Year	Mean/percent	Std. Dev.	Min	Max	Annual % Δ
Average MPCE	2005	747.30	231.51	398.68	1872.6	NA
	2012	1095.76	429.44	528.82	3924.5	5.62
Gini X 100	2005	32.65	6.65	16.82	61.62	NA
	2012	31.71	7.05	16.82	69.82	-0.42
Total Plants	2005	75.49	149.85	0.00	1757	NA
	2012	104.92	218.83	0.00	2175	4.82
Ratio of total plants in district to total plants in India X 100	2005	0.20	0.39	0.00	4.63	NA
	2012	0.20	0.41	0.00	4.12	0.00
Ratio of total plants to total population in district X 10000	2005	0.36	0.68	0.00	9.69	NA
	2012	0.42	0.95	0.00	14.04	2.23
% of HHs availing bank services	2005	34.39	14.17	7.21	79.46	NA
	2012	58.79	15.50	20.32	93.9	7.96
% of HHs electricity is available to	2005	52.57	28.16	3.09	98.34	NA
	2012	63.83	29.02	5.79	99.1	2.81
Available habitable land	2005	422.63	356.62	16.80	3446.8	NA
	2012	428.65	361.85	16.80	3539.6	0.20
% of literate persons	2005	53.28	11.90	24.18	85.39	NA
	2012	62.25	10.01	32.03	88.74	2.25
Rate of migration into district	2005	2.45	1.91	0.34	16.3	NA
	2012	2.94	2.16	0.55	14.79	2.64
% of urban population	2005	22.10	16.37	0.00	100	NA
	2012	24.89	17.82	0.00	100	1.71

Notes: There are 503 observations in each year. The Gini here is the average of the district Gini coefficients. The Gini for India is 38.33 in 2005 and 38.90 in 2012. Estimates of MPCE and Gini are based on real expenditure expressed 2005 prices.

from 38.33 to 38.90.

Unless we decompose the overall inequality into its within and between group terms based on districts as groups, it is difficult to comment on which component was reducing the inequality, within district component or the

Table 3. Districts with Low and High MPCE

2005				2012			
District	MPCE	Gini	Plants	District	MPCE	Gini	Plants
<i>Low MPCE</i>							
Banka (BR)	398.68	16.82	1	Malkangiri (OD)	528.82	33.97	1
Champaran W (BR)	416.58	25.41	15	Bhojpur (BR)	528.91	25.12	10
Malkangiri (OD)	416.58	38.41	2	Koraput (OD)	551.93	31.93	18
Nuapada (OD)	421.12	30.27	2	Sahebganj (JH)	577.01	31.43	28
Nawarangpur (OD)	424.10	41.42	4	Gajapati (OD)	578.06	32.76	1
<i>High MPCE</i>							
Mumbai (MH)	1872.57	40.53	1042	Kollam (KL)	3924.52	69.82	322
Gandhinagar (GJ)	1726.44	46.46	196	Chamba (HP)	3820.33	69.41	1
Thiruvapuram (KL)	1690.90	39.74	81	Kottayam (KL)	3154.43	57.47	82
Eranakulam (KL)	1583.85	48.39	252	Thiruvapuram (KL)	3099.10	56.64	83
Alappuzha (KL)	1532.03	48.43	124	Gurgaon (HR)	2950.10	60.07	537

Notes: The calculations are based on the real MPCE

between district component. However, the increased standard deviation of both district MPCE and Gini may indicate increased between district inequality. Table 2 shows that there has been annual increase of 4.82% in the number of plants. Table 3 shows that the districts which had low MPCE had low number of plants while the districts which had high MPCE had relatively high number of plants. Another interesting pattern is that the district with high MPCE and high number of plants also have high inequality levels. This is expected as higher industrialized districts have higher productivity and hence higher incomes vis-à-vis less industrialized districts. The higher industrialization in certain districts happen following the classic virtuous cycle principles. This will over time increase the concentration of

industries where more industries exist already. This might lead to labour market tightening and wage premiums following capital intensive production. On the one hand average Gini reduced while on the other hand the average number of plants increased. There seems no such increase in India level normalized plants however, the population normalized plants variable shows annual growth of 2.23%. The inspection of our raw data⁸³ suggests that the districts which had low manufacturing plants in 2005 also had low manufacturing plants in 2012. This implies that the growth in manufacturing plants in the low base districts was low. These can be called low industry base districts. Low industry base districts belong mostly to the less industrially developed states such as Bihar, Madhya Pradesh, Rajasthan, Uttar Pradesh and its successor Uttarakhand, Orissa and Assam. On the other hand, the districts which had higher number of plants to begin with continued to have higher number of plants in the later period too. We call these districts the high industry base districts. These high industry base districts belong to the industrially well developed states such as Karnataka, Tamil Nadu, Maharashtra, Gujarat and Andhra Pradesh. We also find that the growth in manufacturing plants has been slower in the high industry base districts compared to the rest, which is expected given the high base effect in the high industry base districts. We observe increase in households availing banking services, availing electricity, literacy, migration, and urban population. There is marginal increase in availability of habitable land which means that the total cover of barren land and the forest land is reduced. Most of these variables suggest that there has been overall development taking place.

⁸³ These tables are not included in the paper on account of space considerations. They are available on request.

5. Results

5.1 Results of the standard panel fixed effects model

First, we discuss the results of the standard panel fixed effects model outlined in equation (1). The results pertaining to two measures of manufacturing industry – India normalised plants and population normalised plants are presented in table 4. Columns (1) and (4) pertain to the specification wherein the linear terms of the manufacturing industry variables are included along with the following control variables: First Princ. Comp., literacy rate, Graduate & Above (Log), Villages-Pucca Roads (%), Villages-Power (%), Bank Branches (Log), PMS schools (Log), HSC & Colleges (Log), Urban Population (%), Total Population (Log), Migration Rate, SC/ST Population (%) and Habitable/Tot Land (%). In this specification, the signs of the coefficients of both the measures of manufacturing industry are negative but statistically insignificant. We next include the squared term in the specification in addition to the specification of columns (1) and (4). The results are reported in columns (2) and (5). It can be seen that the linear term of both the industry measures is negative and the squared term is positive and all the four coefficients are statistically significant. These results suggest that there exists a non-linear U-shape type relationship between inequality and the manufacturing industry growth. In columns (3) and (6), an additional variable (India Norm Service Emp) is added to control for the effect of service sector on inequality. The results of the specification controlling for the effect of service sector and that without controlling for it are almost same⁸⁴. The further analysis is based on the results given in columns (3) and

⁸⁴ We have estimated the model with alternative definitions of service sector variable such as log of service sector employment and share of service sector employment in total employment in a district. The results are qualitatively the same. Furthermore, the results are qualitatively similar for both the variables of manufacturing industry if we drop the observations with zero manufacturing plants.

(6). The coefficient of the linear term for the variables India normalised plants and population normalised plants is -0.130 statistically significant at 5% and -0.088 statistically significant at 1%, respectively. The respective squared terms are 0.019 and 0.007, statistically significant at 5% and 1% level. In the U-shape relationship between the inequality and the manufacturing industry variables India normalised plants and population normalised plants, as shown in figure 1, the inflexion points are at around 3.4 and 6.6, respectively. Inspection of our data shows that these values lie around the 99th percentile of the distribution of manufacturing plants. This essentially means that for most of the distribution the relationship between inequality and manufacturing industry variables is negative.

The level of overall development as indicated by the coefficient of the variable First Princ. Component has a positive association with inequality. 1 unit increase in this development indicator variable induces an increase of around 0.158 percent in inequality. This is consistent with the findings in the literature on India (Mukhopadhyay and Garcés, 2018; Gradin, 2018, Rodríguez-Pose and Tselios, 2009). Among other control variables literacy, number of persons with education level of graduation or above and total population are significant. The estimated coefficient of the variable literacy is 0.010 for both specifications (3) and (6) which indicates that it has a positive association with inequality. 1 percentage point increase in literate population leads to around 1 percent increase in inequality. This shows that the schooling reaps significant higher returns. The graduate education variable on the other hand is negatively associated with inequality. A one percent increase in graduate population reduces inequality by around 2.4 %. This is consistent with the findings of Wheeler (2007) wherein they observe that the high skills reduce inequality due to decreasing returns to high skills as the number of persons with

high skills increases. The total population is positively associated with inequality. One percent increase in total population increases inequality by around 1.6%.

Table 4 Regression of Log Gini on Manufacturing Industry Measures

Dependent Variable: Log Gini	India Normalised Plants			Population Normalised Plants		
	(1)	(2)	(3)	(4)	(5)	(6)
India Norm Plants*100	-0.056 (0.0432)	-0.129** (0.0561)	-0.130** (0.0553)			
Sq India Norm Plants		0.019** (0.0093)	0.019** (0.0094)			
Pop Norm Plants*10000				-0.011 (0.0373)	-0.088*** (0.0276)	-0.088*** (0.0277)
Sq Pop Norm Plants					0.007*** (0.0022)	0.007*** (0.0022)
India Norm Service Emp			0.013 (0.0727)			0.012 (0.0691)
First Princ. Comp.	0.158*** (0.0209)	0.158*** (0.0210)	0.158*** (0.0210)	0.158*** (0.0208)	0.158*** (0.0210)	0.158*** (0.0209)
Literacy Rate	0.010** (0.0042)	0.010** (0.0041)	0.010** (0.0041)	0.010** (0.0042)	0.010** (0.0039)	0.010** (0.0040)
Graduate & Above (Log)	-0.238** (0.0879)	-0.241** (0.0892)	-0.242** (0.0895)	-0.242** (0.0869)	-0.239** (0.0858)	-0.239** (0.0858)
Villages-Pucca Roads (%)	-0.001 (0.0005)	-0.001 (0.0005)	-0.001 (0.0005)	-0.001 (0.0005)	-0.001 (0.0005)	-0.001 (0.0005)
Villages-Power (%)	0.000 (0.0004)	0.000 (0.0004)	0.000 (0.0004)	0.000 (0.0004)	0.000 (0.0004)	0.000 (0.0004)
Bank Branches (Log)	0.058 (0.0462)	0.058 (0.0459)	0.058 (0.0459)	0.057 (0.0463)	0.056 (0.0444)	0.056 (0.0444)
PMS schools (Log)	-0.008 (0.0210)	-0.010 (0.0210)	-0.010 (0.0214)	-0.010 (0.0208)	-0.011 (0.0206)	-0.011 (0.0209)
HSC & Colleges (Log)	0.030 (0.0329)	0.034 (0.0338)	0.034 (0.0339)	0.032 (0.0320)	0.032 (0.0312)	0.032 (0.0312)
Urban Population (%)	-0.001 (0.0048)	-0.001 (0.0047)	-0.002 (0.0045)	-0.001 (0.0048)	-0.001 (0.0046)	-0.001 (0.0043)
Total Population (Log)	0.175* (0.0915)	0.176* (0.0934)	0.178* (0.0924)	0.169* (0.0908)	0.160* (0.0918)	0.163* (0.0908)
Migration Rate	0.006 (0.0144)	0.007 (0.0142)	0.007 (0.0142)	0.005 (0.0140)	0.008 (0.0137)	0.008 (0.0137)
SC/ST Population (%)	0.076 (0.2486)	0.079 (0.2459)	0.076 (0.2478)	0.077 (0.2442)	0.097 (0.2446)	0.094 (0.2463)
Habitable/Tot Land (%)	-0.001 (0.0016)	-0.001 (0.0016)	-0.001 (0.0016)	-0.001 (0.0016)	-0.001 (0.0015)	-0.001 (0.0015)
Constant	2.995* (1.5235)	3.030* (1.5695)	3.004* (1.5356)	3.134* (1.5255)	3.226* (1.5510)	3.201** (1.5193)
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes
Observations	1,006	1,006	1,006	1,006	1,006	1,006
R-squared	0.283	0.284	0.284	0.282	0.291	0.291
Number of Districts	503	503	503	503	503	503

Notes: Robust standard errors clustered at the state level in parentheses. *** p<0.01, ** p<0.05, * p<0.1

The rest of the variables have no statistically significant association with inequality. Nevertheless, the signs of the variables that are supposed to enhance the productivity such as power supply, existence of bank branches and higher education institutes show positive association with inequality, however access by pucca roads and existence of primary, middle and secondary schools shows negative association. If we see the association between overall development indicator and inequality from Kuznets perspective, given India is a developing economy and we are looking into a short period, the initial stage of development of the economy would be associated with increasing inequality resulting in positive association. This association might indicate that there are some development processes that enhance the overall development but has negative implication for the distribution of income. For example, the growth of some subsectors of informal sector might be increasing overall development in a district but the benefits of such growth might accrue to a few which would increase the wage dispersion similar to service sector⁸⁵. If this process dominates over the other growth processes such as manufacturing industry growth, then the impact of former growth process might increase inequality. The overall development indicator variable might pick up that effect and hence show the positive association between inequality and overall development. The literacy on the other hand increases inequality. The increased literacy might provide the population with an opportunity to enter into high wage occupations that widens the income gaps. The growth in the graduate and above population on the other hand has negative association which might suggest that the wage premium in the high skilled jobs decreases as the supply of high educated increases. The total population has positive association with inequality. This result

⁸⁵ In our results the association between service sector and inequality is positive but it is statistically insignificant.

is similar to that of Rosenzweig (2004) wherein he argues that the increase in the total size of the population – a measure of labour force – increases inequality because it hurts the poor.

The U-shape relationship between inequality and manufacturing sector growth can arise due varying effects of the interaction of manufacturing sector with other sectors of the economy and subsequent the labour market changes that influence the income distribution. The most important for us is the interlink between agriculture and the manufacturing sector. In Harris-Todaro (1970) type interlink between manufacturing and agriculture, the latter is primarily located in the rural areas whereas the manufacturing sector being a modern sector is located in the urban sector. If the workers want to work in the manufacturing sector, they have to migrate to the place where the manufacturing plants are located. Two groups – farmers and casual workers from the rural sector are important for us. Farmers (N_F) own land and work on their own land and also are free to work as casual labour in the agriculture and non-farm sector when they are freed from work on own land. This implies that farmers receive their income from own farm produce, causal work done outside of their own land and rent from land. The other group - landless casual workers (N_C) have low skills and receive their income from the casual labour. Finally, an important group of workers that resides in the urban sector is the manufacturing workers and their primary income source is the manufacturing wages. The distribution of workers across the agriculture and manufacturing is such that: $(N_C + N_F) > N_M$. The initial wage rates/income distribution $W(.)$ can be given as: $W(N_M) > W(N_F) > W(N_C)$. At this stage, the difference in wages of $W(N_F)$, $W(N_M)$ and $W(N_C)$ is not very high as is the case in both Lewis (1954) and Harris-Todaro (1970) models. It follows that the groups that consist of highest share of

population, $(N_C + N_F)$, earn the lower income, $E(W(N_C) + W(N_F))$ whereas, the group that has lower population share, N_M earns the higher income, $W(N_M)$. This implies that the inequality is the feature of this economy.

Now as the manufacturing sector grows (phase-I), the demand for workers increases. Given $W(N_M) > W(N_F) > W(N_C)$, both N_F and N_C can possibly move to manufacturing sector in response to the increased demand. However, willingness of N_F to migrate to manufacturing sector location would be lower than N_C if, firstly, the $E[W(N_M)] \leq E[W(N_F)]$ and⁸⁶ secondly and more importantly, they are hesitant to leave the farmland - an immovable asset - on which they have been working for long. On the other hand, N_C would have higher incentive to migrate to manufacturing location as $E[W(N_M)] > [W(N_C)]$. Moreover, they are not stuck with immovable income sources such as land. At this stage the manufacturing sector may increase the wage rate $W(N_M)$ or it may not increase. There won't be increase in $W(N_M)$ if the supply of workers available to it is higher than the demand similar to Harris-Todaro (1970)⁸⁷ if not unlimited (Lewis, 1954). If this is not the situation in the labour market then the manufacturing sector has to increase the wages to attract the workers. Consistent with the earlier discussion, if N_C moves to manufacturing sector responding to the demand from manufacturing sector given $W(N_M) > W(N_C)$, the N_C reduces to N_C' by the amount of $(N_C - N_C')$ and N_M increases by the equivalent amount to N_M' . The $W(N_M' - N_M) = W(N_M)$ if the manufacturing wage rate stays unchanged or $W(N_M' - N_M) = W'(N_M)$ in the case of wage increases. In either of these cases, shift of casual labour from agriculture to manufacturing

⁸⁶ Farmers have more income sources than casual workers.

⁸⁷ Due to the excess supply of workers Harris-Todaro (1970) model predicts that more than required workers by manufacturing sector migrate to urban areas in search of jobs as the expected wages are higher and some lucky of them get the job and others continue working in the urban informal sector with low wages. This gives rise to the urban poverty. Nevertheless, this is not the area we concerned about here.

translates into increased income for $(N_c - N_c')$. In other words, *ceteris paribus*, the low wage workers that were at the bottom of the distribution get higher wages. The workers at the bottom of the distribution can also benefit due to employment in the non-farm employment which grows in size as well as the wages in the non-farm sector due to growth of manufacturing industry in the rural areas as is found to be the case by Foster and Rosenzweig (2004) and Ghani et al (2012). This reduces the differences in incomes, specifically differences between incomes of the farmers and casual workers in the economy resulting in the reduction of inequality. This leads to manufacturing growth having negative association with inequality which explains the first part of U-shape relationship between inequality and manufacturing sector, i.e. the part to the left of inflexion point as given in figure A1. The finding that manufacturing growth reduces inequality is similar to the findings of Wheeler (2007) and Guo et al (2020) that the growth of manufacturing reduces the inequality essentially due to increase in the incomes of the poor. Foster and Rosenzweig (2004) find that the plants enter into the low wage-low productivity areas with the cost considerations and this reduces inequality by increasing the wages in the low income areas. The similar recent evidence on poverty reduction due to increased incomes is documented in Erumban and De Vries (2021). The bottom of the distribution benefitting more from manufacturing growth is also evident from the results that the effect of manufacturing industry variables is higher on the 90/10 measure⁸⁸ of inequality than Gini as can be seen from columns (4) and (5) of table A2 and columns (3) and (6) of table 4. Note that, this is the direct effect of the manufacturing growth on inequality. The indirect effect (spillover and agglomeration effects) of manufacturing growth will take some time to follow. The

⁸⁸ 90/10 measure is more sensitive to the changes in the extremes of the distribution. *Ceteris paribus*, if the income of those at 10th percentile increases, it would fall faster than Gini.

distributional consequences of the above process are depicted in figure A2 left panel entitled 'Phase 1 Lorenz'. The Lorenz curve depicted by continuous line pertains to the situation pre-manufacturing growth in phase-1. The dashed line pertains to the post phase-1 manufacturing growth. The phase-1 Lorenz curve falls inside towards the 45^0 line at the bottom and middle part because the income shares of the population at this part (casual labour that shifted to manufacturing, $(N_C - N_C')$) increases.

The further growth in the manufacturing sector can be seen as phase-2. With the further growth of manufacturing, the process of savings, investment, capital formation and economic growth increases the marginal product of labour. With $MP_L > W_M$ in the manufacturing sector, the demand for workers increases further. Phase-2 growth tends to be more capital intensive than the phase-1. This increases the demand for skilled labour along with the low skilled labour as there exists complementarity between the capital and the high skilled labour. The increased demand for skilled workers pushes the wage premium of skilled workers up. This is documented for India by Kapoor (2016) who finds that rising capital intensity of production has exacerbated wage inequality and resulted in growing divergence in wages earned between skilled and unskilled workers. Increased demand for low-skilled workers has to be satisfied again either from N_F or N_C . To attract more workers, manufacturing sector has to increase the wages for workers. At the same time, the income of farmers $W(N_F)$ might also increase due to intertemporal increase in agricultural productivity and rural labour market tightening due to shift of N_C to manufacturing sector. However, the rate of increase of $W(N_M)$ has to be higher than the rate of increase of $W(N_F)$ so as to provide sufficient incentives to workers to attract them from N_C and N_F . Moreover, $W(N_F)$ would increase at slower pace than

that of the $W(N_M)$ as the productivity growth in the latter would be higher. Therefore, the initial difference in $(W(N_M) - W(N_F))$ widens. Also, the difference $(W(N_M) - W(N_C))$ would increase. Essentially, in the second phase all the incomes increase but at different rates which increases the differences in incomes. These increased differences in the incomes in the economy would imply that the inequality increases. This is consistent with the finding of Pieters (2010) that the heavy manufacturing increases inequality due to sector premium and the findings of Gordon and Resosudarmo (2018) wherein they find the manufacturing growth increases inequality primarily due to non-inclusive nature of growth. Column (7) of table 5 shows that the medium and large manufacturing plants, which can be expected to contain the heavy manufacturing, increase inequality whereas the micro and small plants decrease the inequality. The distributional consequences of phase-2 growth can be seen in the right panel of figure A2 entitled phase 2 Lorenz. The dashed line is the same as in the left panel of figure A2, i.e. belonging to the inequality level after the manufacturing growth in the first phase. The dotted line is for the inequality level after the manufacturing growth in the second phase. The phase-2 Lorenz curve falls out to the right of the phase-1 Lorenz curve at the middle and higher part because along with the increase in the wages of the casual labour, the incomes of skilled workers increase commanding higher share in the distribution. The implication of the rising incomes due to manufacturing growth would be that the poverty in both the phases should fall as the absolute levels of incomes in the economy increases. This should be reflected by declining the 90/10 ratio. It is indeed the case as can be seen from summary stats table wherein the average of 90/10 falls.

5.2 Robustness of the results

The U-shape relationship between inequality and manufacturing industry measures is robust to alternate measures of inequality⁸⁹ such as ratio of consumption expenditure of 90th percentile to 10th percentile (i.e. 90/10) and Gini of earnings instead of consumption, as can be seen from table A1 in the appendix. Column (4) of table A1 which pertains to the specification where India normalised manufacturing industry measure regressed on alternate inequality measure - ratio of 90/10 of consumption expenditure shows that the linear term and the squared term coefficients are negative and positive respectively. Both are statistically significant. The signs are the same as in table 4 and the values of the coefficients are almost double. Column (5) pertains to the specification where population normalised manufacturing industry variable is regressed on the same 90/10 ratio. It shows that compared to results in table 4, the linear and squared terms have the same sign for this variable and the coefficient value of the linear term is higher although that for the squared term is almost same. Results in column (7) and (8) which pertain to the manufacturing industry variables regressed on Gini of earnings instead of consumption also show the U-shape relationship for both the industry measures.

The relationship between the inequality and the manufacturing sector can be driven by the direct effect and indirect effect. The direct effect is the effect of manufacturing growth on inequality via employment in the manufacturing sector. The indirect effect is the one where manufacturing industry growth influences

⁸⁹ We also defined the manufacturing industry variables using CMIE data in addition to the ASI data and estimated the relationship. The results show that the U-shape relationship is statistically significant for absolute no. of plants variable and for normalized variables the sign of the coefficients are same as for the ASI but they are not statistically significant. These results are available on request.

inequality via spillover effects. It appears that the direct effect of growth of manufacturing industry is that of reducing inequality. Regressing inequality measures on the manufacturing industry employment variable might throw some light in this regard. Column (1) and column (6) of table A1 in the appendix which pertains to Gini of consumption and earnings regressed on log of manufacturing industry employment respectively, show negative association. The inclusion of the squared term in this specification (columns (2) and (3)) renders the linear term insignificant although the squared term is significant. The negative association between inequality and manufacturing industry employment variable indicates that the direct effect of manufacturing plants on inequality is that of reducing inequality. So, the U-shape relationship between inequality and industry measures is driven by the spillover effect (indirect effect) and not by the employment effect (direct effect).

To look deeper into the U-shape relationship between inequality and the manufacturing industry growth, we decompose the measures of according to location into two groups – rural-urban and according to the size of the plants again into two groups– micro and small combined, and medium and large combined. Table 5 presents the results. It can be seen from columns (1) and (2) that the U-shape relationship between the inequality and manufacturing industry is driven by urban manufacturing plants. However, these results will depend on how the definition of urban areas changes with the progression of the time. Because over the period, the areas with manufacturing plant locations attract more migration and results in larger habitations leading them to become urban areas vis-à-vis formerly rural areas. The variable pertaining to the rural sector has statistically insignificant linear and squared term. This is true for both the measures of manufacturing industry –

India normalised and population normalised. The specification with only linear terms of micro+small and medium+large plants given in columns (5) - (8) in the table 5 shows that both India normalised and population normalised micro+small industry variable has negative association with inequality and it is statistically significant except for the specification in column (5). The Med+large variables have statistically insignificant association except in specification (7). Specification in column (7) shows that both India normalised micro+small and medium+large variables have statistically significant relationship with inequality with the sign of the coefficient of the former being negative and the sign of the latter being positive. Adding the squared terms of these variables for both India normalised and population normalised measures does not yield statistically significant results.

Table 5. Decomposed manufacturing industry measures and inequality

	Gini						90/10	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Ind Norm Plants (Rural)	-0.078 (0.2307)							
Sq Ind Norm Plants (Rural)	0.039 (0.2563)							
Ind Norm Plants (Urban)	-0.213** (0.0884)							
Sq Ind Norm Plants (Urban)	0.046** (0.0185)							
Pop Norm Plants (Rural)		0.018 (0.0701)						
Sq Pop Norm Plants (Rural)		-0.014 (0.0113)						
Ind Pop Plants (Urban)		-0.142*** (0.0294)						
Sq Pop Norm Plants (Urban)		0.027*** (0.0039)						
Ind Norm Plants (mic+small)			-0.177 (0.2002)		-0.091 (0.1025)		-0.147* (0.0866)	
Sq Ind Norm Plants ((mic+small))			0.046 (0.0618)					
Ind Norm Plants (med+large)			0.498 (0.5878)		0.223 (0.2504)		0.444** (0.1914)	
Sq Ind Norm Plants (med+large)			-0.389 (0.5559)					

Pop Norm Plants (mic+small)				-0.001 (0.0520)		-0.073* (0.0384)		-0.160*** (0.0431)
Sq Pop Norn Plants ((mic+small))				-0.010 (0.0079)				
Pop Norm Plants (med+large)				-0.137** (0.0536)		0.012 (0.0382)		-0.031 (0.0190)
Sq Pop Norn Plants (med+large)				0.017** (0.0062)				
Controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	3.049* (1.5525)	3.258** (1.4554)	3.118* (1.4948)	2.899* (1.5134)	3.145* (1.5101)	3.381** (1.5180)	1.472 (2.3647)	2.210 (2.2623)
Observations	1,006	1,006	1,006	1,006	1,006	1,006	1,006	1,006
R-squared	0.286	0.300	0.284	0.298	0.283	0.287	0.236	0.251
Number of state_district_code	503	503	503	503	503	503	503	503

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. The control variables are same as in table 4.

5.3 Results of spatial models

We are interested in investigating if the estimates of the standard panel fixed effects model have picked up any spatial effects and hence are biased. To that end we present the results of spatial dependence tests for both the specifications each pertaining to India normalised plants and population normalised plants discussed in section 3.5 in table 5. We can see that the null of no spatial autocorrelation or no spatial dependence for the Moran's I (equation (10)) is rejected for both the specifications. This means that there is some kind of spatial autocorrelation present in our data and hence the model that was estimated using equation (1) might not be correctly specified. Moran's I is a diffused test and we don't know exactly how to model this presence of spatial dependence. To get handle of this problem, we have to enquire into the results of the LM tests for lag, error and SARMA. The LM test as given in equation (11) for the lag model, rejects the null that there is no spatial dependence. The LM tests for error model as given in equation (12) also rejects the null. Moreover, the LM test for SARMA model as given in equation (13) also rejects

the null. So now, we have no unambiguous conclusion in terms of spatial model specification. Therefore, we have to check the results of the robust LM tests. The robust LM test for lag model as given in equation (14) is not significant. However, the robust LM test for error model is significant and this provides us a way ahead. The tests of spatial dependence show that the SAR error model is an appropriate model in this context. For comparison across spatial models, the results of SAR lag and SARMA models are presented in the appendix A, in table A1 and A2

Table 6 Tests for spatial dependence

	India Normalised	Population Normalised
Moran's I	4.890*** (0.0000)	4.844*** (0.0000)
Lagrange Multiplier (lag)	13.236*** (0.0003)	13.184*** (0.0003)
Robust LM (lag)	0.694 (0.4048)	0.490 (0.4839)
Lagrange Multiplier (error)	19.468*** (0.0000)	19.024*** (0.0000)
Robust LM (error)	6.926*** (0.0085)	6.330*** (0.0119)
Lagrange Multiplier (SARMA)	20.162*** (0.0000)	19.514*** (0.0001)

Notes: P-values in parenthesis. *** p<0.01, ** p<0.05, * p<0.1

respectively.

Table 6 provides the results of SAR error model. There are results for 4 specifications. Column (I) pertain to the log Gini regressed on India level normalised plants along with controls same as specification (I) of standard panel effects model shown in table 4, with no spatial lag of overall development variable and the plants. In column (II) two more variables appear in addition to the column (I) in table 6: one variable of these two is spatially lagged manufacturing industry measure and the second variable is the spatially lagged overall development variable. The

specification in column (III) is same as column (I) except that the column (III) pertains to the specification with population normalized manufacturing plants variable. Column (IV) is again same as column (II) except that the column (IV) pertains to the specification with population normalized plants variable. We see that the lambda parameter which represents the spatial autocorrelation of the nuisance type is highly significant. This indicates to the fact that the inequality in a focal district depends on the factors beyond the focal district that are not included in the model. The inequality in a district is not influenced by the inequality in the neighbouring district (lag parameter is insignificant in table A1) but is influenced by some other factors that are present in the neighbouring districts. If we include spatially lagged manufacturing industry variable and overall development variable, the coefficient of lambda falls marginally and remains significant. This indicates that there are other factors beyond these two variables from neighbouring districts which strongly influence the inequality in the focal district. Moving ahead, although the sign of the coefficient for the India normalised plants variable and its squared term is similar to that in the standard panel fixed effects model as shown in table 4, they are no more significant in the spatial error model. At the same time, the lambda is significant. This again points to the fact that there exist some strong processes in the neighbouring districts that are stronger than the mere presence of plants in influencing the inequality in the focal district. However, the results from SAR error model are similar to standard model for the population normalized plants, although there is a reduction in the coefficient value of the linear term in the SAR error model (to -0.069) compared to the standard model (from -0.088). This is true for its squared term also which decreases marginally. This means without spatial filter variable, the industry concentration variable – India normalised plants was picking up the effect

of the spatial dependence. Furthermore, the coefficients for population normalized plants and its squared term drop marginally if we add spatially lagged industry variable and spatially lagged overall development variable.

The coefficient for the overall development variable is slightly higher in the error model than the standard model. Among the control variables, the variables that were insignificant in the standard model remain insignificant. The total population variable which was significant in the standard model loses its significance in the spatial model. The coefficient value of the literacy rate is almost same as in the standard model, however the coefficient value of the graduate population variable decreases marginally in the spatial model. Interestingly, the spatial lag of the overall development variable is negative which means that the development in the neighbouring districts is associated negatively with the inequality in the focal district. The spatially lagged manufacturing industry variables have negative values of their coefficients which might indicate that the manufacturing growth in the neighbouring districts reduces inequality in the focal district but these coefficients are insignificant. The significance of lambda in the error model indicate that the patterning of various factors in similar regions was to some extent accounted for by spatial autoregressive process.

Table 7. Results of the Spatial Error Model

Dependent Variable: Log Gini	India Normalised		Population Normalised	
	(1)	(2)	(3)	(4)
	No Lag	Lag	No Lag	Lag
India Norm Plants*100	-0.055 (0.0748)	-0.044 (0.0747)		
Sq India Norm Plants	0.001 (0.0126)	-0.004 (0.0128)		
Pop Norm Plants*10000			-0.069** (0.0277)	-0.061** (0.0286)
Sq Pop Norm Plants			0.006** (0.0023)	0.005** (0.0024)
India Norm Service Emp	0.032 (0.0598)	0.033 (0.0611)	0.036 (0.0587)	0.033 (0.0592)
First Princ. Comp.	0.167*** (0.0151)	0.170*** (0.0151)	0.167*** (0.0151)	0.170*** (0.0150)
Literacy Rate	0.010** (0.0039)	0.009** (0.0039)	0.01** (0.0039)	0.009** (0.0039)
Villages-Pucca Roads (%)	-0.001 (0.0005)	-0.001 (0.0005)	-0.001 (0.0005)	-0.001 (0.0005)
Villages-Power (%)	0.000 (0.0003)	0.000 (0.0003)	0.000 (0.0003)	0.000 (0.0003)
Bank Branches (Log)	0.043 (0.0415)	0.049 (0.0407)	0.043 (0.0411)	0.051 (0.0403)
PMS schools (Log)	0.005 (0.0213)	0.001 (0.0219)	0.002 (0.0214)	-0.001 (0.0218)
HSC & Colleges (Log)	0.02 (0.0262)	0.022 (0.0259)	0.023 (0.0248)	0.025 (0.0249)
Urban Population (%)	-0.002 (0.0027)	-0.002 (0.0027)	-0.002 (0.0026)	-0.002 (0.0026)
Total Population (Log)	0.117 (0.1164)	0.107 (0.1161)	0.108 (0.1156)	0.096 (0.1152)
Graduate & Above (Log)	-0.214*** (0.0744)	-0.199*** (0.0706)	-0.217*** (0.0720)	-0.206*** (0.0693)
Migration Rate	0.009 (0.0100)	0.007 (0.0101)	0.01 (0.0100)	0.009 (0.0102)
SC/ST Population (%)	0.062 (0.2710)	0.122 (0.2724)	0.068 (0.2728)	0.136 (0.2722)
Habitable/Tot Land (%)	-0.001 (0.002)	-0.001 (0.002)	-0.001 (0.0019)	-0.001 (0.0020)
Error Parmeter (Lambda)	0.320*** (0.0536)	0.294*** (0.0565)	0.308*** (0.0537)	0.284*** (0.0562)
Sp. Lag First Princ. Comp.		-0.060** (0.0266)		-0.054** (0.0262)
Sp. Lag Ind. Norm. Plants		-0.175 (0.1441)		
Sp. Lag Pop. Norm. Plants				-0.065 (0.0592)
Constant	-0.274***	-0.193***	-0.272***	-0.197***

	(0.0621)	(0.0681)	(0.0608)	(0.0665)
District FE	Yes	Yes	Yes	Yes
Observations	1006	1006	1006	1006
Pseudo R-squared	0.269	0.283	0.277	0.290
Number of Districts	503	503	503	503

Notes:

KP-HET standard errors in the parenthesis.

*** p<0.01, ** p<0.05, * p<0.1

6. Concluding Remarks

The results have shown that there exists a U-shaped relationship between the manufacturing industry and inequality in India. This relationship holds for both measures of industry. The overall development indicator variable is positively associated with inequality which indicates that the inequality increases in the district as the economic development progresses. The U-shape relationship between manufacturing industry and the inequality entails that the inequality decreases in the initial phases of the manufacturing industry growth and increases in the next phases. The decrease in the initial phase comes as the growing manufacturing sector provides relatively higher income to the workers at the bottom of the income distribution. The inequality increases in the next phases of manufacturing growth because this growth is capital intensive and provides wage premium to the high skilled workers.

The U-shaped relationship holds in the spatial models for the population normalised variable but not for the india normalised variable. The spatial models show that the standard models that do not account for the spatial dependence estimate the coefficients in a biased manner. These results have policy implication that if the manufacturing industry grows in a capital intensive manner inequality will increase. Moreover, India which has comparative advantage in labour would

not be able to utilise it to its benefit. If the manufacturing industry grows in such a way that it creates employment for the low skilled population, the inequality increase can be contained and subsequently poverty reduction can be achieved at the faster rate.

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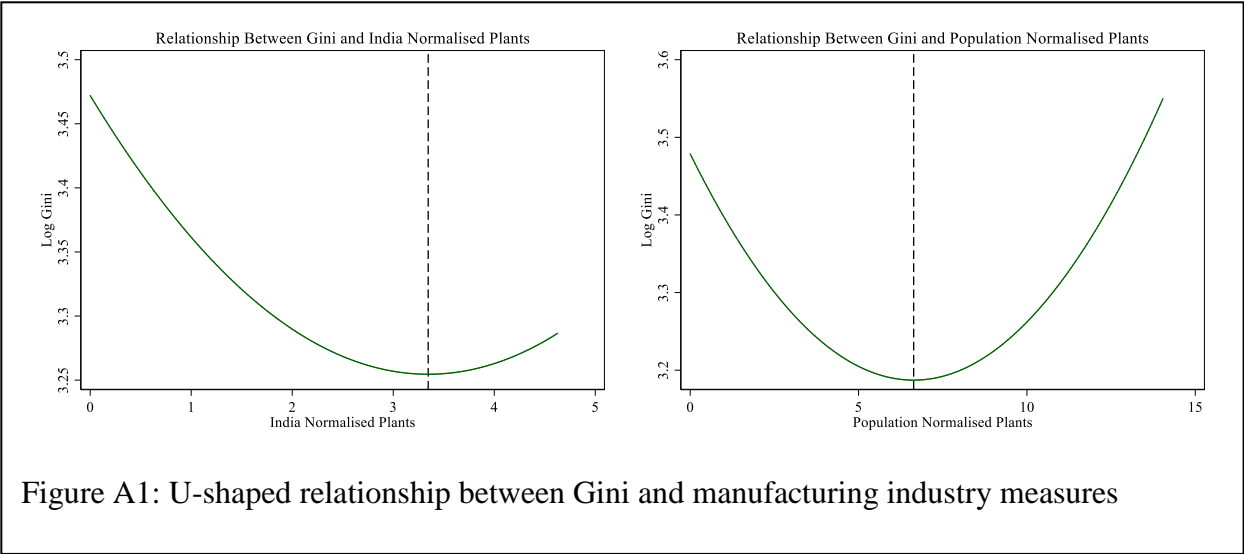
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Appendix A



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Figure A2: Lorenz Curves for Phase-1 and Phase-2.

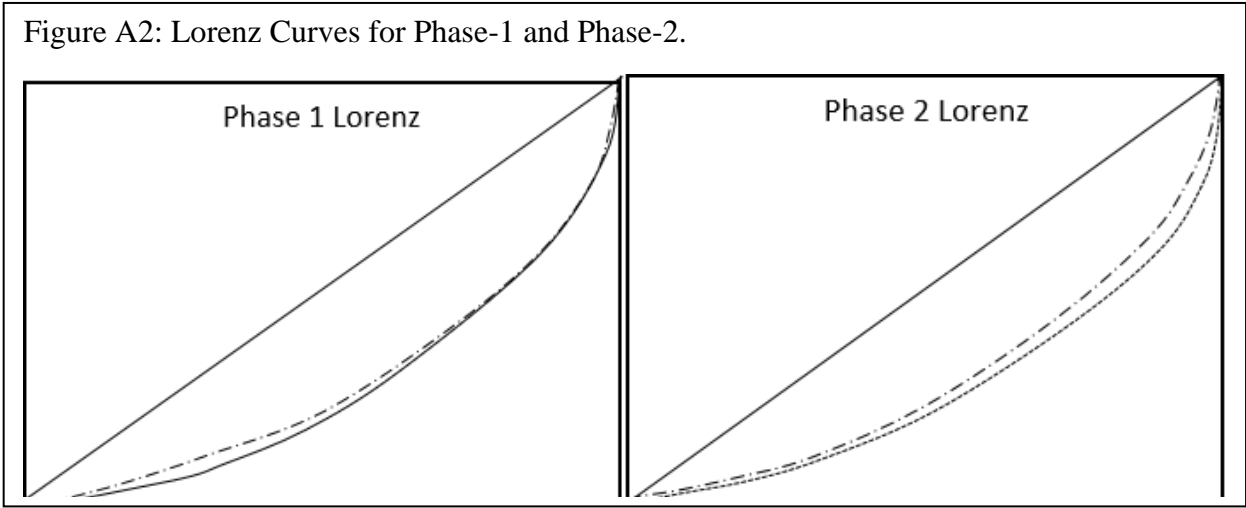


Table A1. Robustness of relationship between manufacturing industry and inequality

	Consumption inequality					Earnings inequality		
	Gini			90/10		Gini		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
ASI Emp (Log)	-0.009*					-0.013*		
	(0.0049)					(0.0069)		
Ind Norm ASI Emp		-0.040						
		(0.0621)						
Sq Ind Norm ASI Emp		0.019*						
		(0.0110)						
Pop Norm ASI Emp			-0.000					
			(0.0002)					
Sq Pop Norm ASI Emp			0.000***					
			(0.0000)					
India Norm Plants				-0.284***			-0.139**	
				(0.0863)			(0.0640)	
Sq India Norm Plants				0.036**			0.024**	
				(0.0149)			(0.0108)	
Pop Norm Plants					-0.148***			-0.045*
					(0.0352)			(0.0225)
Sq Pop Norm Plants					0.007***			0.005***
					(0.0019)			(0.0012)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year Dummy	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
District FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	3.08**	3.208**	2.935*	1.374	1.895	1.591	3.375**	3.456**
	(1.5441)	(1.5616)	(1.5395)	(2.3606)	(2.3227)	(2.4121)	(1.5223)	(1.4926)
Observations	1,006	1,006	1,006	1,006	1,006	1,006	1,006	1,006
R-squared	0.284	0.284	0.293	0.243	0.252	0.237	0.182	0.186
Number of Districts	503	503	503	503	503	503	503	503

Notes: Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.1. Control variables are same as in table 4.

Table A2. Results of the SAR and SARMA

Dependent Variable:	SAR Model		SARMA Model	
	India Norm	Population Norm	India Norm	Population Norm
Log Gini	(1)	(2)	(3)	(4)
India Norm Plants*100	-0.109 (0.0693)		-0.072 (0.0763)	
Sq India Norm Plants	0.015 (0.0121)		0.005 (0.0137)	
Pop Norm Plants*10000		-0.083*** (0.0248)		-0.073*** (0.0278)
Sq Pop Norm Plants		0.006*** (0.0023)		0.006*** (0.0023)
India Norm Service Emp	0.02 (0.0635)	0.018 (0.0618)	0.028 (0.0597)	0.031 (0.0578)
First Princ. Comp.	0.157*** (0.0162)	0.157*** (0.016)	0.164*** (0.0152)	0.164*** (0.0152)
Literacy Rate	0.009** (0.0039)	0.009** (0.0038)	0.009** (0.0040)	0.009** (0.0040)
Villages-Pucca Roads (%)	-0.001 (0.0004)	-0.001 (0.0004)	-0.001 (0.0005)	-0.001 (0.0005)
Villages-Power (%)	0.000 (0.0003)	0.000 (0.0003)	0.000 (0.0003)	0 (0.0003)
Bank Branches (Log)	0.048 (0.0373)	0.048 (0.0367)	0.043 (0.0412)	0.042 (0.0411)
PMS schools (Log)	-0.006 (0.0211)	-0.008 (0.0211)	0.001 (0.0217)	0 (0.0218)
HSC & Colleges (Log)	0.029 (0.0292)	0.029 (0.028)	0.023 (0.0266)	0.024 (0.0252)
Urban Population (%)	-0.002 (0.0027)	-0.001 (0.0027)	-0.002 (0.0026)	-0.002 (0.0026)
Total Population (Log)	0.154 (0.1115)	0.144 (0.1114)	0.126 (0.1217)	0.114 (0.1211)
Graduate & Above (Log)	-0.225*** (0.0741)	-0.226*** (0.0722)	-0.215*** (0.0769)	-0.216*** (0.0757)
Migration Rate	0.007 (0.0098)	0.008 (0.0098)	0.008 (0.0101)	0.01 (0.0101)
SC/ST Population (%)	0.069 (0.2359)	0.087 (0.2367)	0.061 (0.2663)	0.07 (0.2697)
Habitable/Tot Land (%)	-0.001 (0.0020)	-0.001 (0.0020)	-0.001 (0.0020)	-0.001 (0.002)
SAR Parmeter	0.129 (0.1480)	0.105 (0.1543)	0.103 (0.1647)	0.085 (0.1712)
Lambda			0.261** (0.1398)	0.281** (0.1431)
Constant	-0.259* (0.0603)	-0.258*** (0.0594)	-0.265*** (0.0616)	-0.264*** (0.0609)
District FE	Yes	Yes	Yes	Yes
Observations	1006	1006	1006	1006
Pseudo R-squared	0.290	0.294	0.2856	0.291

Spatial Psuedo R-squared	0.269	0.277	0.2669	0.275
Number of Districts	503	503	503	503

Notes: HAC standard errors for SAR model and KP-HET standard errors for SARMA model in the parenthesis.

*** p<0.01, ** p<0.05, * p<0.1

Appendix B

This appendix discusses the tests for detecting spatial dependence.

Moran's I is given as:

$I = \frac{\frac{e'we}{\frac{S_0}{\frac{e'e}{n}}}}$ where S_0 is the sum of weights, which if weights are row standardized becomes

$$I = \frac{e'we}{e'e} \quad (10)$$

i.e. a simple ratio of two quadratic forms in the regression residuals. The Moran's I test statistic has asymptotic distribution that is approximated by the standard normal. We plug the residuals into the expression of the Moran's I to get the test statistic. The numerator of the Moran's I is the cross product of the residuals and the spatial lag of the residuals. The denominator is the variance of the residual. The null in the Moran's I test is that there is no spatial autocorrelation of any form. Rejecting the null means that there is spatial autocorrelation of some form (not necessarily lag or error).

However, having information only about the presence of spatial autocorrelation is not sufficient and it is important to know the form of such spatial autocorrelation so as to be able to model it. Here comes the role of focused tests. There are 5 focused tests important to us: Lagrange Multiplier (LM) lag test, LM error test, LM SARMA test, LM robust lag test and LM robust error test. It is useful to discuss these tests briefly. The null hypothesis for LM error, LM lag test and LM SARMA test is the standard linear specification of the regression model of the type given in equation (1) or equation (4) without error process. In other words, $H_0: \rho = 0$ for lag model, $H_0: \lambda = 0$ for error model and $H_0: \rho = \lambda = 0$ for SARMA model.

The specific alternative for the LM lag test is that the model includes spatially lagged dependent variable as given in equation (2). The LM lag test is given as follows:

$$LM_{\rho} = \frac{d_{\rho}^2}{D} = \frac{(e'Wy/(e'e))^2}{\frac{(WX\hat{\beta})'[I-X(X'X)^{-1}X'](WX\hat{\beta})}{e'e} + tr(WW+W'W)} \sim \chi^2(1) \quad (11)$$

where \mathbf{e} is a vector of OLS residuals, $\mathbf{WX}\hat{\beta}$ is a spatially lagged predicted values of explanatory variable \mathbf{X} . The numerator term is covariance between OLS residuals and lag term divided by the variance of OLS residuals and the whole term is squared. In the denominator, the first part $\frac{(WX\hat{\beta})'[I-X(X'X)^{-1}X'](WX\hat{\beta})}{e'e}$ is the sum of squared residuals in a regression of the spatially lagged predicted values, $\mathbf{WX}\hat{\beta}$, on the \mathbf{X} . The remaining term $tr(WW + W'W)$ is a matrix trace expression for the weights matrix.

The specific alternative hypothesis for the LM error test of spatial autoregressive form is as given in equation (4) and that of spatial moving average form is $\mathbf{e} = \lambda\mathbf{W}\mathbf{v} + \mathbf{v}$; where \mathbf{v} is vector of idiosyncratic errors, $\mathbf{W}\mathbf{v}$ is spatially lagged term for moving average form, λ is associated coefficient of the spatially lagged terms. The LM test cannot distinguish between the autoregressive and moving average processes. The LM error test is given as follows:

$$LM_{\lambda} = \frac{d_{\lambda}^2}{T} = \frac{(e'W\mathbf{e}/(e'e))^2}{tr(WW+W'W)} \sim \chi^2(1) \quad (12)$$

The numerator term in equation (12) is covariance between OLS residuals and spatial lag of the residuals divided by the variance of OLS residuals and the whole term is squared. The denominator is the trace expression.

In LM SARMA test, the alternative hypothesis is the SARMA model,

$y = \rho Wy + X\beta + e$ where $e = \lambda We + v$ (for SAR error process) Or $e = \lambda Wv + v$ (for moving average process). In other words, $H_1: \rho \neq 0$ and $\lambda \neq 0$.

The LM SARMA test is given as follows:

$$LM_{\rho\lambda} = \frac{d_\lambda^2}{T} + \frac{(d_\lambda - d_\rho)^2}{D - T}$$

$$LM_{\rho\lambda} = \frac{(e'We/(e'e))^2}{tr(WW+W'W)} + \frac{\left(\left(\frac{e'We}{e'e}\right) - \left(\frac{e'Wy}{e'e}\right)\right)^2}{\left[\frac{(WX\hat{\beta})' [I - X(X'X)^{-1}X'] (WX\hat{\beta})}{e'e} + tr(WW+W'W)\right] - tr(WW+W'W)} \sim \chi^2(2)$$

(13)

In the SARMA test, the first part on the RHS is the LM error test; however, the second part is not the LM lag test. The second part is the robust LM lag test. So, the SARMA test is not the sum of the test of both error and lag. It is the sum of the LM error and robust LM lag test. SARMA test consists of two terms, and can be significant if one of those terms is significant.

The remaining two LM tests are the robustified versions of the LM lag and LM error tests. The LM test for lag (error) model is sensitive to the presence of spatial autocorrelation (spatial lag). These tests therefore may suggest wrong alternative. The robustified LM tests are developed to correct for this undesirable property of the standard LM tests. Essentially, the robustified tests remove the value corresponding to potential influence of the 'other' alternative hypothesis. LM statistics are corrected for covariance between d_ρ and d_λ . Then if the considered alternative was proper then the correction will be minimal and the robustified test statistic would be similar to the original. If the alternative was incorrect then the robustified test statistic will move away from being significant to being insignificant. By construction, the test statistic of the robustified test will always be smaller than the original test statistic.

The LM robust test for lag model is given as

$$LM_{\rho}^R = \frac{(d_{\lambda} - d_{\rho})^2}{D - T} = \frac{\left(\left(\frac{e'we}{e'e} \right) - \left(\frac{e'wy}{e'e} \right) \right)^2}{\left[\frac{(wx\hat{\beta})' [I - X(X'X)^{-1}X'] (wx\hat{\beta})}{e'e} + tr(WW + W'W) \right] - tr(WW + W'W)} \sim \chi^2(1) \quad (14)$$

And robust test for error model is given as

$$LM_{\lambda}^R = \frac{(d_{\lambda} - TD^{-1}d_{\rho})^2}{[T(1 - TD)]} = \frac{\left(\left(\frac{e'we}{e'e} \right) - tr(WW + W'W) \left[\frac{(wx\hat{\beta})' [I - X(X'X)^{-1}X'] (wx\hat{\beta})}{e'e} + tr(WW + W'W) \right]^{-1} \left(\frac{e'wy}{e'e} \right) \right)^2}{tr(WW + W'W) - \left(tr(WW + W'W)^2 \left[\frac{(wx\hat{\beta})' [I - X(X'X)^{-1}X'] (wx\hat{\beta})}{e'e} + tr(WW + W'W) \right] \right)} \sim \chi^2(1) \quad (15)$$

The robust tests are not better than the standard tests rather they should be used after the standard tests significantly reject the null. Robust tests can be used in model specification search strategy. So, looking first at the standard LM test, then looking at the robust LM test, one can decide reliably, which is the proper alternative, i.e. appropriate specification spatial model.

Energy Transition Metals and Economic Development in Latin America

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August 2022
Preliminary version

Abstract

This paper aims to analyze the role of energy transition metals (ETM) in the development of regions, in Latin America countries conditional on the quality of institutions in place. As an increase in the demand of ETM is expected in line with the energy transition needs, several countries, ETM producers, may profit of the bonanza or, on the contrary, may fall into a natural resources curse. We aim to identify these effects at a disaggregated level. To do this, we construct and use an original dataset on 18 Latin American countries, at regional level, employing geo-localized data on the ETM mines locations. We also build a new regional index of the quality of institutions. We find that ETM have a positive impact on regional growth, under specific conditions.

JEL: O13, O47, O54, Q32

Keywords: Development, Resource curse, Energy Transition Metals, Latin America

Introduction

Limiting global warming and meeting the climate objective put forward by the COP Agreement supposes a profound restructuring of economic activities. This requires a transition of the economies to a less energy intensive framework and a low/zero carbon future. While the transition to a low/ zero carbon future implies a reduction in the demand of fossil fuels which will affect the producers, it also implies an increase of the demand of other mineral and metals required for the transmission, storage and subsequent expansion of green energy. In order to assess the increase of use of Energy transition metals (ETM)¹, the World Bank Group (2017) proxy low carbon future using wind, solar, and energy storage batteries to estimate the demand of metals required to meet the goals of global temperature increase (e.g. 2°C , 4°C and 6°C). For example, depending on the scenario, demand may increase as much as 1000% for metals required for the production of electric batteries.

The goal of low/zero carbon implies that the consumption of some natural resources like copper, iron, lithium, etc, will dramatically increase while the consumption of fossil fuels would decrease in the long run. This duality of natural resources² represents a global opportunity for developing countries rich of these resources: Latin America's economies have a key strategic advantage in copper, iron ore, silver, lithium, aluminum, nickel, manganese, and zinc; Africa in platinum, manganese, bauxite, and chromium; Asian economies as well (particularly China with both metals and rare earths, India in iron, steel and titanium and Indonesia, Malaysia and Philippines to a lesser extent in other metals) (World Bank Group, 2017).

While the World Bank Group (2017) highlights the potentials of the demand of ETM for developing countries, it neglects the possible negative impacts that it may bring to the nations, in the form of an (over) dependency on natural resources and how during the 70's and 00's most of the countries with abundant natural resources presented stagnation in economic growth (Sachs and Warner, 2001).

This paper focuses on the impact that ETM (measured as mines, production capacity and related activities) have on economic growth in Latin America (LA). We focus on LA countries as they are largely dependent on natural resources. For example, net commodity exporters countries represent 93% of LA GDP Sinnot et al. (2011). The share of natural resources in exports has decreased over time but much is less than in other

¹For the rest of the text ETM will refer to minerals and metals needed to meet the demand of the required deployment of technology in order to meet a carbon-constrained scenario

²We use natural resources and commodities indifferently and both refer to traded, non- branded, bulk goods with little to no processing, which characteristics can be objectively established and they are supplied without qualitative differentiation across a market Sinnot et al. (2011)

regions: in the case of East Asia and Pacific commodity exports passed from 93.9% in the 1970's to 29.9% in 2000's while in LA passed from 85.5% to 51.6%. Over the last decade the share of realexport of primary products has been relatively stable with an average of 55.5%.

Further, LA countries tend to have lower natural resources endowments percapita than high income countries yet LA economies are much more dependent on them (developed countries average share of commodity exports was 17.8% in 2000's) (Sinnot et al., 2011) while LA economies had an average share of primary products (based on renewable sources) of 27.9% and an average shareof exports of non renewable resources of 29.3% over the last couple of decades(ECLAC, 2021).

Moreover, we analyze this impact at regional level. We implement this disaggregated approach as regions tend to have heterogeneous development paths: capital regions tend to account for a big portion of the economy activity, in oursample their participation in the country GDP is on average 29.5% and it can beas high as 68%. The impact that ETM possibly have on the regional economy may help to reduce this divergence in the path of development. Further, the contribution of ETM to the economy may get diluted at national level. We consider that this level of disaggregation helps us to better capture possible local externalities of the ETM sectors.

We investigate the effect of ETM on the economic growth of the LA regions, conditional on the quality of institutions in place; to the best of our acknowl- edge, this is a first attempt to exploit regional data in 18 countries covering 334sub-national units in Latin America to analyze the effect of natural resources -particularly ETM- on economic development. We focus in the quality of in- stitutions for three reasons: first, scholars (see Acemoglu and Robinson (2012), North (1990) or Rodrik et al. (2004), for further explanation) recognize that the quality of institutions is a key factor for sustainable development. Second, we observe that the quality of institutions in LA is lower than in high income countries, or their Europeans and East Asians counterparts, and has decayed over the last decade in Latin America reaching a minimum value in 2016 ³, while the quality of institutions has been increasing in high income countries Kraay et al.(2010). Third, the literature shows that the quality of institutions may shape the impact that natural resources have in the economy (Mehlum et al. (2006),Ross (2001), Bhattacharyya and Hodler (2010), de Vaal and Ebben (2011)). Hence, we consider that the inclusion of quality of institutions is key to the analysis of ETM.

The rest of the paper is divided as follows: section 2 is dedicated to the literature review, with a focus on natural resources curse. Section 3 presents the data. Section 4 reports the results followed by robustness checks. The last section concludes.

³We use the average value of 6 variables that control for quality of institutions from theWGI to compute a measure of country quality of institutions

Literature Review

The literature regarding the relation of natural resources and development is vast, but mainly focused on the resource curse. It highlights the negative relation between resources abundance and economic development captured using GDP growth (see Sachs and Warner (2001), Frankel (2010), Humphreys et al. (2007), Ross (2001), etc.). However in the case of LA the results are inconclusive: Sinnot et al. (2011) states that Latin American countries have escaped this curse, but Papyrakis and Pellegrini (2019) find that the region show mixed results.

Even if there's a vast literature related to natural resources effect, mainly focus on the effects of fossil fuels, there's little to none information related to ETM. Nevertheless, the channels described by the resource curse apply to any natural resource with a given set of characteristics that in most of the cases are common to ETM as type of natural resource, high rents, price volatility and effect on institutions.

In the first part of this section we describe the main channels through which natural resources may constitute a burden for economic growth, we will focus particularly in the institutional channel, hence second, covers the literature related to the quality of institutions, particularly corruption and economic development. In the last section we highlight empirical works related to the topic.

Resource curse's channels

Characteristics of natural resources

First it is important to highlight the specific characteristics of natural resources that make them unique. To start, resources are in general not produced but rather extracted, that's why usually there's not a production process involved. Thus, natural resource wealth can take place independently of other economic activities in the country. Humphreys et al. (2007), this is particularly true for the extraction of hydrocarbons where fields require specialized machinery and human capital that is unlikely to be found in the location of the resource.

Furthermore, most of the products from natural resource extraction represent commodities with little to none qualitative differentiation across markets. This characteristic is directly linked with the idea that the natural resource sector has low –to none- positive spill-overs in the economy. However, there's no compelling evidence that natural resources based production is necessarily inferior to other types of production in its linkage and spillovers as there's forward and backwards linkage in the sector that can boost growth Sinnot et al. (2011).

Moreover, many natural resources are non-renewable, thus their extraction constitutes a depletion of an asset for a country. Then to generate sustainable growth countries should invest the income of mineral extraction to the formation of other types of capital that allow current and future generations to profit from its benefits.

High rents

Commodity sectors, in particular hydrocarbons and minerals/metals produce high rents. This is a potential risk as an overdependence on natural resources can lead the economy to the Dutch disease Gylfason (2001), that is, the increase of commodity exports will tend to appreciate the real exchange rate which in return will affect and deviate resources from other sectors. In particular, it is believed that the appreciation of the exchange rate may deeply affect the manufacturer sector in the economy. Sachs and Warner (2001) proved how resource abundance leads to higher than normal prices in the economy making manufacturers to compete in international markets with higher prices, consequently rendering exporting sector uncompetitive.

Note that Latin American countries have experienced similar effects coming from the agricultural sector, as it produces considerable rents too in Brazil, Colombia and Central America with coffee, or with oilseeds and grains in Brazil, Argentina and Chile. Sinnott et al. (2011).

Price volatility

At theoretical level, prices of commodities may have a downward trend or an upward trend for non-renewables, nevertheless empirical studies may prove one or the other depending on the years of observation Frankel (2010), rather than focusing on this issue. It is important to note that commodities in particular fossils experience high volatility of prices.

Commodities tend to have higher volatility due to the low elasticity of supply and demand. Therefore, shocks in either side takes time to adapt. In the case of the oil sector, demand elasticities are low in the short run largely because the capital stock at any point in time is designed physically to operate with a particular ratio of energy to output. Supply elasticities are also often low in the short run because it takes time to adjust output, particularly if the production capacities are working at full capacity Frankel (2010).

Low elasticities create great fluctuations of prices of commodities, which may harm development. Depending on the level of dependency on commodities, volatility increases uncertainty and risk discouraging investment. In general a procyclical attitude of governments in the short run may harm development in longer time horizons. Increases in government's expenditure in boom cycles, may lead to difficult situations if policy makers fail to adjust the government expenditure when international prices fall, reducing significantly governments revenue and therefore exacerbating the magnitudes of the cycle.

Institutions

High rents can undermine institutions:

"This pool of easy money (referring to rents from natural resources), especially when combined with government ownership, creates conditions conducive to rent seeking and poor governance, and can undermine the development of good institutions and, consequently, of long-term growth" Sinnott et al. (2011)

The intrinsic relationship of natural resources and institutions has been largely discussed in the literature, we could divide the findings in direct effects, mainly antidemocratic effects and rise of corruption; and indirect effects, related to the effects of natural resources in an outcome of interest given the institutions:

Ross (2001) states that oil and minerals can undermine democracy, especially if the country is poor. The antidemocratic effect of oil is channelled to the state via (i) a rentier effect, when high rents allow the government to reduce taxes and avoid accountability, (ii) a repression effect, when government uses rents to invest more in national security that allows the state to prevent any democratic movement, and (iii) a modernization effect which suggests that highly educated and specialized working class will demand accountability and democracy, but due to the characteristics of oil and mineral extraction, either the government won't be interested in investing in education or people would choose rent seeking activities, which in return would delay democratization.

The idea behind is that democracy is strongly linked with accountability (as well as transparency) which will deter the discretionary power of public office which lead to better quality of institutions Holmberg et al. (2009), thus improving development. Similar effects are found related to the increase of corruption (Knutson et al. (2016), Sala-i Martin and Subramanian (2013), Sinnot et al. (2011) and Leite and Weidmann (1999)).

Regarding the indirect effects, the literature shows that natural resources can be a curse or a blessing depending on the quality of institutions in a country, if the institutions available are high (producers friendly) then natural resources will spur growth but if institutions are low (grabbers friendly) –referring to rent seeking activities– then natural resources will hinder development (Mehlum et al. (2006), Epo and Nochi Faha (2019)). Similar conditional results are found by Bhattacharyya and Hodler (2010) who say that if a country is democratic enough, natural resources will have a positive effect on development but if the democracy is weak NR will increase corruption; Further, NR can lead to higher (or lower) violence rate depending on the type of institutions set in place Couttenier et al. (2017).

These channels can be generalized to any commodity which gives high rents, reason why ETM may undermine institutions if the rents associated are high enough.

Corruption and development

In this section we address the literature related to economic development with a particular emphasis in the role of corruption given the strong relationship of natural resources with the spur of rent seeking activities.

The determinants of economic development can be narrowed to three strands: the neoclassical approach that focuses on inputs of physical and human capital in the production process and technological advances as the determinant of economic performance; a geographical strand underlying that geography location determines the economic performance of countries⁴; the third strand advocates that the key to economic performance is to assure institutions that support the market Gwartney et al. (2006). This latter hypothesis is defended by Acemoglu and Robinson (2012), North (1990) and Rodrik et al. (2004).

While the debate regarding the role of institutions is centered in whether the effect is significant (and of course positive) or not (put the citation of Rodrick and the other guy there Holmberg et al. (2009), North (1990)), corruption - commonly defined as the abuse of public office for private gain World Bank Group (2020)- stands as a separate topic giving mixed results.

The literature can be summarized in the positive (*grease on the wheels*) and negative (*sand on the wheels*) impacts of corruption on the economic performance. The *grease on the wheels* hypothesis states that if the government has pervasive and inefficient regulations then corruption can relax or remove bureaucratic rigidities, allocates investment or speed up process, then, the bribery can boost the economic performance (Leff (1964), Méon and Sekkat (2005), Ahmad et al. (2012)). The counterpart states that corruption *sand on the wheels* of the economy by reducing investment (Paulo et al. (2022), Gyimah-Brempong and de Gyimah-Brempong (2006), Mo (2001)), reducing government investment in education and health (Gyimah-Brempong and de Gyimah-Brempong (2006), Mo (2001), Leite and Weidmann

⁴The idea behind this is that countries situated in tropical areas are prone to more diseases as Malaria that reduces the productivity of the people and the soil in this zones tends to be less productive than those in more temperate areas. Hence, countries in temperate areas have relative advantages over nations in tropical areas Acemoglu and Robinson (2012)

(1999)) and causing missallocation of resources (Méon and Sekkat (2005), Tanzi and Davoodi (2000)).

While most of the literature finds a negative effect of corruption in economic development, usually the empirical and theoretical studies that find a positive effects of corruption on the GDP growth rely on the institutional environment, that is, corruption has a positive (negative) effect in a given country if the quality of institutions is weak (strong) (Ahmad et al. (2012), Malanski and Póvoa (2021), de Vaal and Ebben (2011), Bhattacharyya and Hodler (2010), Méndez and Sepúlveda (2006), Dzhumashev (2014)).

The following section covers the empirical results found in the literature related to the effect of natural resources at subnational level.

Local level impact and natural resources

There's a proliferating literature related to the effects of natural resources at a subnational level, particularly to its impact on the local labor market (see Marchand and Weber (2017) for a synthesis of the literature), in general we can highlight that most of the studies are concentrated on developed economies analyzing the effect of energy fossils (mainly oil and gas) in different aspects of the society as income, employment, inequalities, etc.

Marchand and Weber (2017) highlight the main results of the literature, in the case of the US and other developed countries as Canada and Australia, most of the literature analyzes the impact of booms and/or burst of fossils finding that at county level (or equivalent), natural resources have an impact in income and have, in most of the studies, positive spillovers.

Nevertheless, in the labor market the multiplier during burst tends to be higher than in a booming of the sector, that is, an expansion of the oil and gas sector tends to create less jobs than the ones that are destroyed during its contraction. Further, the results regarding the impact of natural resources in education are mixed. Further, Couttenier et al. (2017), give a glimpse on the potential relation of natural resources and institutions, they find that natural resources discoveries where there was an absence of formal institutions, lead to persistently higher levels of violence, that is to say, in United States of America natural resources discoveries before the formation of the state lead to permanent higher levels of violence. While in the US studies of growth of income show mixed results Marchand and Weber (2017).

The literature provides evidence regarding the impact of natural resources in Sub-Saharan Africa giving mixed results on different aspects of development: Axbard et al. (2021) find that mining activity reduce crime activity in South Africa due to the increase in the cost of crime thanks to an increase in job opportunities. In Burkina Faso artisanal gold mining has a positive effect on household consumption (in close communities) but industrial mining has no significant effect even though has a greater contribution to government revenue Bazillier and Girard (2020). Using nightlight data to measure development, Mamo et al. (2019) show that opening a mine accelerates growth in an area, nevertheless the effect of mining dies out at a 10km radius, that is to say, mining is an enclave activity in Sub-Saharan Africa, a similar result is found in the positive impact of gold mining on health in the region: mining opening and activity was associated with a

reduction of infant mortality but the effect disappeared at a 20km radius Benshaul-Tolonen (2018).

Negative outcomes are also found in the literature: Knutsen et al. (2016) find that mining activity in Africa has a negative effect on institutions (measure as corruption), they state that in these (mining) localities growth and corruption may have different dynamics but in the long-term growth would be affected due to the (negative) effect on the quality of institutions. While using mining intensity as a proxy for pollution Aragón and Rud (2015) show evidence that mining has a negative effect on agricultural productivity in Ghana. Further (von der Goltz and Barnwal, 2018) find evidence of health problems related to exposure to contamination of the mining sector

In the case of Brazil, Caselli and Michaels (2013) find that oil activity has no impact in the income, off-shore activities don't have significant spillovers, but on-shore activities tend to modify the composition of the economy without modifying the output. Additionally, they find that oil revenue modifies the characteristics of the bottom quantile in the localities studied but it doesn't have a robust effect in poverty, nor it shows a particular effect in the provision of public goods.

Aragón and Rud (2013) state that gold mining activity in Peru has positive downward spillovers and a positive effect on income, on consumption and an increase in relative prices in the locality close to the operation of the mine. Further, Gennaioli et al. (2012) using regional level data find that the main determinant of development is education, geography have a significant impact (using oil endowment among others to measure it), and they don't find a significant effect of quality of institutions, using two measures: trust in others and institutional quality.

While there's evidence of the effect of natural resources extraction in local development, as far as we know there's no empirical evidence of any analysis related to the relation of economic development and ETM in Latin America. In the next section a strategy is identified to cover this issue.

Data and Specification

Methodology

We base our empirical strategy in our variable of interest ETM and the relationship that it may have with the quality of institutions, further we control for the main strands of the economic growth literature (see section above). The modelling framework is constructed in a cross section approach, set at regional level (e.g. for a region i):

$$y_i = \alpha + \beta_1 etm_i + \beta_2 etm_i * ins_i + \beta_3 ins_i + G_i + X_i + e_i$$

Where y_i is GDP growth, alternatively we use GDP in levels in the robustness section to address issues highlighted by Alexeev and Conrad (2009)⁵. Our variable of interest is etm_i we use six measures for the purpose: the value of the capacity installed of ETM extraction and/or operation in a given region, the value of the deposit size prior exploitation, the value of the production, and three measures of the number of mines. ins_i

represents quality of institutions; note that we use an interaction term to control for possible conditional effect of natural resources, as they should be seen as a double-edge sword that may spur or hinder growth (Mehlum et al. (2006), Sinnott et al. (2011)). In this sense a positive value would imply that the quality of institutions helps spur the effect of ETM activity on the development of a region and a negative coefficient would imply that the quality of institutions hinders the benefits of ETM in the sample.

G_i is a set of controls for geographical characteristics, captured by the percentage of tropical land of the region and average temperature. X_i encompass controls for inputs of the economy, we use average year of schooling, life expectancy and an index for physical capital accumulation. e_i represents the error term. Lastly, i represents regions in our sample.

We rely on our baseline estimation strategy in a 2SLS due to the possible endogeneity of the covariates, we prefer this estimation method due to the short horizon of our data (2010-2018) compared with the time horizon of the mining sector and the dynamics of the quality of institutions.

Further we test the possible nonlinear relation of ETM and the quality of institutions using a dynamic panel, a panel smooth transition regression (PSTR) and subsequently a Dynamic Panel Data Threshold Effects Model with Endogenous Regressors (PTR) to control for possible endogeneity issues (See Haile-mariam and Dzhumashev

(2019) for more information in the PTR estimation)

⁵The authors state that there's a misinterpretation of the effect of endowments of natural resources when GDP is measured as the growth rate. Thus they propose the use of GDP in levels to demonstrate that natural resources have inhibited long-term growth

Data

We construct a novel dataset at regional level for Latin American countries. We explain its construction into details, in the annex. We use data on mineral resources from U.S. Geological Survey (USGS), Minex and SP Global. The USGS dataset provides information about the major known mineral commodities, their characteristics and geographical location Cunningham et al. (2005); Minex and SP Global have similar characteristics, they gather a comprehensive list of mineral deposits of medium or larger size around the globe. Table 24 presents the number of observations by country of each of the datasets. Figures 5, 6, 7, 8, show the spatial location of the spots. We use the information to construct six measures of ETM, three measures related to the value of the operation: capacity installed (USGV), the deposit prior mining (Minex) and the production per year (SP), and three measures that counts (two from Minex and one from SP) the number of mines.

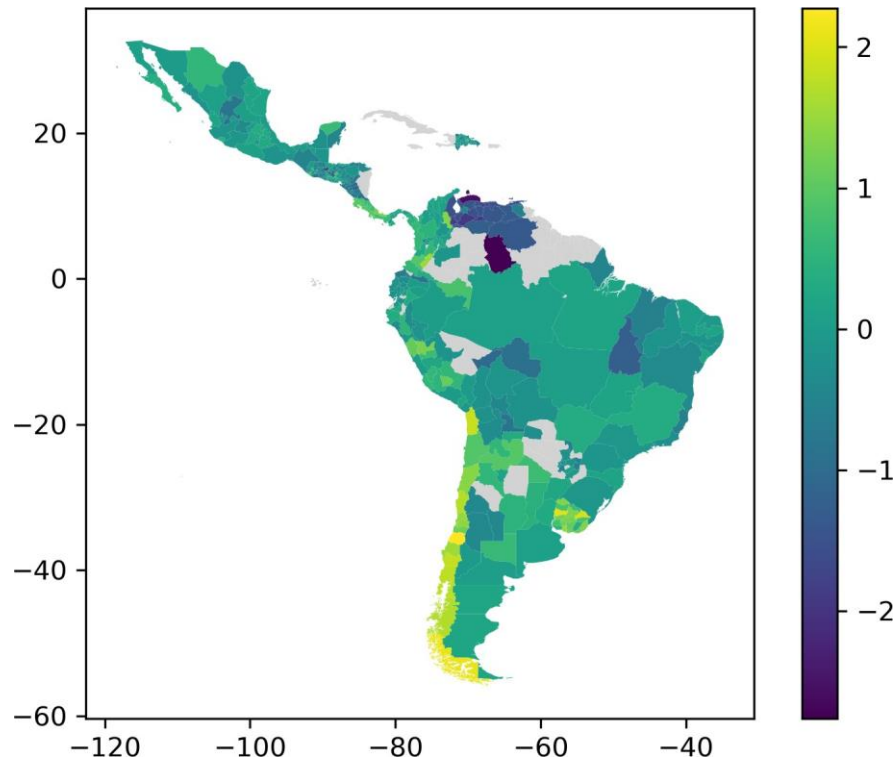
A novel index of institutional quality is built at regional level for Latin American countries. To do this, we use information from Latino barometer to perform the analysis. In particular, we use the questions related to confidence and trust in institutions and perceived corruption. The survey covers in 18 countries and the number of Regions varies depending on the wave. Table 3 shows the countries included in the sample. We followed the procedure presented by Charron et al. (2019) used for the construction of the European Quality of Governance Index (EQI) data on regional governance in EU countries. That is, we use factor analysis to find the latent variables associated with the survey, afterwards we construct the index using the following formula:

$$I_i = WGI_{country} + (Rqog_i - Cqog_{country})$$

Where I represents the index, WGI represents the country quality of institution score given in the WGI, $Rqog$ represents the score obtained by the region using the factor analysis and $cqog$ represent the country score obtained by the weighted average of each region (using population). The values of the index are shown in table 23. Figure 1 shows a map with the quality of institutions. In general, the regions with the highest values are located in Uruguay and Chile while the lowest values of quality of institutions are located in Venezuela.

We use measures of GDP from different sources (see table 25). When available the regional GDP from OCDE was used, otherwise from the national statistical office or equivalent for each country. If not available we looked for a proxy for the GDP participation. Measures for life expectancy and education come from Global Data Lab Smits and Permanyer (2019). And a measure of regional physical investment was constructed based on the number of companies per capita (see Annex). Regarding geographical controls, we use data from Copernicus Climate Change Service for average temperature and use data from the Köppen-Geiger climate classification to measure percentage of tropical land Kottek et al. (2006).

Figure 1: Quality of institutions in Latin America



Note: High values imply high quality of institutions

Table 4 in appendix shows the descriptive statistics of the variables. The first analysis to the data is done by looking at the relation between the independent variables and the GDP. Figure 3 shows a boxplot of the distribution between regions by the presence (or not) of energy transitions metals (ETM). In general, ETM regions have a bigger GDP and less dispersion even though the region with the largest GDP has no ETM activity.

Results

Main results

Table 1 and 2 show the baseline results using two-step least square (2sls) and robust errors for the estimations (a small definition and sources of the variables is presented in table 5). The results present our six proxies for ETM operation in a region, we consider our measures of ETM as signals that are received by the economy, as so, etm value, and etm deposit are signals of the size of the operation installed in a region, etm production measures the actual value of the production in the area; these three are fully continuous and signal in three different ways the size of the ETM sector in a region: etm sp, etm minex and etm primary measure the number of active mines in a given region, as so the signal is rather simpler and does not take into account the size of the sector, in that sense if the latter measures are significant but the ones related to the size are not, we argue that is the

presence of ETM rather than the size of the operation that is an important determinant.

Table 1 presents the results when we do not include the proxy for capital input (our business index), and it is our preferred estimation due to the lost of observations when the index is included. The results show that ETM regardless of the definition used has a positive effect on economic development, however the effect is rather small. We also observe that quality of institutions has a positive effect while the interaction term is only significant in column (1) and has a negative effect.

Table 2 shows the results when we include the business index, we observe that the results change ⁶, ETM is only significant in column 1, the quality of institutions is not different from zero and the interaction term is positive in three cases.

It is interesting to note that while the effect of the ETM and the quality of institutions vary with the change on the sample, the effect of the controlling group is largely unchanged. Further, while in table 1 the interaction term is not significant in table 2 it is, we interpret this result as evidence for the intrinsic relation between natural resources and the quality of institutions that we highlighted in the previous section. Overall we observe that ETM has either a positive or insignificant effect in development (rejecting the resource curse hypothesis).

To better understand the results related to the quality of institutions in table 1 and

⁶An early conclusion of this study is that the differences in the results are driven by the sample selection rather than the inclusion of additional covariates. We test this hypothesis in two ways: by balancing the panel to the business index and by diving the sample in the robustness check

Table 1: 2SLS Results I

	(1)	(2)	(3)	(4)	(5)	(6)
etm-value	0.00130*** (3.12)					
etm-production		0.000931*** (3.78)				
etm-deposit			0.00249** (2.57)			
etm-sp				0.00383** (2.41)		
etm-minex					0.00515*** (3.70)	
etm-primary						0.00587*** (3.98)
inter	-0.000901*** (-4.02)	-0.000583 (-1.18)	-0.00171 (-0.76)	-0.00124 (-0.44)	-0.00248 (-0.95)	-0.00329 (-1.02)
reg-effec	0.0249*** (4.14)	0.0248*** (4.11)	0.0246*** (4.11)	0.0250*** (3.94)	0.0250*** (4.07)	0.0252*** (4.12)
school	-0.0163*** (-5.58)	-0.0169*** (-5.76)	-0.0167*** (-5.66)	-0.0174*** (-5.77)	-0.0169*** (-5.71)	-0.0167*** (-5.68)
life-exp	0.00552*** (2.59)	0.00540*** (2.58)	0.00541** (2.57)	0.00546*** (2.58)	0.00546*** (2.59)	0.00547*** (2.60)
temp	-0.00126* (-1.66)	-0.00111 (-1.49)	-0.00120 (-1.58)	-0.00113 (-1.49)	-0.00100 (-1.33)	-0.00100 (-1.34)
tropicalI	0.0558*** (4.61)	0.0562*** (4.65)	0.0558*** (4.63)	0.0572*** (4.72)	0.0581*** (4.80)	0.0570*** (4.72)
N	276	276	276	276	276	276
Robust score	34.724***	35.164***	35.200***	36.772***	35.784***	34.962***
R. regression	29.309***	29.471***	29.482***	32.422***	29.983***	28.621***

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Average temperature and % of tropical are used as exogenous variables. We use as instruments the lags of the dependent variables.

Table 2: 2SLS Results II

	(1)	(2)	(3)	(4)	(5)	(6)
etm-value	0.000780** (1.99)					
etm-production		0.000249 (1.37)				
etm-deposit			0.000541 (0.74)			
etm-sp				0.00207 (1.37)		
etm-minex					0.000986 (0.73)	
etm-primary						0.00165 (1.21)
inter	-0.000238 (-1.02)	0.000882** (2.16)	0.00258* (1.81)	0.00117 (0.57)	0.00389** (2.07)	0.00425 (1.48)
reg-effec	0.00361 (0.82)	0.00269 (0.62)	0.00362 (0.84)	0.00345 (0.71)	0.00174 (0.39)	0.00254 (0.57)
school	-0.00816** (-2.51)	-0.0109*** (-3.59)	-0.00983*** (-3.14)	-0.00973*** (-2.83)	-0.0102*** (-3.15)	-0.0100*** (-3.12)
life-exp	-0.00224** (-2.08)	-0.00236** (-2.22)	-0.00192* (-1.75)	-0.00171 (-1.53)	-0.00164 (-1.47)	-0.00185* (-1.68)
bzz-index	0.00608* (1.80)	0.00875*** (2.71)	0.00732** (2.34)	0.00763** (2.24)	0.00813** (2.44)	0.00798** (2.47)
temp	0.000836 (1.10)	0.000820 (1.08)	0.000778 (1.02)	0.000729 (0.96)	0.000795 (1.04)	0.000833 (1.10)
tropical1	0.0282*** (3.31)	0.0265*** (3.14)	0.0264*** (3.10)	0.0288*** (3.40)	0.0265*** (3.12)	0.0261*** (3.07)
N	156	156	156	156	156	156
Robust score	18.27***	17.38***	15.01**	17.91***	16.85***	16.38***
R. regression	4.83***	4.93***	4.25***	4.96***	4.76***	4.60***

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Average temperature and % of tropical are used as exogenous variables. We use as instruments the lags of the dependent variables.

the positive value of the interaction term in table 2 we decompose our index of quality of institutions in its three components, control of corruption, trust and government effectiveness. Table 6 and 7 shows the results.

Once we decompose the results related to ETM largely change, table 6 shows that ETM is largely insignificant although is negative -and significant- once (for value of the deposits). Regarding institutions trust is an important determinant of growth while control of corruption deters development. Moreover, the interactions show that higher levels of control of corruption enhance the effect of ETM (columns 3 and 5) but higher level of government effectiveness may reduce the effect of ETM. The results with the reduced sample show a different story (table 7): the value of the deposits is still negative, but it may be reduced -or compensated- by the positive effect of the interaction term with trust (columns 3-5).

Decomposing quality of institutions shows two interesting results: first we observe that ETM can have a negative effect on development under specific scenarios but its effect is largely conditioned to the institutional quality (due to the contrary effect of the value of ETM and the interaction term in table 3). Second higher quality of institutions may have a negative effect on development -given the results of the control of corruption-.

In the subsequent sections we first make some robustness tests to check the validity of our results, next we further analyze the relationship of ETM and quality of institutions.

Robustness check

We cannot confidently say that ETM have a positive impact in economic development in Latin America, specially if we consider the negative effect found when we decompose the quality of institutions. To test the robustness of our results, we run several checks along three lines: considering different ways of approaching natural resources and the inclusion of covariates, using a sample selection, and changing our estimation method.

We first test whether our results are driven by other types of natural resources, we partially cover this by using our measure of etm primary in our baseline results, that only takes into account those deposits in which an ETM is the primary mineral extracted. We further test this hypothesis by including three measures of natural resources, one that accounts for the value of the capacity installed related to oil and gas (oil gas value), the number of mines that extract precious metals and the value of the deposits that extract precious metals.

Table 8 shows the results for the broad sample, we observe that the effect of ETM is positive but less significant (only in columns 1, 2 and 5), this result is not surprising as Silver constituted an ETM and a precious metal. We also note that while the presence of precious metals tend to have a positive effect, the size of the subsector has a negative robust negative effect on economic growth. Finally, our proxy for fossil fuel is not significant. Adding the business index the results are qualitatively the same as the baseline, only etm value is significant and the interaction term is positive; moreover the value of the precious deposits keep its negative effect while the number of mines is no longer significant. While we do not focus on precious metals, it seems that at regional level the resource curse may be driven by this type of metals. The results remain qualitatively the same when adding this

set of covariates with control of corruption, trust and government effectiveness (results do not displayed).

We further test if our results remain unchanged to the addition of conflict related covariates, it may be argued that conflict deters investment, in our case it may deter exploration in areas in conflict and/or enhance -spur- the effect of the mining sector. We use two measures to control for this issue, conflicts, that account for the number of conflicts registered in a region and deaths that sum the number of deaths related to conflicts (Uppsala University, 2022). The results remain unchanged with respect of the previous case.

We further test the differences in the results obtained due to sample selection, our baseline results already show a variation in the results due to the change in the sample. We further test this by dividing the sample by the median of GDP and by removing capital regions from the sample. The first test should allow us to see if there's variation in the results between the more and least developed regions, we run the second test to control for the fact that in general most of the economic dynamics tend to be concentrated in capital regions in the case of LA (QUOTE MISSING).

Table (10) shows the results above the median, the results are largely unchanged, that is, the different measures of ETM are positive and significant as well as the regulatory quality, one difference is that the interaction term has a negative effect, in that sense depending on the level of quality of institutions the effect of ETM maybe positive, negative or null in columns 1, 2, 5 and 6. When we decompose quality of institutions, the main results remain unchanged (trust is positive while control of corruption is negative) but ETM and the interaction terms present changes in the significance level without a change in the signs, for example, the interaction of control of corruption and ETM present 3 positive values (columns 1-3, table 11) while the baseline results present 2 (column 3 and 5 in table 6). We only analyze the effect with the broad sample as the reduced form do not reject the endogeneity test.

The results below the median considerably change (Table 12), for the least developed region we observe that the value of the deposits prior mining has a negative effect and the effect of ETM in development is conditional to the quality of institutions as the interaction term is positive and significant (columns 1, 2, 3, 6). We also note that the presence of precious metals tend to have a positive effect but the size of the operation negatively affect growth. A similar result is found when we introduce the business index (although we are cautious with this result as the sample drop to 46 observations). Decomposing the quality of institutions, we observe that the results are driven by the interaction of ETM with government effectiveness: a high level of government effectiveness is necessary to allow ETM to have a positive effect, further control of corruption is not longer significant (Table 13).

When we remove capital regions the results remained qualitatively the same regardless of the specification. That is, our results are not driven by capital regions, this result was expected as most of mines are usually located in remote locations.

We use GMM as an alternative estimation method, as in the 2SLS we treat geographical controls as exogenous variables and the rest are instrumented using lag values.

We do not use GMM as our preferred estimation method because of the short horizon of our panel (2010-2018) taking into account the characteristics of the ETM and the quality of institutions, in the case of ETM passing from exploration to extraction can take 10-15 years, and the extraction usually takes decades.

Tables 14, 15 present the results, the effect of our variable of interest is not robust and it changes sign, further our index of quality of institutions is not significant. Once we decompose we found that control of corruption and government effectiveness has a robust effect on growth, further some interaction are significant under specific scenarios attenuating the negative effect found in ETM (column 4). Additionally oil and gas present a robust positive effect.

In general our results shows that ETM do not respond to the resource curse in the case of Latin American regions, however the possible effect (if any) seems to be largely conditional to the quality of institutions (given the mixed results of the interaction terms) and the location (given the differences arise by the change in the sample). In the next section we try to disentangle the relation between ETM and institutions.

ETM and quality of institutions

Towards the previous section we analyze the interaction term setting a certain level of quality of institutions, we drop that assumption and we cover the possible nonlinear relationship of the quality of institutions and ETM. To do so we rely on two estimation strategies: panel smooth transition regression (PSTR) and subsequently a Dynamic Panel Data Threshold Effects Model with Endogenous Regressors (PTR), the latter being a particular case of the first one when i) there's only one threshold and ii) there's endogenous variables in the model; hence we rely on the PSTR to choose the estimations that are not linear and base our interpretation in the PTR outcome.

We analyze three possible scenarios i) the conditional effect of ETM given institutional quality on economic growth, ii) the conditional effect of the quality of institutions given ETM on growth and iii) the nonlinear effect of ETM in quality of institutions.

The first scenario covers the idea that natural resources (NR) may act as a double-edged sword, then depending on the quality of institutions in place, NR - in our case ETM - may have a positive (negative) effect when the institutional quality is high (low) (Epo and Nochi Faha (2019), Mehlum et al. (2006)). We perform the preliminary linearity test of the PSTR estimation and we do not reject the linearity test for our baseline, adding covariates rise non linearities in the results, we are cautious with the outcome as only half of the test rejects the null hypothesis of linearity.

The results concerning the first scenario show that the non linearities are driven by trust and government effectiveness components, in general we observe that ETM is not significant and the negative effect of number of precious mines - when significant - increases with better quality of institutions. Surprisingly the effect of the variables is linear with respect to the control of corruption. Tables 16 and 17 show the results for the PTR using trust and government effectiveness respectively, we observe that while below the threshold ETM may have a positive or a negative effect depending on the measure, above it

the results is always positive (or null), further it shows the negative effect of precious metals in the economy.

The second scenario try to analyze the fact that natural resources may hinder the quality of institutions, as so, we want to test if the effect of institutional quality is affected by the size of the mining sector in a given region. The results of the PSTR and the PTR fail to prove this hypothesis, etm production and etm primary tend to have a nonlinear effect but the variables of interest do not show any significance across regimes in any of the estimations. We believe that the lack of significance is due to the delay that it may come from ETM affecting institutions and/or institutions affecting economic growth.

The last scenario try to analyze the effect of ETM in the quality of institutions, it may happen that quality of institutions is only damaged if it is damaged at all- when the amount of the mining sector pass a certain threshold, or that the negative effect is only perceived once the sector start (opening the first mine in a region) and further development of the mining sector has no effect on the quality of institutions. We couldn't find robust evidence of nonlinearities using ETM as a regime for our sample. Hence we proceed to analyze it using a dynamic panel.

Tables (18, 19, 20) show the results for our index of quality of institutions and its components ⁷, as expected quality of institutions is persistent (the lag of the dependent variable is always positive and significant), we further find that ETM has a rather positive effect when significant. The results highlight that i) the quality of institutions (particularly control of corruption and trust) are positively affected by ETM, ii) the extraction of precious metals tend to negatively affect them (albeit not robust) and iii) the effect largely depend on the sample studied (but it reduces the significance rather than changing signs).

We believe that the positive result is associated with windfall coming from the sector that it may be used to strengthen the government capacity. Further the negative result associated with precious metals can be due to the fact that it is easier for agents to enter the sector in search of profit; this should not be possible in the case of ETM -except for silver-, as the price of the minerals is relatively low, making the operation profitable only in larger scale. Hence the dynamics at micro level may be shaping the effect on institutions. Further research is needed to tackle this issue.

Conclusion

We summarize our results as follows. We find evidence that ETM presence in a region may most likely have a positive effect on growth and it will be intrinsically related to the quality of institutions. This result however depends largely on the sample selection, hence we cannot treat ETM as manna from heaven, while the evidence from this study shows that there's little to none evidence of resource curse regarding ETM, in several specifications the effect over development was zero.

⁷Government effectiveness is omitted as the estimation is not robust

In general the results confirm two ideas: first Latin American countries seem to have avoid the resource curse, we observe that the effect of ETM is positive or null and only in specific cases (not robust) may decrease growth; second, we find evidence that natural resources affects institutions at regional level.

We highlight two aspects of their relationship, first the effect of NR depends on the quality of institutions, second natural resources affects the quality of institutions, in our results we show that ETM has most likely have a positive effect while precious metals tend to negative affect institutions. Further research addressing the different effects over institutions of the mining sector depending on the material is need it.

As mentioned in the introduction, it is expected an increase in the demand of ETM due to the commitments to cope with global warming. Latin America sits in a comfortable position to enjoy from the bonanza as ETM activities mostly have a positive effect on growth. Nevertheless regions need to be cautious: while ETM enhanced growth, its relation with institutions may trigger negative spillovers in the long run.

It is important to recall that this research can be extended in several ways. Another option to control for quality of institutions would give more rigor to the results. Analysis is necessary to identify the possible effect of ETM on welfare. It is well known in particular that mining activities have an environmental impact, and may trigger social discomfort on local residents, due to the possible negative effects on health and security creating hotspots of environmental and social problems Lèbre et al. (2020). Addressing this issue and possible effects of ETM on inequalities remains a task for future research.

Annex

Regional quality of institutions index construction

This document shows to our understanding a first attempt to construct an index of the institutions' quality, at regional level, for Latin American countries. We followed the procedure presented by Charron et al. (2019) and used for the construction of the European Quality of Governance Index (EQI) data on regional governance in EU countries.

We used the information from Latino barometer to perform the analysis, we use 8 rounds (2009-2018) using in particular the questions related to confidence and trust in institutions and perceived corruption. Table (CITATION) presents number of questions and regions included in each of the waves used for this study. Table 3 shows the countries included.

We used on average 27 questions that are related to quality of institutions usually in a four points ordinal scale: this avoids the problems related to the use of the middle point as a don't know answer Charron et al. (2019). All variables are rescaled using Z-score so that low values represent low quality of institutions and higher values better quality.

Factor analysis is used to find the latent variables associated with the survey, results of factor analysis for 2018 are presented in table 21. We observe that the eigen value is greater

than one for only three factors. Following the Kaiser's rule, we retain the latent factors that account for more variation than the original factors.

Further, the factor loadings (table 22) show that the questions are distributed so that questions related to corruption are loaded in one factor, trust related questions in another factor and confidence in the quality of the institutions in the last latent factor with eigen value over unity.

We use the factors to construct an index following Charron et al. procedure, that is: we use WGI from the World Bank to compute an index so that the index can vary over time. We use the following formula:

$$I_i = WGI_{country} + (Rqog_i - Cqog_{country})$$

Where I represent the index, WGI represents the country quality of institution score given in the WGI, $Rqog$ represent the score obtained by the region using the factor analysis and $cqog$ represent the country score obtained by the weighted average of each region (using population), i represents regions. Note that the score of quality of institution of each region will be a deviation from the mean depending on the WGI of each country. In that way, it will be unlikely that a region in a country with a low score (on the WGI database) will get a (too) high score as the variables are rescaled using Z-score.

We use three variables from the WGI to compute the index taking into account the factor loadings (Table 22). For the first factor the control of corruption is used, for the second regulatory quality and for the third we use government effectiveness.

The results of the index of quality of institutions are shown in Table 3. Note that for the year of 2018, the region with the lowest score in terms of quality of institutions is the Amazonas region from Venezuela followed by the Falcon region from the same country (-2.75 and -2.57 respectively). The highest scores are from the regions of Magallanes Antarctic (2.06) in Chile and Paysandú (1.91) in Uruguay. Further the closest to the mean (which should be zero) are the region of Buenos Aires in Argentina (-0.004) and Itapúa in Paraguay (0.0022).

Taking into account only the perception of corruption of the regions, Amazonas in Venezuela has the lowest scored followed by Barahona in Dominican Republic, while the highest scores (related to low perception of corruption) are in Arica and Parinacota region of Chile and Paysandú in Uruguay.

Note that for statistical purposes some regions were added to the sample in order to fill the gap between the information on mines location and the survey of Latino Barometer: for those regions absent in the latter, the average score of the higher order aggregation was used (constructed with the available regions). We also fill the gaps of the survey (2012 and 2014) using the average score of $t+1$ and $t-1$.

Data on natural resources extraction

We use three databases to construct the variables related to energy transition metals, fossil fuels and precious metals mining.

We use the data available from the U.S. Geological Survey (USGS). The database provides information about the major known mineral commodities, their characteristics and geographical location (Cunningham et al., 2005). The database includes deposits around the world. Nevertheless we selected data only on the countries included in the sample of the Latino barometer (Table 3). As a result, the data contains information related to 649 spots in 18 countries. It is important to note that the database includes information related to extraction and processing of minerals as it includes location of mines, fields, refineries, plants, etc. Table 24 presents the number of observations by country of each of the databases, we observe that Brazil is the country with the most observations (187) followed by Peru (102).

We construct the value of the capacity installed of ETM and fossil fuels (oil and gas) for a given region based on the information available in the dataset. Because the survey is time in-varying and does not present initial or close up year, the variation of the variables is given by the international prices of the commodities.

The datasets of SP and Minex have similar scope, both covering from medium size (or bigger) mineral deposits. We construct two variables using the SP dataset, the value of the ETM production per year and the N° of active ETM mines in a given region, note that the value of the production may not take into account all the present mines in a given region due to the lack of information.

We use the Minex dataset to generate six variables: the value of the deposits prior exploitation for energy transition metals (etm deposit) and for precious metals (precious deposit). We also create four variables for number of operating mines each year by region, two counting the number of deposits that have ETM or precious metals and two where they are the primary metal of the deposits.

With the data of SP we create the value of productions of ETM and the number of mines that produces any ETM by year.

Figures 5, 6, 7, 8, show the distribution of the deposits in LA distinguishing between ETM and other types of deposits. We match the information of the mines to regions using geolocation data, we double check the locations using a process of reverse geocoding using the service of Openstreetmap Abdishakur (2019).

Other variables

The information of population comes from the institute of national statistics (or the equivalent) of each country INDEC-Argentina (2015); INE-Bolivia (2021); IBGE-Brazil (2018); INE-Chile (2019); DANE (2018); INEC-Costa Rica (2021); ONE-Dominic Republic (2016); INEC-Ecuador (2012); DISGESTYC - El Salvador (2021); INE-Guatemala (2020); INE-Honduras (2021); CONAPO (2018); INIDE-Nicaragua (2021); INEC-Panama (2013); INE-Paraguay (2015); INEI-Peru (2019); INE-Uruguay (2014); INE-Venezuela (2021). This information is used to construct the quality of institutions index and per capita variables.

The construction of the regional GDP is made in two steps: first we construct a measure of the percentage participation on the GDP of each region in the country, afterwards we construct the region's GDP using World Bank's country GDP at constant US dollars (year 2010). Table 25 shows the source of the participation percentage of the regions and its source. In general, when available the regional GDP from OECD was used, otherwise from the national statistic office or equivalent for each country. If not available, we used a proxy for the GDP participation either from ONG's or other government institute. When no information was found in all previously mentioned sources, we proxy the GDP using the nighttime light (NTL) data.

The procedure used to NTL activity is as follows, i) we use the VIIRS Stray Light Corrected Nighttime Day/Night Band Composites Version 1 dataset, it is available from 2014 to 2021 and it features monthly average radiance composite (for further details on the data see Mills et al. (2013)). ii) We create an annual composite using the median of the data. iii) We take into account the the first level administrative units of the Global Administrative Unit Layers (GAUL) to estimate the sum of lights (SOL). iv) We compute the country SOL. v) Finally we calculate the participation of each unit (department) on the country.

We use an index of number of companies per capital per region to control for physical capital accumulation. Due to the heterogeneity of information across countries, we construct the variable using a similar procedure of the quality of institutions index. We begin by measuring the number of companies (when available) or economic units by region per capita. Table 26 shows the source used for each country; second, we transform the data using Z-score by country. Finally we construct the index using investment as a proportion of the GDP from the World Bank (WB) as a base following:

$$bz = Inv + bz_{reg}$$

Where bz is the index of companies, inv is investment as a percentage of the GDP and bz_{reg} is the Z-score of the number of companies per capita.

Note that this variable will measure the level of companies per capita as a deviation from the mean (which will be given by the WB investment). We consider that this variable should proxy accurately the level of physical capital accumulation.

We use life expectancy and average years of schooling from Global Data Lab Smits and Permanyer (2019) to control for human capital accumulation. We use percentage of tropical land from Kottek et al. (2006) and average temperature at 2m of the surface from ERA5 Monthly Aggregates - Latest Climate Reanalysis Produced by ECMWF / Copernicus Climate Change Service dataset (C3S) to control for geographical conditions. Finally we use number of conflicts and number of deaths -due to conflicts- from UCDP (Uppsala University, 2022)

Appendix

Figure 2: Scatter of GDP and Business per capita Index

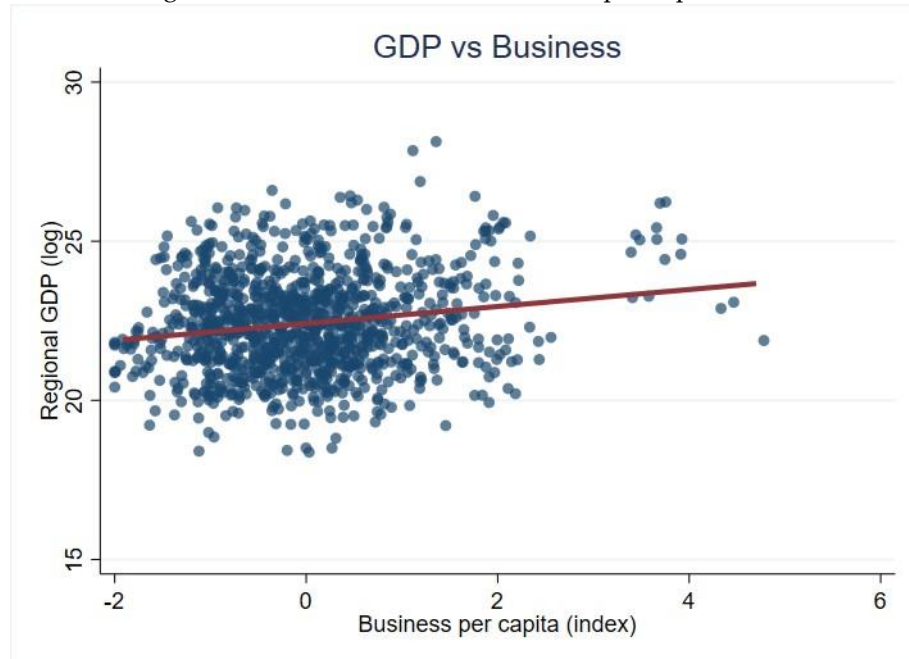


Table 3: Countries in the Sample

Country Code	Country Name	N° of Regions*	On the index†
ARG	Argentina	22	13
BOL	Bolivia	9	9
BRA	Brasil	27	24
CHL	Chile	15	15
COL	Colombia	25	20
CRI	Costa Rica	7	7
DOM	Dominic Republic	31	30
ECU	Ecuador	23	18
GTM	Guatemala	22	22
HND	Honduras	17	17
MEX	Mexico	32	32
NIC	Nicaragua	17	16
PAN	Panama	10	10
PER	Peru	22	19
PRY	Paraguay	16	10
SLV	El Salvador	14	14
URY	Uruguay	19	18
VEN	Venezuela	24	23

* includes overall sample

† includes regions with information available for the construction of the index

Table 4: Descriptive Statistics

Variable	Obs	Mean	Std.Dev.	Min	Max
gr-gdp	341	0,0046	1,6369	-4,6629	5,7995
ins-quality	336	0,0113	0,7711	-2,7632	2,2768
corruption	336	0,01452	0,9881	-3,4564	3,4420
etm	352	0,1363	0,3466	0	1
etm-value	352	1.4420	10.697	0	113.308
mine	352	0,1733	0,3790	0	1
oil-gas	352	0,0625	0,2424	0	1
oil-gas-value	352	0,8404	0,6641	0	10,15
school	336	8,045	1,725	3,184	13,01
life-exp	336	75,472	2,4024	64,83	81,76
bzz-index	225	1,34E-07	0,97742	-1,917	4,6162
temp	333	294,4393	5,1608	278,2003	301,6186
tropical1	326	0,2293	0,3473	0	1

Table 5: Definition of variables

Variable	Definition	Source
GDP	Measure of GDP (see annex for the proxy used), if not stated differently growth of GDP is used as dependent variable	See Table 25
ETM (dummy)	Dummy that takes value of 1 if there's ETM activity in a region and 0 otherwise	U.S. Geological Survey
ETM (value)	Measure of the value of the ETM operation in a region (in thousand millions)	U.S. Geological Survey
Ins quality	Index of quality of institutions (see annex for details of the construction)	See annex
Interaction	Interaction between ETM and index of quality of institutions	N/A
Temp	Average temperature at 2m of the surface	Copernicus Climate Change eService dataset
Tropical	Percentage of tropical land in a region	Kottek et al. (2006)
School	Average year of schooling	Global Data Lab
Life exp	Life expectancy	Global Data Lab
bzz index	Business index (see annex)	See annex

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Table 6: 2SLS Results III

	(1)	(2)	(3)	(4)	(5)	(6)
etm_value	0.000575 (1.32)					
etm_production		0.000411 (0.56)				
etm_deposit			-0.00489* (-1.75)			
etm-sp				-0.00259 (-1.00)		
etm-minex					0.00232 (1.09)	
etm-primary						-0.0000330 (-0.01)
sy-reg-corruption	0.000135 (0.49)	0.000660 (1.57)	0.00454* (1.66)	0.00216 (1.01)	0.00435** (2.02)	0.00178 (0.30)
sy-reg-trust	-0.000217 (-0.38)	-0.000313 (-0.65)	0.00262* (1.85)	0.000436 (0.19)	-0.00256 (-1.36)	0.0000734 (0.02)
sy-reg-effec	-0.000446** (-2.36)	-0.000589 (-1.00)	-0.00545 (-1.27)	0.00149 (0.45)	-0.00218 (-0.86)	-0.00249 (-0.47)
reg-corruption	-0.0211** (-2.27)	-0.0231** (-2.45)	-0.0234** (-2.53)	-0.0250*** (-2.72)	-0.0234** (-2.51)	-0.0227** (-2.42)
reg-trust	0.0492*** (6.02)	0.0477*** (5.51)	0.0481*** (5.81)	0.0490*** (5.42)	0.0482*** (5.77)	0.0479*** (5.73)
reg-effec	0.0133 (1.61)	0.0141* (1.67)	0.0137* (1.66)	0.0119 (1.26)	0.0139 (1.59)	0.0136 (1.57)
school	-0.00867** (-2.45)	-0.00900** (-2.45)	-0.00889** (-2.38)	-0.00813** (-2.08)	-0.00894** (-2.41)	-0.00896**(-2.43) (-2.42)

life.exp	-0.000330 (-0.13)	-0.000226 (-0.09)	-0.000218 (-0.08)	-0.000433 (-0.17)	-0.000181 (-0.07)	-0.000202 (-0.08)
temp	-0.000781 (-0.87)	-0.000755 (-0.82)	-0.000919 (-1.04)	-0.000863 (-0.98)	-0.000661 (-0.74)	-0.000855 (-0.99)
tropical1	0.0331*** (2.69)	0.0334*** (2.68)	0.0332*** (2.66)	0.0320** (2.51)	0.0339*** (2.72)	0.0337*** (2.71)
N	215	215	215	215	215	215
Robust score	32.21***	31.66***	29.64***	29.72***	29.49***	29.54***
R. regression	13.15***	14.03***	14.87***	15.17 ***	14.05***	13.93***

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Geographical controls are used as exogenous variables. We use as instruments the lags of the dependent variables.

Table 7: 2SLS Results IV

	(1)	(2)	(3)	(4)	(5)	(6)
etm_value	0.000138 (0.33)					
etm_production -		0.000204 (0.28)				
etm_deposit			-0.00568* (-1.87)			
etm-sp				-0.00283 (-1.41)		
etm-minex					-0.00240 (-1.48)	
etm-primary						-0.00320 (-1.15)
sy-reg-corruption	-0.000140 (-0.74)	0.000427 (1.27)	-0.000311 (-0.10)	0.000270 (0.16)	0.00112 (0.59)	-0.00251 (-0.47)
sy-reg-trust	0.000531 (1.18)	-0.000173 (-0.36)	0.00361** (2.32)	0.00361** (2.27)	0.00267* (1.68)	0.00432 (1.35)
sy-reg-effec	-0.000178 (-0.89)	0.000858 (1.53)	0.00390 (0.87)	0.00207 (0.95)	0.00282 (1.49)	0.00514 (1.17)
reg-corruption	-0.00251 (-0.52)	-0.00742 (-1.53)	-0.00703 (-1.44)	-0.00804 (-1.60)	-0.00749 (-1.53)	-0.00679 (-1.41)
reg-trust	0.0161** (2.04)	0.00444 (0.45)	0.00719 (0.77)	0.00688 (0.72)	0.00990 (1.16)	0.00899 (1.04)
reg-effec	0.00366 (0.83)	0.00358 (0.79)	0.00405 (0.93)	0.00362 (0.79)	0.00270 (0.59)	0.00244 (0.55)

school	-0.00652 (-1.50)	-0.0112*** (-2.75)	-0.00955** (-2.36)	-0.00973** (-2.18)	-0.00977** (-2.38)	-0.0101** (-2.42)
life-exp	-0.00452*** (-2.75)	-0.00247 (-1.40)	-0.00245 (-1.36)	-0.00247 (-1.40)	-0.00265 (-1.55)	-0.00245 (-1.36)
bzz-index	0.00788**	0.0101*** (3.00)	0.00858*** (2.70)	0.00964*** (2.69)	0.00938*** (2.80)	0.00925*** (2.24) (2.84)
temp	0.000793 (0.95)	0.000372 (0.42)	0.0000649 (0.08)	0.000245 (0.29)	0.000356 (0.44)	0.000229 (0.29)
tropical1	0.0195** (2.47)	0.0187** (2.42)	0.0198*** (2.59)	0.0165** (2.19)	0.0153** (2.00)	0.0167** (2.19)
<i>N</i>	130	130	130	130	130	130
Robust score	20.48***	18.31**	13.55*	17.52**	15.52**	13.69*
R. regression	3.33***	3.92***	3.07***	3.26 ***	3.05***	2.84***

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Geographical controls are used as exogenous variables. We use as instruments the lags of the dependent variables.

Table 8: Robustness Check: covariates I

	(1)	(2)	(3)	(4)	(5)	(6)
etm-value	0.00105** (2.15)					
etm-production		0.000692** (2.24)				
etm deposit -			0.00124 (0.91)			
etm sp -				0.00144 (0.60)		
etm-minex					0.00688* (1.95)	
etm-primary						0.00306 (1.10)
inter	-0.000797*** (-3.00)	-0.000475 (-0.89)	-0.00101 (-0.37)	-0.000796 (-0.27)	-0.00341 (-1.40)	-0.00340 (-1.09)
reg-effec	0.0249*** (4.17)	0.0248*** (4.12)	0.0245*** (4.12)	0.0247*** (3.89)	0.0254*** (4.11)	0.0251*** (4.10)
school	-0.0171*** 5.75)	-0.0173*** (-5.79)	-0.0173*** (-5.75)	-0.0175*** (-5.71)	-0.0170*** (-5.68)	-0.0170***(- (-5.65)
life-exp	0.00572*** (2.62)	0.00553*** (2.58)	0.00558*** (2.59)	0.00561*** (2.61)	0.00536** (2.53)	0.00560*** (2.62)
temp	-0.000976 (-1.29)	-0.000958 (-1.28)	-0.000961 (-1.27)	-0.000977 (-1.30)	-0.000963 (-1.27)	-0.000946 (-1.26)
tropical1	0.0569*** (4.63)	0.0567*** (4.61)	0.0570*** (4.64)	0.0573*** (4.68)	0.0577*** (4.76)	0.0571*** (4.65)
Precious-t	0.00652*** (2.79)	0.00381 (1.53)	0.00575** (2.27)	0.00556* (1.65)	-0.000372 (-0.07)	0.00500 (1.27)
precious-deposit	-0.00925*** 2.81)	-0.00540* (-1.71)	-0.00693** (-2.04)	-0.00747** (-2.10)	-0.00651* (-1.68)	-0.00805*(- (-1.81)
oil-gas-value	0.000366	0.00185	0.00141	0.000966	0.00118	0.000567

	(0.08)	(0.40)	(0.30)	(0.22)	(0.27)	(0.13)
<i>N</i>	276	276	276	276	276	276
Robust score	33.53***	33.83***	34.59***	36.57***	36.07***	34.03***
R. regression	27.35***	27.90***	28.92***	31.15***	31.34***	27.11***

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Geographical controls are used as exogenous variables. We use as instruments the lags of the dependent variables.

Table 9: Robustness Check: covariates II

	(1)	(2)	(3)	(4)	(5)	(6)
etm_value	0.000766* (1.76)					
etm_production		0.000288 (1.37)				
etm_deposit			0.0000464 (0.05)			
etm_sp				0.00167 (0.88)		
etm_minex					0.00327 (1.57)	
etm_primary						0.00113 (0.56)
inter	-0.000254 (-0.99)	0.000824** (1.99)	0.00284* (1.78)	0.00108 (0.48)	0.00281 (1.45)	0.00345 (1.17)
reg_effec	0.00409 (0.93)	0.00288 (0.66)	0.00391 (0.90)	0.00373 (0.76)	0.00277 (0.61)	0.00329 (0.72)
school	-0.00891*** (-3.57)	-0.0110*** (-3.57)	-0.0101*** (-3.16)	-0.00979*** (-2.79)	-0.0103*** (-3.16)	-0.00989*** (-2.84) (-2.98)
life-exp	-0.00225** (-2.05)	-0.00247** (-2.33)	-0.00198* (-1.81)	-0.00183* (-1.66)	-0.00188* (-1.69)	-0.00191* (-1.71)
bzz-index	0.00644** (2.04)	0.00797** (2.46)	0.00713** (2.24)	0.00714** (2.13)	0.00773** (2.37)	0.00733** (2.24)
temp	0.000943 (1.26)	0.000884 (1.18)	0.000864 (1.15)	0.000806 (1.08)	0.000872 (1.15)	0.000890 (1.19)
tropical1	0.0275*** (3.16)	0.0244*** (2.84)	0.0258*** (2.97)	0.0272*** (3.15)	0.0252*** (2.91)	0.0256*** (2.95)
Precious-t	0.00322 (1.28)	0.000254 (0.14)	0.00238 (1.17)	0.00174 (0.75)	-0.00123 (-0.42)	0.00174 (0.73)
precious-deposit	-0.00930** (-2.25)	-0.00508* (-1.72)	-0.00729** (-2.17)	-0.00737** (-2.22)	-0.00620** (-2.39)	-0.00595* (-1.77)

oil-gas-value	0.0000763	0.00199	0.000919	0.000474	0.000828	0.000741
	(0.03)	(0.86)	(0.39)	(0.21)	(0.33)	(0.31)
<i>N</i>	156	156	156	156	156	156
R. score	14.44**	13.44**	12.33**	14.78**	13.09**	11.76**
R. regression	4.70***	3.67***	3.50***	4.20***	3.84***	3.28***

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Geographical controls are used as exogenous variables. We use as instruments the lags of the dependent variables.

Table 10: Robustness Check: Sample division (above median GDP) I

	(1)	(2)	(3)	(4)	(5)	(6)
etm-value	0.000903** (2.36)					
etm-production		0.00110*** (3.86)				
etm-deposit			0.00271* (1.89)			
etm-sp				0.00548** (2.27)		
etm-minex					0.00798** (2.53)	
etm-primary						0.00651** (2.38)
inter	-0.000889*** (-3.33)	-0.00120** (-2.17)	-0.00224 (-0.73)	-0.00367 (-1.38)	-0.00532** (-1.99)	-0.00715** (-2.19)
reg-effec	0.0302*** (4.56)	0.0306*** (4.59)	0.0296*** (4.50)	0.0317*** (4.59)	0.0316*** (4.56)	0.0313*** (4.59)
school	-0.0245*** (6.52)	-0.0249*** (-6.51)	-0.0257*** (-6.71)	-0.0260*** (-6.56)	-0.0239*** (-6.20)	-0.0238*** (-6.16)
life-exp	0.00999***	0.00951*** (2.97)	0.00920*** (2.91)	0.00914*** (2.86)	0.00885*** (2.78)	0.00930*** (3.08) (2.93)
temp	-0.000655 (-0.49)	-0.000665 (-0.49)	-0.000790 (-0.58)	-0.000904 (-0.67)	-0.000703 (-0.51)	-0.000593 (-0.43)
tropical1	0.0537*** (3.39)	0.0539*** (3.44)	0.0545*** (3.49)	0.0576*** (3.65)	0.0572*** (3.68)	0.0558*** (3.55)
Precious t	0.00762*** (2.73)	0.00210 (0.79)	0.00342 (1.19)	0.00123 (0.34)	-0.00127 (-0.23)	0.00295 (0.73)
precious deposit	-0.0110** (-2.44)	-0.00352 (-0.91)	-0.00308 (-0.67)	-0.00334 (-0.72)	-0.00727 (-1.11)	-0.00905 (-1.38)

oil-gas-value	0.00289	0.00553	0.00573	0.00430	0.00434	0.00316
	(0.64)	(1.16)	(1.18)	(1.06)	(0.99)	(0.75)
N	143	143	143	143	143	143

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Geographical controls are used as exogenous variables. We use as instruments the lags of the dependent variables.All estimations pass the robustness score and robustness regression test.

Table 11: Robustness Check: Sample division (above median GDP) II						
	(1)	(2)	(3)	(4)	(5)	(6)
etm-value	0.00112*** (2.95)					
etm_production		0.0000981 (0.09)				
etm-deposit			-0.00994 (-0.93)			
etm-sp				-0.000842 (-0.32)		
etm-minex					-0.00614 (-0.47)	
etm-primary						-0.00933 (-1.15)
sy-reg-corruption	0.000468** (1.97)	0.000905** (1.99)	0.00981* (1.95)	0.000267 (0.13)	0.00656 (1.28)	0.00434 (0.65)
sy-reg-trust	-0.00114** (-2.37)	-0.0000407 (-0.07)	0.00461 (0.84)	0.00107 (0.53)	-0.000588 (-0.16)	0.00481 (0.81)
sy-reg-effec	-0.000544*** (-4.19)	-0.00143*** (-2.69)	-0.0109* (-1.81)	-0.00106 (-0.37)	-0.00656** (-2.03)	-0.0131** (-2.51)
reg-corruption	-0.0201*** (2.85)	-0.0205*** (-2.97)	-0.0205*** (-2.93)	-0.0229*** (-3.13)	-0.0213*** (-2.97)	-0.0209*** (-2.95)
reg-trust	0.0482*** (4.58)	0.0473*** (4.45)	0.0448*** (4.21)	0.0396*** (4.04)	0.0472*** (4.28)	0.0420*** (4.12)
reg-effec	0.0252*** (3.93)	0.0259*** (3.84)	0.0252*** (3.92)	0.0252*** (3.56)	0.0269*** (3.92)	0.0262*** (4.05)
school	-0.0126** (-2.42)	-0.0133** (-2.51)	-0.0145*** (-2.63)	-0.0164*** (-3.19)	-0.0127** (-2.33)	-0.0143*** (-2.64)
life-exp	0.00147	0.00126	0.00168	0.00298	0.000918	0.00200

	(0.32)	(0.27)	(0.36)	(0.65)	(0.19)	(0.42)
temp	-0.000554 (-0.38)	-0.000389 (-0.27)	-0.000338 (-0.23)	-0.000851 (-0.63)	-0.000201 (-0.13)	-0.000832 (-0.62)
tropical1	0.0450*** (3.89)	0.0445*** (3.81)	0.0440*** (3.84)	0.0425*** (3.57)	0.0460*** (3.93)	0.0457*** (3.91)
Precious t	0.00356 (1.24)	0.00257 (0.52)	0.00412 (0.79)	0.00350 (0.82)	0.0141 (0.91)	0.0118* (1.89)
precious deposit	-0.00655 (-1.21)	-0.00126 (-0.18)	-0.000390 (-0.05)	-0.00674 (-1.03)	-0.00767 (-1.09)	-0.0159** (-2.00)
oil-gas-value	0.00400 (1.63)	0.00542 (1.61)	0.00531* (1.78)	0.00512* (1.69)	0.00369 (1.27)	0.00382 (1.37)
<i>N</i>	114	114	114	114	114	114

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Geographical controls are used as exogenous variables. We use as instruments the lags of the dependent variables. All estimations pass the robustness score and robustness regression test.

Table 12: Robustness Check: Sample division (below median GDP) I

	(1)	(2)	(3)	(4)	(5)	(6)
etm-value	-0.00114 (-1.59)					
etm production -		0.000266 (0.26)				
etm-deposit			-0.0320*** (-4.47)			
etm-sp				0.000717 (0.16)		
etm-minex					0.0176 (1.21)	
etm-primary						-0.00161 (-0.19)
inter	0.00224*** (2.96)	0.00266** (2.47)	0.0642*** (4.06)	0.0117 (1.41)	0.00734 (1.04)	0.0190** (2.12)
reg effec	-0.00640 (-0.58)	-0.00751 (-0.69)	-0.00944 (-0.84)	-0.00661 (-0.58)	-0.00707 (-0.62)	-0.00814 (-0.72)
school	-0.000920 (-0.28)	-0.000539 (-0.17)	-0.000531 (-0.17)	-0.000289 (-0.09)	-0.000587 (-0.18)	-0.000795 (-0.24)
life-exp	-0.00153 (-0.67)	-0.00148 (-0.64)	-0.000867 (-0.38)	-0.00123 (-0.52)	-0.00131 (-0.56)	-0.000993 (-0.41)
temp	0.00113 (1.20)	0.00114 (1.21)	0.000440 (0.50)	0.000984 (1.04)	0.00111 (1.17)	0.000966 (1.06)
tropical1	0.0670*** (2.58)	0.0667** (2.58)	0.0662** (2.56)	0.0649** (2.49)	0.0643** (2.50)	0.0653** (2.53)

Precious-t	0.0131** (2.43)	0.00843** (2.05)	0.0133*** (2.78)	0.00970 (1.54)	-0.00709 (-0.49)	0.0107 (1.19)
precious-deposit	-0.00797** (-2.04)	-0.00507 (-1.54)	-0.00921** (-2.57)	-0.00926* (-1.77)	-0.00919* (-1.79)	-0.00643 (-1.03)
oil-gas-value	-0.00628 (-1.43)	-0.00606 (-1.41)	-0.00609 (-1.38)	-0.00608 (-1.38)	-0.00548 (-1.28)	-0.00587 (-1.36)
N	132	132	132	132	132	132

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Geographical controls are used as exogenous variables. We use as instruments the lags of the dependent variables. All estimations pass the robustness score and robustness regression test.

Table 13: Robustness Check: Sample division (below median GDP) II						
	(1)	(2)	(3)	(4)	(5)	(6)
etm-value	-0.00424					
	(-1.24)					
etm production		0.000897				
-		(0.89)				
etm-deposit			-0.00160			
			(-0.09)			
etm-sp				0.00217		
				(0.46)		
etm-minex					0.00626	
					(0.40)	
etm-primary						0.000842
						(0.11)
sy-reg-corruption	-0.0235**	-0.00520	-0.0270**	-0.0159	-0.0135	-0.0266***
	(-2.54)	(-0.87)	(-2.51)	(-1.54)	(-1.22)	(-3.63)
sy-reg-trust	0.00954	0.00230	0.00355	0.000684	0.00287	0.0129
	(1.19)	(0.38)	(0.44)	(0.10)	(0.29)	(1.56)
sy-reg-effec	0.0105***	0.00166	0.0586***	0.0213**	0.0157*	0.0259**
	(3.68)	(0.42)	(2.78)	(2.29)	(1.82)	(2.50)
reg-corruption	-0.0157	-0.0163	-0.00700	-0.00755	-0.0109	-0.0119
	(-1.18)	(-1.30)	(-0.57)	(-0.45)	(-0.55)	(-0.99)
reg-trust	0.0267**	0.0271**	0.0193*	0.0266**	0.0246*	0.0237**
	(2.01)	(2.04)	(1.79)	(2.01)	(1.73)	(2.00)
reg-effec	-0.0299	-0.0291	-0.0273	-0.0284	-0.0280	-0.0297
	(-1.51)	(-1.43)	(-1.48)	(-1.44)	(-1.41)	(-1.49)

school	0.00241 (0.56)	0.00273 (0.64)	0.00102 (0.23)	0.00120 (0.26)	0.00166 (0.39)	0.00171 (0.40)
life-exp	-0.00256 (-0.98)	-0.00250 (-0.81)	-0.00190 (-0.74)	-0.00196 (-0.70)	-0.00256 (-0.95)	-0.00215 (-0.80)
temp	0.0000429 (0.04)	-0.000324 (-0.34)	-0.000497 (-0.56)	-0.000643 (-0.65)	-0.000291 (-0.29)	-0.000424 (-0.45)
tropical1	0.0580** (2.08)	0.0570** (2.10)	0.0591** (2.07)	0.0512* (1.82)	0.0548** (1.96)	0.0569** (2.10)
Precious-t	0.00708** (2.15)	0.00462 (1.23)	0.00657* (1.84)	0.00607 (1.16)	-0.000111 (-0.01)	0.00558 (0.90)
precious deposit	-0.00345 (-1.33)	-0.00278 (-0.99)	-0.00462 (-1.56)	-0.0104** (-2.41)	-0.00900** (-2.08)	-0.00379 (-0.74)
oil gas value	-0.00936* (-1.89)	-0.00918* (-1.78)	-0.00697 (-1.61)	-0.00698 (-1.47)	-0.00779 (-1.42)	-0.00791* (-1.67)
N	100	100	100	100	100	100

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Geographical controls are used as exogenous variables35.

All estimations pass the robustness score and robustness regression test.

Table 14: Robustness Check: GMM I

	(1)	(2)	(3)	(4)	(5)	(6)
etm_value	0.000405 (0.98)					
etm_production		0.000126 (0.37)				
etm_deposit			0.000799* (1.81)			
etm_sp				-0.00626** (-2.05)		
etm_minex					0.000567 (0.23)	
etm_primary						-0.00163 (-0.60)
L.gr-gdp-pop	0.228*** (3.04)	0.225*** (2.97)	0.224*** (2.95)	0.223*** (2.93)	0.225*** (2.98)	0.226*** (3.00)
inter	-0.000500* (-1.81)	-0.0000650 (-0.43)	-0.000292 (-1.36)	0.00293* (1.83)	-0.000628 (-0.71)	0.0000791 (0.08)
reg-quality	0.0113** (2.02)	0.00752 (1.36)	0.00801 (1.35)	0.00634 (0.93)	0.00817 (1.29)	0.00826 (1.33)
temp	-0.00132** 2.46)	-0.00143*** (-2.59)	-0.00145** (-2.55)	-0.00147** (-2.58)	-0.00149** (-2.53)	-0.00146**(- (-2.52)
school	-0.0185*** 5.73)	-0.0194*** (-5.82)	-0.0201*** (-5.90)	-0.0186*** (-5.54)	-0.0199*** (-5.90)	-0.0200***(- (-5.88)
life-exp	0.00588*** (2.61)	0.00613*** (2.69)	0.00615*** (2.68)	0.00567** (2.51)	0.00589** (2.56)	0.00621*** (2.71)
Precious-t	0.000868 (0.64)	-0.000324 (-0.18)	0.0000304 (0.02)	0.00418* (1.96)	0.000387 (0.15)	0.00177 (0.84)

precious deposit	-0.00238 (-1.11)	-0.000939 (-0.37)	-0.00128 (-0.54)	-0.00148 (-0.64)	-0.00211 (-0.90)	-0.00240 (-1.08)
oil-gas-value	0.00503***	0.00567*** (4.02)	0.00584*** (3.86)	0.00562*** (4.76)	0.00550*** (3.67)	0.00569*** (3.71)
<i>N</i>	2081	2081	2081	2081	2081	2081
sargan	880.1***	898.2***	892.5***	883.8***	898.1***	899.7***
hansen	256.9	267.1	260.9	257.0	262.1	263.3

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Geographical controls are used as exogenous variables. Ibid.

Table 15: Robustness Check: GMM II

	(1)	(2)	(3)	(4)	(5)	(6)
etm_value	0.000632 (1.16)					
etm_production		0.000364 (0.84)				
etm_deposit			0.00188*** (3.07)			
etm_sp				-0.00597** (-2.13)		
etm_minex					0.00248 (0.78)	
etm_primary						-0.000930 (-0.28)
L.gr-gdp_pop	0.235*** (3.27)	0.228*** (3.19)	0.230*** (3.19)	0.228*** (3.15)	0.229*** (3.17)	0.231*** (3.19)
sy-reg_corruption	0.0000667 (0.40)	-0.000174 (-1.05)	-0.000817*** (-3.04)	0.00164 (1.41)	-0.00143 (-1.45)	-0.000229 (-0.16)
sy-reg_trust	-0.000396 (-1.48)	0.0000530 (0.46)	0.000264* (1.74)	0.00219** (2.41)	-0.000838 (-0.79)	-0.000201 (-0.15)
sy-reg_effec	-0.000257 (-0.87)	-0.0000433 (-0.41)	-0.000249 (-1.57)	-0.000704 (-0.55)	0.000970 (0.85)	0.000359 (0.26)
reg_corruption	-0.00919** (-2.40)	-0.0109*** (-3.03)	-0.0106*** (-2.91)	-0.0116*** (-2.91)	-0.00964** (-2.55)	-0.0103*** (-2.66)
reg_trust	0.00428 (1.35)	0.00327 (1.03)	0.00342 (1.07)	0.00308 (0.89)	0.00410 (1.25)	0.00407 (1.30)
reg_effec	0.0101*** (3.16)	0.00968*** (2.88)	0.00967*** (2.92)	0.00957** (2.57)	0.00827** (2.28)	0.00915*** (2.61)
temp	-0.00175*** (-3.06)	-0.00185*** (-3.29)	-0.00184*** (-3.24)	-0.00187*** (-3.29)	-0.00188*** (-3.29)	-0.00185*** (-3.16)
school	-0.0193*** (-6.07)	-0.0206*** (-6.46)	-0.0211*** (-6.51)	-0.0195*** (-6.00)	-0.0209*** (-6.49)	-0.0207*** (-6.41)
life_exp	0.00586*** (3.05)	0.00608*** (3.19)	0.00611*** (3.27)	0.00542*** (2.94)	0.00601*** (3.25)	0.00609*** (3.30)
Precious t	0.000326 (0.29)	-0.00146 (-0.81)	-0.000727 (-0.66)	0.00349* (1.78)	-0.00177 (-0.68)	0.00100 (0.49)
precious_deposit	-0.00285 (-1.47)	-0.00117 (-0.50)	-0.00167 (-0.83)	-0.00137 (-0.52)	-0.00355* (-1.67)	-0.00312 (-1.54)
oil-gas_value	0.00483*** (3.32)	0.00571*** (4.21)	0.00578*** (4.01)	0.00519*** (4.43)	0.00524*** (3.84)	0.00536*** (3.56)
N	2081	2081	2081	2081	2081	2081
sargan	931.2***	940.7***	931.2***	930.9***	938.8***	946.8***
hansen	279.3	287.2	284.1	286.6	287.0	285.1

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Geographical controls are used as exogenous variables. Ibid.

Table 16: PTR Results I

	etm-value	etm-production	etm-deposit	etm-sp	etm-minex	etm-primary
	(1)	(2)	(3)	(4)	(5)	(6)
ETM below	-0.00100* (-1.81)	0.0797*** (2.98)	0.263*** (3.26)	0.0200 (1.21)	0.0535*** (3.26)	0.0685*** (4.27)
ETM above	-0.000430 (-0.97)	-0.000152 (-0.31)	-0.00100 (-0.52)	0.0374*** (3.35)	0.0406*** (2.62)	0.0431*** (3.17)
reg trust	-0.0000979 (-0.03)	0.00236 (0.69)	0.00238 (0.73)	0.000749 (0.22)	0.00355 (1.06)	0.00251 (0.77)
L.gr gdp pop	0.0794*** (3.65)	0.0884*** (3.93)	0.0578*** (2.60)	0.0794*** (3.62)	0.0747*** (3.44)	0.0750*** (3.45)
temp	-0.00763*** (-9.10)	-0.00641*** (-7.48)	-0.00720*** (-9.15)	-0.00547*** (-5.97)	-0.00556*** (-6.35)	-0.00536*** (-5.88)
school	-0.0766*** (-9.43)	-0.0693*** (-8.00)	-0.0756*** (-9.40)	-0.0909*** (-9.41)	-0.0807*** (-9.77)	-0.0791*** (-9.58)
life-exp	0.0138*** (3.94)	0.0135*** (3.68)	0.0137*** (3.94)	0.0215*** (4.83)	0.0163*** (4.59)	0.0153*** (4.31)
Precious t	-0.00532 (-0.59)	-0.00563 (-0.59)	-0.00581 (-0.65)	-0.0304** (-2.53)	-0.0408** (-2.25)	-0.0300** (-2.48)
precious deposit	0.0158* (1.93)	0.0144* (1.72)	0.0156* (1.93)	0.00795 (0.93)	0.0197** (2.38)	0.0202** (2.46)
oil-gas-value	0.00430 (0.94)	0.00548 (1.17)	0.00440 (0.98)	0.00536 (1.17)	0.00350 (0.77)	0.00175 (0.38)
N	2092	2092	2092	2092	2092	2092
γ	0.790	-1.325	-1.325	-1.325	-0.841	-1.011
upper bond	1.167	1.167	1.167	1.167	1.167	1.167
lower bond	-1.325	-1.325	-1.325	-1.325	-1.325	-1.325

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Threshold: Trust.

Dependent variable: GDP growth

Table 17: PTR Results II

	etm_value	etm_production	etm_deposit	etm_sp	etm_minex	etm_primary
	(1)	(2)	(3)	(4)	(5)	(6)
ETM below	-0.00184*** (-2.82)	-0.00224** (-2.17)	0.178** (2.12)	0.0426*** (3.61)	0.0462*** (2.65)	0.0594*** (3.37)
ETM above	-0.000246 (-0.47)	-0.000188 (-0.36)	-0.00173 (-0.79)	0.0395*** (3.35)	0.0448*** (2.59)	0.0610*** (4.17)
reg effec	-0.00333 (-0.75)	-0.00304 (-0.68)	-0.00122 (-0.28)	0.00108 (0.24)	0.000994 (0.22)	-0.000830 (-0.19)
L.gr gdp pop	0.0531** (2.25)	0.0187 (0.81)	0.0510** (2.19)	0.0415* (1.76)	0.0513** (2.18)	0.0518** (2.21)
temp	-0.00832*** (-9.49)	-0.00779*** (-9.25)	-0.00789*** (-9.45)	-0.00629*** (-6.61)	-0.00633*** (-6.93)	-0.00541*** (-5.75)
school	-0.100*** (-12.05)	-0.103*** (-12.34)	-0.0956*** (-11.61)	-0.116*** (-12.08)	-0.101*** (-11.88)	-0.103*** (-12.20)
life-exp	0.0220*** (6.09)	0.0244*** (6.60)	0.0209*** (5.81)	0.0299*** (6.83)	0.0225*** (6.12)	0.0239*** (6.53)
Precious t	0.0104 (1.16)	0.0141 (1.51)	0.00485 (0.53)	-0.0238* (-1.86)	-0.0363* (-1.77)	-0.0273** (-2.08)
precious deposit	0.0177* (1.95)	0.0172* (1.92)	0.0176** (1.96)	0.0102 (1.06)	0.0203** (2.21)	0.0242*** (2.64)
oil-gas-value	0.00681 (1.42)	0.00658 (1.39)	0.00694 (1.47)	0.00721 (1.50)	0.00645 (1.35)	0.00358 (0.74)
N	2137	2137	2137	2137	2137	2137
γ	0.968	-0.163	-0.666	0.884	0.840	-0.641
upper bond	0.977	1.248	-0.658	1.248	1.248	1.248
lower bond	-0.961	-1.082	-0.820	-1.082	-1.082	-1.082

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Threshold:

Government effectiveness. Dependent variable: GDP growth

Table 18: Quality of institutions Results I

	(1)	(2)	(3)	(4)	(5)	(6)
etm-value	0.00216*** (2.81)					
etm production -		0.00366*** (4.06)				
etm-deposit			0.0118*** (4.63)			
etm sp -				0.0152 (1.50)		
etm-minex					0.0342*** (4.15)	
etm-primary						0.0292*** (3.08)
L.reg-quality	0.541*** (13.27)	0.545*** (13.46)	0.537*** (13.34)	0.534*** (13.09)	0.528*** (12.81)	0.534*** (13.09)
school	-0.144*** (-6.61)	-0.142*** (-6.77)	-0.142*** (-6.54)	-0.142*** (-6.43)	-0.147*** (-6.79)	-0.143*** (-6.47)
life-exp	0.0884*** (5.17)	0.0917*** (5.51)	0.0911*** (5.40)	0.0911*** (5.48)	0.0906*** (5.57)	0.0883*** (5.39)
temp	-0.0236***	-0.0232*** (-6.82)	-0.0238*** (-6.89)	-0.0242*** (-6.82)	-0.0246*** (-7.02)	-0.0243***(-6.92) (-6.90)
lreg-gdpp-pop	0.104*** (2.79)	0.0984*** (2.60)	0.0953** (2.56)	0.0931** (2.46)	0.0997*** (2.66)	0.0957** (2.52)
Precious-t	0.00670 (0.57)	-0.0115 (-1.24)	-0.00238 (-0.34)	-0.00981 (-0.78)	-0.0241** (-2.00)	-0.0153 (-1.14)
precious deposit	-0.0175 (-1.26)	0.00146 (0.12)	-0.00505 (-0.47)	-0.00912 (-0.73)	-0.0139 (-1.43)	-0.00451 (-0.39)
oil-gas-value	0.00563 (0.48)	0.0106 (0.94)	0.00857 (0.75)	0.00560 (0.48)	0.00558 (0.47)	0.00375 (0.32)
N	2043	2043	2043	2043	2043	2043

sargan	887.3***	890.0***	871.6***	876.7***	883.1***	881.6***
hansen	255.7	258.6	254.5	250.6	253.8	249.4

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

Dependent variable: Quality of institution index

Table 19: Quality of institutions Results II

	(1)	(2)	(3)	(4)	(5)	(6)
etm-value	0.00239* (1.69)					
etm production -		0.00411*** (3.83)				
etm-deposit			0.0153*** (3.90)			
etm sp -				0.00827 (0.44)		
etm minex					0.0258* (1.93)	
etm primary						0.0246* (1.78)
L.reg-corruption	0.411*** (10.99)	0.418*** (11.08)	0.412*** (10.67)	0.407*** (10.59)	0.416*** (11.00)	0.415*** (10.86)
school	-0.158*** (-4.90)	-0.163*** (-5.16)	-0.160*** (-5.07)	-0.156*** (-4.78)	-0.159*** (-5.08)	-0.157*** (-4.88)
life-exp	0.0833*** (4.00)	0.0924*** (4.49)	0.0870*** (4.32)	0.0883*** (4.19)	0.0850*** (4.02)	0.0820*** (3.98)
temp	-0.0358*** 7.43)	-0.0343*** (-7.37)	-0.0355*** (-7.54)	-0.0366*** (-7.62)	-0.0355*** (-7.52)	-0.0364***(- (-7.39)
lreg-gdpp-pop	0.135** (2.03)	0.142** (2.07)	0.139** (2.09)	0.120* (1.69)	0.136** (2.04)	0.123* (1.83)
Precious-t	-0.0132 (-0.88)	-0.0194* (-1.71)	-0.0165 (-1.17)	-0.0152 (-0.84)	-0.0237 (-1.44)	-0.0167 (-1.08)
precious deposit	-0.0307 (-1.42)	-0.0246 (-1.41)	-0.0245 (-1.18)	-0.0333* (-1.78)	-0.0417** (-2.44)	-0.0352* (-1.74)
oil gas value	-0.00288 (-0.19)	0.00142 (0.10)	-0.000115 (-0.01)	-0.00443 (-0.30)	-0.00596 (-0.40)	-0.00762 (-0.51)
N	2053	2053	2053	2053	2053	2053

sargan	912.3***	930.8***	897.5***	903.0***	910.9***	905.6***
hansen	250.0	254.0	251.6	254.3	248.7	250.7

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Dependent variable: Control of corruption

Table 20: Quality of institutions Results III

	(1)	(2)	(3)	(4)	(5)	(6)
etm-value	0.00422*** (3.04)					
etm production -		0.00706*** (4.26)				
etm-deposit			0.0234*** (4.84)			
etm-sp				0.0497*** (2.83)		
etm-minex					0.0782*** (5.14)	
etm-primary						0.0657*** (3.71)
L.reg-trust	0.442*** (10.77)	0.448*** (10.54)	0.441*** (11.00)	0.433*** (10.49)	0.425*** (10.46)	0.429*** (10.55)
school	-0.222*** (-6.37)	-0.203*** (-5.03)	-0.216*** (-6.45)	-0.223*** (-6.47)	-0.224*** (-6.46)	-0.221*** (-6.44)
life-exp	0.133*** (5.70)	0.116*** (6.13)	0.138*** (6.27)	0.137*** (5.98)	0.138*** (6.27)	0.140*** (6.22)
temp	-0.0192*** (-6.87)	-0.0247*** (-6.87)	-0.0194*** (-3.30)	-0.0204*** (-3.36)	-0.0199*** (-3.29)	-0.0191***(-3.29) (-3.18)
lreg gdpp pop	-0.00274 (-0.04)	0.0184 (0.25)	-0.0184 (-0.27)	-0.0298 (-0.42)	-0.0174 (-0.25)	-0.0168 (-0.24)
Precious-t	0.0395 (1.49)	0.00305 (0.13)	0.0166 (0.86)	-0.00997 (-0.37)	-0.0411 (-1.60)	-0.0129 (-0.48)
precious deposit	-0.0460	-0.00179	-0.0161	-0.0227	-0.0262	-0.0129

	(-1.41)	(-0.06)	(-0.62)	(-0.72)	(-1.14)	(-0.48)
oil gas value	0.0304	0.0408*	0.0372**	0.0333*	0.0332*	0.0289
	(1.59)	(1.95)	(2.01)	(1.84)	(1.76)	(1.54)
N	2069	2069	2069	2069	2069	2069
sargan	921.8***	900.5***	894.5***	908.7***	906.9***	908.3***
hansen	260.1	839.5***	258.8	256.3	256.1	255.5

t statistics in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$ Dependent variable: Trust

Table 21: Factor Analysis I

Factor analysis/correlation		Number of obs:	11,441	
Method: principal factors		Retained factors:	3	
Rotation: (unrotated)		Number of params:	69	
Factor	Eigenvalue	Difference	Proportion	Cumulative
Factor1	6,77226	4,0396	0,67	0,67
Factor2	2,73266	1,56089	0,2704	0,9404
Factor3	1,17177	0,76902	0,1159	1,0563
Factor4	0,40275	0,21081	0,0398	1,0962
Factor5	0,19195	0,05662	0,019	1,1152
Factor6	0,13532	0,01833	0,0134	1,1285
Factor7	0,11699	0,06454	0,0116	1,1401
Factor8	0,05245	0,02731	0,0052	1,1453
Factor9	0,02514	0,0204	0,0025	1,1478
Factor10	0,00474	0,02355	0,0005	1,1483
Factor11	-0,01881	0,01917	-0,0019	1,1464
Factor12	-0,03798	0,00953	-0,0038	1,1426
Factor13	-0,0475	0,01958	-0,0047	1,1379
Factor14	-0,06708	0,01399	-0,0066	1,1313
Factor15	-0,08108	0,00593	-0,008	1,1233
Factor16	-0,087	0,00984	-0,0086	1,1147
Factor17	-0,09684	0,01444	-0,0096	1,1051
Factor18	-0,11128	0,01974	-0,011	1,0941
Factor19	-0,13101	0,00344	-0,013	1,0811
Factor20	-0,13445	0,00328	-0,0133	1,0678
Factor21	-0,13773	0,02163	-0,0136	1,0542
Factor22	-0,15936	0,02412	-0,0158	1,0384
Factor23	-0,18349	0,02149	-0,0182	1,0203
Factor24	-0,20498		-0,0203	1

Table 22: Factor Analysis II (loading's)

Variable	Factor1	Factor2	Factor3	Uniqueness
z- P15STGBS B		0,4857		0,6685
z- P15STGBS C				0,8797
z- P15STGBS D		0,6451		0,524
z- P15STGBS E		0,7093		0,4384
z- P15STGBS F		0,6861		0,4486
z- P15STGBS G		0,6388		0,5527
z- P15STGBS H		0,6379		0,5002
z- P16NC- A			0,5529	0,6424
z- P16NCB			0,6202	0,555
z- P16NC- C		0,3096	0,4619	0,6791
z- P16NC- D			0,512	0,6731
z- P16NC- E			0,679	0,5018
z- P16NC- F			0,602	0,5675
z- P16NC- G			0,6593	0,5115
z- P71TI- A	0,6604			0,4999
z- P72TI- B	0,7157			0,4333
z- P73TI- C	0,7052			0,4888
z- P74TI- D	0,7399			0,4257
z- P75TI- E	0,7091			0,4703
z- P76TI- F	0,7586			0,404
z- P77TI- G	0,7491			0,4121
z- P78TI- H	0,6019			0,6048
z- P79TI- I	0,6666			0,531
-				
z P80STTI				0,9108
Blanks <0.3				

Figure 3: Boxplot of GDP and Institutions Quality Index

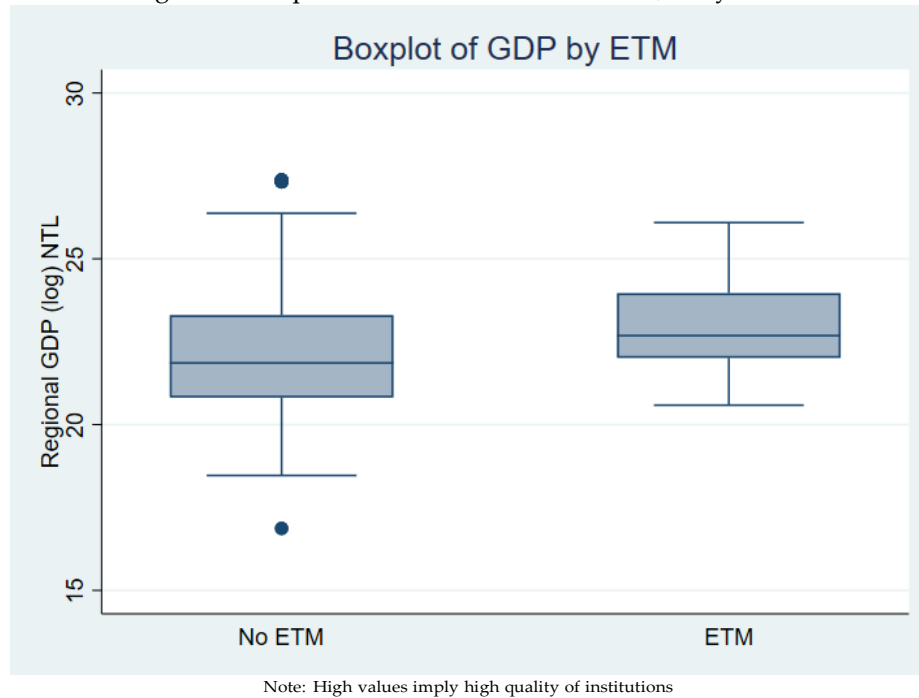


Table 23: Index quality of institutions (2018)

Cod	Region	corr	trust	effecti v	quality
17000	CO: Bogotá D.C.	0,173	0,105	0,076	0,118
17001	CO: Amazonas	0,899	1,123	0,464	0,829
17002	CO: Antioquia	0,725	0,175	0,555	0,485
17004	CO: Atlántico	-0,258	0,453	0,212	0,136
17005	CO: Bolívar	0,780	0,326	-1,004	0,034
17006	CO: Boyacá	0,913	-0,553	-0,251	0,036
17007	CO: Caldas	-0,135	-0,249	0,549	0,055
17010	CO: Cauca	1,021	1,167	0,644	0,944
17011	CO: César	-0,149	0,018	0,425	0,098
17013	CO: Córdoba	0,055	0,066	0,080	0,067
17014	CO: Cundinamarca	-1,062	0,881	0,991	0,270
17017	CO: Huila	1,676	0,671	2,287	1,545
17019	CO: Magdalena	0,746	-0,097	0,005	0,218
17020	CO: Meta	0,205	0,139	-0,685	-0,114
17021	CO: Nariño	0,409	1,219	0,083	0,570
17022	CO: Norte de Santander	0,824	2,286	0,976	1,362
17025	CO: Risaralda	-1,437	0,606	-0,650	-0,494

Cod	Region	corr	trust	effecti v	quality
17027	CO: Santander	-0,372	-0,090	0,137	-0,108
17029	CO: Tolima	-0,110	1,536	0,294	0,573
17030	CO: Valle del cauca	0,207	0,542	0,056	0,268
17031	CO: Sucre	0,107	0,216	-0,072	0,084
17032	CO: La Guajira	0,107	0,216	-0,072	0,084
17033	CO: Chocó	0,546	0,976	0,261	0,594
17034	CO: Putumayo	0,552	0,631	-0,111	0,357
32001	AR: Capital Federal	0,969	0,208	0,431	0,536
32101	AR: Mendoza	0,002	-1,419	0,268	-0,383
32201	AR: Chaco	1,515	-0,013	0,631	0,711
32202	AR: Corrientes	0,568	-0,362	0,511	0,239
32203	AR: Entre R'ios	0,605	-0,271	0,549	0,294
32209	AR: Salta	2,426	0,024	0,415	0,955
32211	AR: Tucumán	-0,273	0,236	0,509	0,157
32301	AR: Buenos Aires	0,141	-0,196	0,310	0,085
32302	AR: Córdoba	0,781	0,350	0,345	0,492
32303	AR: La Pampa	0,809	-1,810	2,873	0,624
32304	AR: Santa Fé	0,516	0,626	0,220	0,454
32306	AR: Neuquén	-0,215	0,044	0,142	-0,010
32307	AR: R'io Negro	0,254	-0,547	0,391	0,032
32308	AR: Chubut	0,282	-0,771	1,135	0,216
32309	AR: Jujuy	1,076	0,130	0,462	0,556
32310	AR: San Luis	0,002	-1,419	0,268	-0,383
32311	AR: San Juan	0,002	-1,419	0,268	-0,383
32312	AR: Santa Cruz	0,282	-0,771	1,135	0,216
32313	AR: Catamarca	1,076	0,130	0,462	0,556
32314	AR: Tierra de Fuego	0,282	-0,771	1,135	0,216
68001	BO: Beni	-0,105	-0,489	0,163	-0,144
68002	BO: Chuquisaca	-0,642	-1,625	-0,198	-0,822
68003	BO: Cochabamba	-0,595	-0,734	0,108	-0,407
68004	BO: La Paz	-0,014	-0,524	-0,083	-0,207
68005	BO: Oruro	0,296	-0,949	-0,015	-0,223
68006	BO: Pando	1,359	-2,519	-1,978	-1,046
68007	BO: Potos'í	-0,142	-0,662	-0,097	-0,301
68008	BO: Santa Cruz	-0,215	-0,358	-0,072	-0,215
68009	BO: Tarija	1,316	-0,859	0,489	0,315
76001	BR: Federal distric	-0,753	2,580	-1,978	-0,050
76002	BR: Bahia	-0,408	-0,124	-0,587	-0,373
76003	BR: Ceará	-0,013	-0,228	0,349	0,036
76004	BR: Esp'irito Santo	-0,658	-0,028	-1,085	-0,591
76005	BR: Goiás	0,412	0,402	-0,249	0,188
76006	BR: Maranhão	0,341	-0,986	-1,104	-0,583

Cod	Region	corr	trust	effecti v	quality
76007	BR: Mato Grosso	0,251	0,129	-0,251	0,043
76008	BR: Mato Grosso do Sul	0,552	0,393	0,053	0,333
76009	BR: Minas Gerais	0,355	0,061	0,596	0,337
76010	BR: Para	0,715	0,270	-0,447	0,179
76011	BR: Paraíba	-0,473	0,271	0,683	0,160
76012	BR: Paraná	-0,427	0,018	0,059	-0,117
76013	BR: Pernambuco	0,874	0,000	-1,323	-0,150
76014	BR: Piauí	0,046	0,015	-0,537	-0,159
76015	BR: R'io de Janeiro	-0,299	-0,311	-0,215	-0,275
76016	BR: Rio Grande do Norte	-0,452	-0,868	1,187	-0,045
76017	BR: Rio Grande do Sul	0,908	-1,059	-0,071	-0,074
76018	BR: Rondônia	-1,515	-0,011	-1,067	-0,864
76019	BR: Santa Catarina	0,529	0,045	-0,048	0,175
76020	BR: Alagoas	0,067	-0,449	-0,029	-0,137
76021	BR: Amazonas	0,364	0,042	-0,164	0,081
76023	BR: São Paulo	0,124	-0,245	-0,131	-0,084
76024	BR: Sergipe	0,814	-0,172	-0,018	0,208
76025	BR: Tocantins	-2,084	-0,714	-0,977	-1,258
76026	BR: Amapá	-0,630	-0,103	-0,664	-0,466
152000	CL: Metropolitana	1,879	1,097	1,275	1,417
152001	CL: Tarapacá	1,557	2,394	1,585	1,845
152002	CL: Antofagasta	0,697	1,672	0,392	0,920
152003	CL: Atacama	1,870	0,685	1,577	1,377
152004	CL: Coquimbo	2,502	1,542	1,120	1,721
152005	CL: Valpara'iso	0,937	1,095	2,386	1,473
152006	CL: O'Higgins	1,138	0,817	1,582	1,179
152007	CL: Maule	2,094	2,070	2,662	2,275
152008	CL: B'io-B'io	1,652	0,910	2,104	1,556
152009	CL: La Araucan'ia	0,630	2,775	2,073	1,826
152010	CL: Los Lagos	1,637	1,096	2,578	1,770
152011	CL: Aysén	1,292	1,949	1,872	1,704
152012	CL: Magallanes & Antártica	1,633	2,781	1,896	2,103
152014	CL: Los R'ios	0,771	1,518	2,939	1,743
152015	CL: Arica y Parinacota	3,384	2,054	0,877	2,105
188001	CR: San José	1,244	0,494	0,744	0,827
188002	CR: Alajuela	1,493	0,537	0,703	0,911
188003	CR: Cartago	1,521	1,051	-0,030	0,847
188004	CR: Heredia	0,525	-0,121	1,193	0,532
188005	CR: Guanacaste	0,510	0,088	2,214	0,937
188006	CR: Puntarenas	1,746	0,276	1,092	1,038
188007	CR: Limón	-0,290	1,920	0,483	0,704
214000	DO: Distrito Nacional	0,137	0,605	-0,156	0,195

Cod	Region	corr	trust	effecti v	quality
214001	DO: Azua	-1,175	0,684	0,229	-0,088
214002	DO: Baoruco	-1,861	0,618	0,720	-0,174
214003	DO: Barahona	-2,246	0,706	0,213	-0,443
214004	DO: Dajabón	-0,909	-0,251	-0,029	-0,396
214005	DO: Duarte	0,632	-0,007	-0,621	0,001
214007	DO: El Seibo	-1,224	0,236	0,508	-0,160
214008	DO: Espaillat	-1,000	0,037	-0,347	-0,437
214009	DO: Hato Mayor	-0,567	0,134	0,265	-0,056
214010	DO: H. Mirabal/Salcedo	0,253	-0,099	-0,515	-0,120
214012	DO: La Altagracia	-1,202	-0,145	-0,193	-0,513
214013	DO: La Romana	0,741	1,421	-1,374	0,263
214014	DO: La Vega	-0,722	-0,043	0,020	-0,248
214015	DO: M. Trinidad Sánchez	-0,759	-1,255	0,726	-0,429
214016	DO: Monseñor Nouel	-0,443	0,183	-0,295	-0,185
214017	DO: Montecristi	-0,334	-0,841	-1,010	-0,728
214018	DO: Monte Plata	-0,705	0,440	0,080	-0,062
214019	DO: Pedernales	-0,470	-1,269	-0,002	-0,580
214020	DO: Perav'ia	0,282	-0,402	-1,931	-0,684
214021	DO: Puerto Plata	0,316	0,604	0,024	0,315
214022	DO: Samaná	-0,249	0,046	-0,169	-0,124
214023	DO: Sánchez Ramírez	0,492	0,471	1,556	0,840
214024	DO: San Cristóbal	-0,644	0,539	-0,089	-0,065
214025	DO: San José de Ocoa	-0,736	1,405	-0,456	0,071
214026	DO: San Juan	0,054	-0,348	0,438	0,048
214027	DO: San Pedro de Macor'is	-1,293	-1,408	1,133	-0,523
214028	DO: Santiago	-0,293	-0,580	-0,721	-0,531
214029	DO: Santiago Rodríguez	0,170	0,219	0,511	0,300
214030	DO: Santo Domingo	0,000	0,137	-0,075	0,021
214031	DO: Valverde	0,474	-0,523	0,575	0,175
218001	EC: Azuay	0,427	-0,482	-0,602	-0,219
218002	EC: Bol'ivar	-0,207	-0,983	0,804	-0,129
218005	EC: Chimborazo	1,156	-1,150	0,293	0,100
218006	EC: Cotopaxi	0,258	-0,569	-0,440	-0,250
218007	EC: El Oro	0,245	-0,819	0,446	-0,043
218008	EC: Esmeraldas	-1,410	-1,401	0,888	-0,641
218010	EC: Guayas	-0,188	-0,465	0,009	-0,214
218011	EC: Imbabura	-0,506	-0,484	-0,505	-0,499
218012	EC: Loja	0,405	-1,244	1,722	0,294
218013	EC: Los R'ios	0,211	-0,871	0,092	-0,189
218014	EC: Manab'í	-0,038	-0,494	0,042	-0,163
218015	EC: Morona Santiago	0,348	-0,745	1,336	0,313
218017	EC: Orellana	0,544	1,482	-0,171	0,618
218019	EC: Pichincha	-0,054	-0,508	-0,290	-0,284
218020	EC: Santa Elena	-0,248	-1,308	0,690	-0,289

Cod	Region	corr	trust	effecti v	quality
218021	EC: Sachilas	-0,157	-0,602	-0,203	-0,321
218022	EC: Sucumbios	-2,152	0,615	-0,995	-0,844
218023	EC: Tungurahua	-0,016	-0,796	0,032	-0,260
218024	EC: Pastaza	-0,420	0,451	0,057	0,029
218025	EC: Napo	-0,420	0,451	0,057	0,029
222101	SV: Ahuachapán	-0,533	-0,090	-0,926	-0,516
222102	SV: Santa Ana	0,350	0,110	-0,475	-0,005
222103	SV: Sonsonate	-0,421	0,219	-0,711	-0,304
222201	SV: La Libertad	0,288	0,350	0,227	0,288
222202	SV: Chalatenango	0,737	0,119	0,281	0,379
222203	SV: Cuscatlán	-1,130	-0,040	0,832	-0,113
222204	SV: San Salvador	-0,049	0,207	-0,363	-0,068
222205	SV: La Paz	-0,427	0,183	-0,740	-0,328
222206	SV: Cabañas	1,758	-1,670	1,134	0,408
222207	SV: San Vicente	-0,552	0,464	-0,169	-0,086
222301	SV: Usulután	0,064	-0,621	0,302	-0,085
222302	SV: San Miguel	-0,353	0,876	-0,751	-0,076
222303	SV: Morazán	-0,838	1,374	1,096	0,544
222304	SV: La Unión	-0,593	-0,003	0,365	-0,077
320109	GT: Guatemala	-0,483	-0,124	-0,378	-0,328
320201	GT: Alta Verapaz	-0,991	-0,140	-0,290	-0,474
320202	GT: Baja Verapaz	-0,359	0,120	-0,806	-0,348
320304	GT: Chiquimula	-0,195	1,144	-0,868	0,027
320306	GT: El Progreso	-0,979	-0,681	-0,884	-0,848
320311	GT: Izabal	-0,242	-0,267	0,911	0,134
320322	GT: Zacapa	-1,881	-1,449	-2,295	-1,875
320412	GT: Jalapa	-1,093	-0,233	-0,274	-0,533
320413	GT: Jutiapa	-0,201	-0,694	-0,862	-0,586
320418	GT: Santa Rosa	-0,819	-0,783	-0,458	-0,687
320503	GT: Chimaltenango	1,311	0,200	-0,577	0,312
320508	GT: Escuintla	0,049	-0,795	-1,593	-0,780
320516	GT: Sacatepequez	-0,074	0,287	-0,950	-0,245
320614	GT: Quetzaltenango	-0,385	-0,141	-0,433	-0,320
320615	GT: Retalhuleu	-0,131	1,592	0,990	0,817
320617	GT: San Marcos	-0,344	0,142	-0,427	-0,210
320619	GT: Solola	-1,266	-0,140	-0,812	-0,739
320620	GT: Suchitepéquez	-0,380	0,066	0,226	-0,030
320621	GT: Totonicapan	1,346	1,138	-0,381	0,701
320707	GT: Quiché	-0,836	0,250	-0,860	-0,482
320710	GT: Huehuetenango	0,215	-0,030	-0,167	0,006
320805	GT: Petén	-0,108	0,342	-0,581	-0,116
340001	HO: Atlántida	0,081	0,459	0,327	0,289

Cod	Region	corr	trust	effecti v	quality
340002	HO: Choluteca	-0,108	0,146	0,279	0,106
340003	HO: Colón	-0,662	-1,416	0,390	-0,563
340004	HO: Comayagua	-0,361	0,395	-0,456	-0,141
340005	HO: Copán	-0,032	0,054	0,016	0,013
340006	HO: Cortés	-0,261	-0,122	-0,572	-0,318
340007	HO: El Paraíso	1,101	-0,715	-1,478	-0,364
340008	HO: Francisco Morazán	0,132	-0,250	-0,655	-0,258
340009	HO: Gracias a Dios	0,106	-0,328	-0,881	-0,368
340010	HO: Intibucá	1,175	0,236	1,165	0,859
340012	HO: La Paz	-0,743	-0,007	0,477	-0,091
340013	HO: Lempira	-1,973	-1,454	-0,334	-1,254
340014	HO: Ocotepeque	-0,737	-1,438	-1,504	-1,226
340015	HO: Olancho	0,515	-0,469	-0,538	-0,164
340016	HO: Santa Bárbara	-0,330	-0,597	-0,247	-0,392
340017	HO: Valle	-0,651	0,983	-0,093	0,079
340018	HO: Yoro	-0,455	-0,293	-0,859	-0,536
484102	MX: Baja California	-0,716	1,809	-0,869	0,075
484103	MX: Baja California Sur	-0,273	1,168	0,306	0,400
484105	MX: Coahuila	-0,009	-0,372	-0,265	-0,215
484108	MX: Chihuahua	0,604	0,320	0,714	0,546
484110	MX: Durango	0,213	0,338	-0,288	0,088
484119	MX: Nuevo León	-0,634	0,329	0,833	0,176
484124	MX: San Luis Potosí	-0,130	-0,033	0,334	0,057
484125	MX: Sinaloa	-0,519	-0,504	0,515	-0,169
484126	MX: Sonora	-1,172	0,641	0,549	0,006
484128	MX: Tamaulipas	0,258	0,406	-0,211	0,151
484132	MX: Zacatecas	-0,973	-0,305	-1,089	-0,789
484201	MX: Aguascalientes	0,769	-0,578	-0,142	0,016
484206	MX: Colima	-0,695	0,431	1,709	0,481
484211	MX: Guanajuato	-0,739	-0,136	-0,264	-0,380
484214	MX: Jalisco	-0,402	-0,236	0,205	-0,145
484216	MX: Michoacán	-0,099	0,114	-0,280	-0,088
484218	MX: Nayarit	-1,360	1,514	0,383	0,179
484222	MX: Querétaro	-1,487	0,805	0,700	0,006
484309	MX: Ciudad de México	-0,062	0,405	-0,314	0,010
484313	MX: Hidalgo	-0,585	1,434	0,191	0,347
484315	MX: México	-0,190	0,418	0,573	0,267
484317	MX: Morelos	-0,101	0,898	-1,106	-0,103
484321	MX: Puebla	-0,159	0,606	0,418	0,288
484329	MX: Tlaxcala	1,600	-1,531	0,450	0,173
484404	MX: Campeche	-2,155	-0,078	1,574	-0,220
484407	MX: Chiapas	-1,497	-0,118	0,152	-0,488
484412	MX: Guerrero	0,196	0,389	-0,275	0,103
484420	MX: Oaxaca	-0,727	0,389	-0,172	-0,170

Cod	Region	corr	trust	effecti v	quality
484423	MX: Quintana Roo	-0,690	-0,692	0,083	-0,433
484427	MX: Tabasco	0,417	-0,423	0,078	0,024
484430	MX: Veracruz	-0,621	0,518	0,100	-0,001
484431	MX: Yucatán	-0,382	0,345	2,009	0,657
558001	NI: Managua	-1,006	-0,719	-0,538	-0,754
558002	NI: Chinandega	-1,377	-1,271	-0,061	-0,903
558003	NI: León	-0,548	-0,365	-0,919	-0,611
558004	NI: Masaya	-0,606	-0,497	-0,283	-0,462
558005	NI: Granada	-0,709	-0,116	-0,483	-0,436
558006	NI: Carazo	-1,018	-1,344	0,132	-0,743
558007	NI: Rivas	-1,042	0,002	-1,130	-0,723
558008	NI: Chontales	-0,648	-0,666	-0,697	-0,670
558009	NI: Boaco	-2,100	-1,200	-0,743	-1,348
558010	NI: Matagalpa	-1,045	-0,966	-0,862	-0,958
558011	NI: Jinotega	0,203	-0,278	-2,076	-0,717
558012	NI: Estelí	-0,177	-0,707	0,085	-0,266
558013	NI: Nueva Segovia	-0,916	-0,602	-0,507	-0,675
558014	NI: Río San Juan	-0,387	0,450	-2,475	-0,804
558015	NI: R.A.A.S	-0,140	-0,111	-0,185	-0,145
558016	NI: R.A.A.N	1,365	1,443	-0,176	0,877
558017	NI: Madriz	-0,833	-0,924	-0,506	-0,755
591001	PA: Panamá	-0,169	0,244	0,269	0,115
591002	PA: Colón	-0,493	0,163	0,718	0,129
591003	PA: Bocas del Toro	1,025	1,356	1,343	1,241
591004	PA: Coclé	-0,592	0,926	0,334	0,223
591005	PA: Chiriquí	-0,044	1,422	0,808	0,729
591006	PA: Herrera	-0,080	-0,642	-0,184	-0,302
591007	PA: Los Santos	-1,144	0,981	0,885	0,241
591008	PA: Veraguas	1,088	0,799	0,097	0,661
591009	PA: Darién	-0,323	0,796	0,844	0,439
591011	PA: Comarca Ngäbe Buglé	0,773	-0,317	-1,143	-0,229
600001	PY: Asunción	-0,469	0,117	-0,470	-0,274
600003	PY: San Pedro	-0,501	0,426	-0,629	-0,235
600004	PY: Cordillera	1,623	-1,767	-0,241	-0,128
600006	PY: Caaguazú	0,077	0,071	-0,842	-0,232
600007	PY: Caazapá	-0,111	0,594	-0,235	0,083
600008	PY: Itapúa	-0,143	0,641	-0,636	-0,046
600010	PY: Paraguari	0,530	-0,230	-2,058	-0,586
600011	PY: Alto Paraná	-0,946	-0,061	-0,728	-0,578
600012	PY: Central	-0,630	0,165	0,486	0,007
600014	PY: Amambay	-0,528	0,332	-1,517	-0,571

Cod	Region	corr	trust	effecti v	quality
604000	PE: Lima	-0,027	0,373	-0,253	0,031
604001	PE: Amazonas	-1,338	0,088	0,345	-0,301
604002	PE: Áncash	0,827	1,477	0,981	1,095
604003	PE: Apurímac	1,950	2,561	-1,134	1,126
604004	PE: Arequipa	-0,040	0,612	-0,561	0,004
604005	PE: Ayacucho	-0,175	0,824	0,874	0,508
604006	PE: Cajamarca	0,306	0,418	0,861	0,528
604007	PE: Cusco	-0,217	0,582	1,307	0,557
604008	PE: Huancavelica	0,282	1,501	0,003	0,596
604009	PE: Huánuco	0,672	1,767	1,430	1,289
604010	PE: Ica	0,737	1,005	-0,053	0,563
604011	PE: Junín	0,521	0,449	-0,282	0,229
604012	PE: a libertad	-0,353	0,346	-0,074	-0,027
604013	PE: Lambayeque	-0,605	0,103	-0,449	-0,317
604015	PE: Loreto	-0,694	0,970	-0,236	0,013
604019	PE: Piura	-0,617	0,925	0,694	0,334
604020	PE: Puno	-0,060	0,341	-0,318	-0,012
604021	PE: San martín	-0,118	-0,035	-0,350	-0,168
604022	PE: Tacna	-0,767	-0,142	0,649	-0,087
604023	PE: Pasco	0,492	1,239	0,384	0,705
604024	PE: Moquegua	-0,061	0,575	0,227	0,247
604025	PE: Ucayali	-0,716	0,341	-0,080	-0,152
858001	UY: Montevideo	1,984	0,578	1,035	1,199
858002	UY: Artigas	1,904	0,388	1,708	1,333
858003	UY: Canelones	1,678	0,614	1,070	1,121
858004	UY: Cerro Largo	2,278	1,500	2,032	1,937
858005	UY: Colonia	0,208	0,406	0,946	0,520
858006	UY: Durazno	1,421	1,452	0,842	1,238
858007	UY: Flores	2,605	0,191	0,800	1,199
858008	UY: Florida	1,636	1,358	0,285	1,093
858009	UY: Lavalleja	1,087	-1,475	1,598	0,403
858010	UY: Maldonado	1,595	0,921	0,939	1,152
858011	UY: Paysandú	3,440	0,866	1,781	2,029
858012	UY: R'ío Negro	0,607	0,521	2,592	1,240
858013	UY: Rivera	2,414	-0,146	-0,145	0,708
858014	UY: Rocha	1,743	1,015	1,224	1,328
858015	UY: Salto	2,236	0,172	0,098	0,835
858016	UY: San José	2,091	1,046	1,405	1,514
858017	UY: Soriano	1,326	0,244	0,787	0,786
858018	UY: Tacuarembó	2,346	0,677	0,944	1,322
858019	UY: Treinta y Tres	1,603	0,588	0,351	0,847
862000	VE: Distrito Capital	-0,934	-1,862	-2,032	-1,609

Cod	Region	corr	trust	effecti v	quality
862001	VE: Amazonas	-3,458	-2,871	-1,957	-2,762
862002	VE: Anzoátegui	-1,020	-1,864	-1,043	-1,309
862003	VE: Apure	-0,863	-1,927	-0,988	-1,259
862004	VE: Aragua	-1,180	-1,948	-1,549	-1,559
862005	VE: Barinas	-1,684	-2,294	-1,716	-1,898
862006	VE: Bolívar	-0,969	-2,149	-0,967	-1,361
862007	VE: Carabobo	-1,267	-2,221	-1,578	-1,688
862008	VE: Cojedes	-2,157	-0,063	-2,204	-1,475
862010	VE: Falcón	-0,851	-3,166	-3,694	-2,570
862011	VE: Guárico	-0,785	-1,763	-1,607	-1,385
862012	VE: Lara	-0,648	-1,793	-1,722	-1,388
862013	VE: Mérida	-1,560	-2,267	-0,806	-1,544
862014	VE: Miranda	-1,039	-1,887	-1,590	-1,505
862015	VE: Monagas	-0,315	-0,259	-1,142	-0,572
862016	VE: Nueva Esparta	-1,404	-2,268	-1,771	-1,814
862017	VE: Portuguesa	-0,879	-1,625	-2,022	-1,509
862018	VE: Sucre	-0,780	-1,379	-2,337	-1,498
862019	VE: Táchira	-0,821	-2,448	-2,139	-1,803
862020	VE: Trujillo	0,536	-1,886	-0,006	-0,452
862021	VE: Vargas	-0,509	-2,583	-1,595	-1,562
862022	VE: Yaracuy	-0,645	-1,604	-1,980	-1,410
862023	VE: Zulia	-1,290	-1,847	-1,264	-1,467

Figure 4: Scatter of GDP and Institutions Quality Index

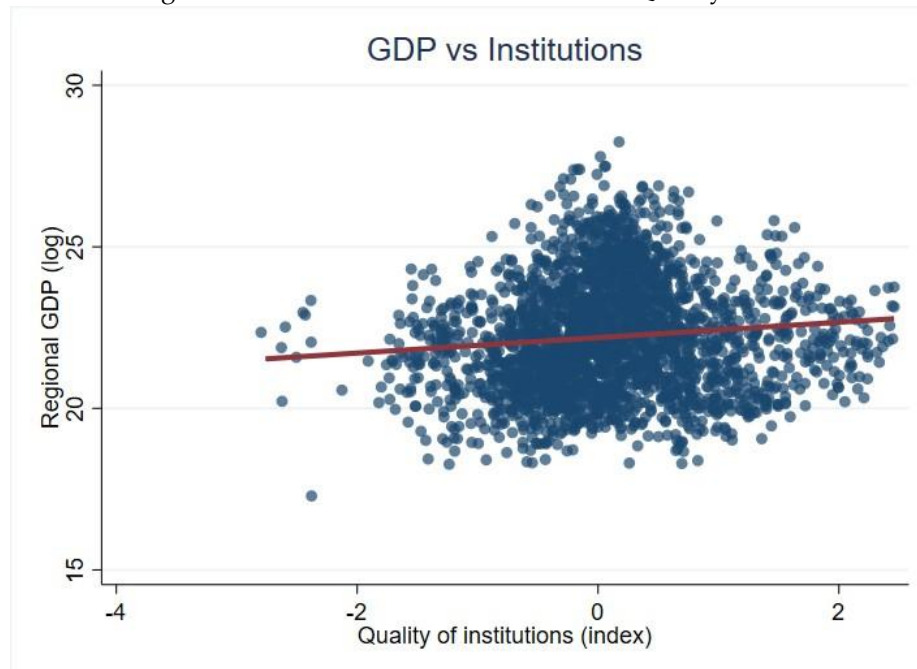


Table 24: Number of observation on minerals related activities

Country	Minex	S&P	USGV
Argentina	165	189	147
Bolivia	119	163	134
Brazil	1219	1172	1187
Chile	1163	1271	166
Colombia	125	127	148
Costa Rica	16	13	112
Dominican Republic	17	114	11
Ecuador	131	127	117
El Salvador	13	12	18
Guatemala	16	112	17
Honduras	12	17	16
Mexico	1193	1271	164
Nicaragua	15	15	15
Panama	112	19	12
Paraguay	11	11	12
Peru	1131	1220	1102
Uruguay	12	11	12
Venezuela	110	120	139
Total	900	1214	649

Figure 5: Mineral activities location (USGV)

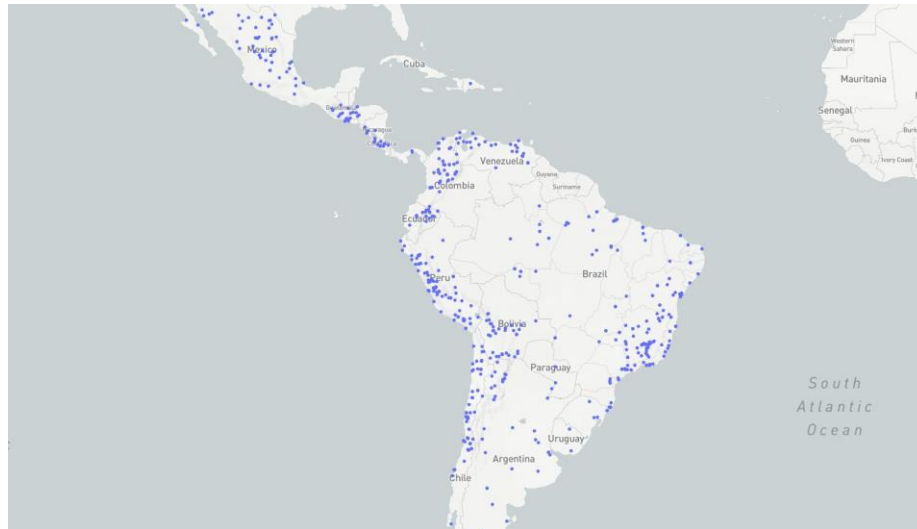


Figure 6: Mines location (Minex)

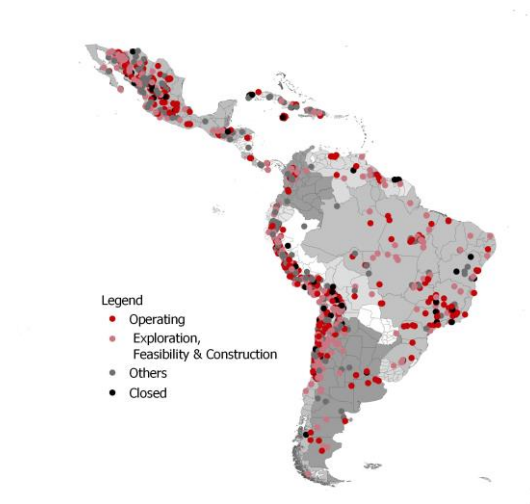


Figure 7: ETM mines location (Minex)



Note: includes mines that produce ETM as secondary products

Figure 8: ETM mines location (S&P)



Note: All mines have ETM extraction

Table 25: GDP Proxy per country

Country	Type of proxy	Source
Argentina	Energy consumption participation	Ministerio de Hacienda Argentina
Bolivia	Regional GDP	INE-Bolivia
Brasil	Regional GDP	OCDE
Colombia	Regional GDP	OCDE
Chile	Regional GDP	OCDE
Costa Rica	Energy consumption participation (per capita)	UNDP, University of Costa Rica
Dominic Republic	Nightlight time (NTL)	
Ecuador	Regional GDP	Central Bank of Ecuador
El salvador	NTL	
Guatemala	Regional GDP (per capita)	FUNDESA
Honduras	NTL	
Nicaragua	NTL	
Panama	Regional GDP	MINERPA
Paraguay	Proxy consumo energetico per capita (NTL)	UNDP
Peru	Regional GDP	OCDE
Uruguay	Regional GDP	OTU, OPP
Venezuela	Regional GDP	
	NTL	

Table 26: Number of companies information source

Country	Source
Argentina	OEDE
Bolivia	Fundempresa
Brasil	IBGE - Brazil
Colombia	DANE
Chile	BCN
Costa Rica	INEC - Costa Rica
Dominic Republic	ONE - Dominic Republic
Ecuador	INEC - Ecuador
El salvador	DIGESTYC
Guatemala	INE - DINESE
Honduras	INE - Honduras
Nicaragua	INIDE-Nicaragua
Panama	INEC - Panama
Paraguay	INE - Paraguay
Peru	INEI - Peru
Uruguay	INE - Uruguay

End of appendix

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