

Louvain School of Management

**How to measure the impact of the  
Belt and Road Initiative on the  
Greek economy? A study of  
indicators.**

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## List of Acronyms

BRI: Belt and Road Initiative

B: Billion

COSCO: China Ocean Shipping (Group) Company

EU: European Union

ECB: European Central Bank

ECI: Economic Complexity Index

FDI: Foreign Direct Investment

GDP: Gross domestic product

IMF: International Monetary Fund

LSBCI: Liner shipping bilateral connectivity index

M: Million

PLSCI: Port liner shipping connectivity index

PPA: Piraeus Port Authority

OEC: Observatory of Economic Complexity

OECD: Organization for Economic Cooperation and Development

R&D: Research and Development

WITS: World Integrated Trade Solution

# INTRODUCTION

Launched in 2013 by Xi Jinping, the Belt and Road Initiative (BRI) generates mixed opinions in the press. While some highlight the complex geopolitical implications and the risk of over-dependence on China, others consider it an opportunity for development and economic integration. The press is filled with various headlines, such as: “*Belt and Road Initiative: Is China's trillion-dollar gamble worth it?*” (Wong, 2023), “*China Is Lending Billions to Countries in Financial Trouble*” (Bradsher, 2023), “*COSCO-owned port a Sino-Greek Belt and Road Initiative success story*” (Wang Mingjie, 2023), “*The sky is the limit: China's rise as a transportation superpower challenges the EU*” (Zenglein & Sebastian, 2023), “*Kenyan train to nowhere reveals China's debt trap diplomacy*”(Flanagan, 2024). In the literature and in the press, opinions are divided<sup>1</sup>.

The first step is to define the BRI. The World Bank describes it as: “*The Belt and Road Initiative (BRI) is an effort to improve regional cooperation and connectivity on a transcontinental scale. The initiative aims to strengthen infrastructure, trade, and investment links.*” (World Bank, n.d.). BRI aims to connect Asia, Africa, and Europe via a land and maritime network. The goals are to improve connectivity, increase trade and stimulate economic growth (Financial Times, 2023). Over time, Xi Jinping's project has spread, finding new partners and gaining a presence in Europe. The acquisition of the Port of Piraeus by COSCO is one of the BRI's flagship projects in Europe. In my thesis, I investigated the economic impact of BRI in Greece. My research question is: **How to measure the impact of the Belt and Road Initiative on the Greek economy? A study of indicators.**

The structure of my thesis is as follows. I start by establishing a theoretical framework through a literature review. I begin by defining the BRI in general terms (its components, its funding, etc.), and then introduce it in the Greek context. Afterwards, I will describe my methodology to answer the research question. Then, I will carry out a study of indicators. The selected indicators are those on which the literature suggests the BRI has an impact. Other pertinent indicators will also be studied. In the discussion, the study of indicators will be compared with the literature review. Lastly, the results obtained, and the limitations of my research are outlined in the conclusion.

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<sup>1</sup> According to the press, opinions on the BRI are controversial and sometimes biased.

Since English is not my native language, I have used English translation and spelling correction software to improve the formulations of my thesis.

# CHAPTER 1: BELT AND ROAD INITIATIVE

## OVERVIEW

The BRI is an international strategic policy launched by Xi Jinping in 2013 (Griffiths, 2017). This program is supported by the Peoples’ Republic of China. It is considered as “*the biggest multilateral development program ever undertaken by a single country*” (Leahy et al., 2023). The BRI is composed of two parts which link the Eurasian and the Northern African economies. On one hand, there is the Silk Road Economic Belt, also called the Belt. It is the road on the continent which connects China to Europe via Central Asia. This first route entails infrastructure development such as railways, roads, and pipelines. On the other hand, there is the route over the sea (also known as the Road) that links China to Southeast Asia, South Asia, Africa, and Europe through seaports (Griffiths, 2017; Carrai et al., 2020; Tsigaros, 2022). These routes aim to enhance connectivity, trade and economic cooperation between China and participating countries.

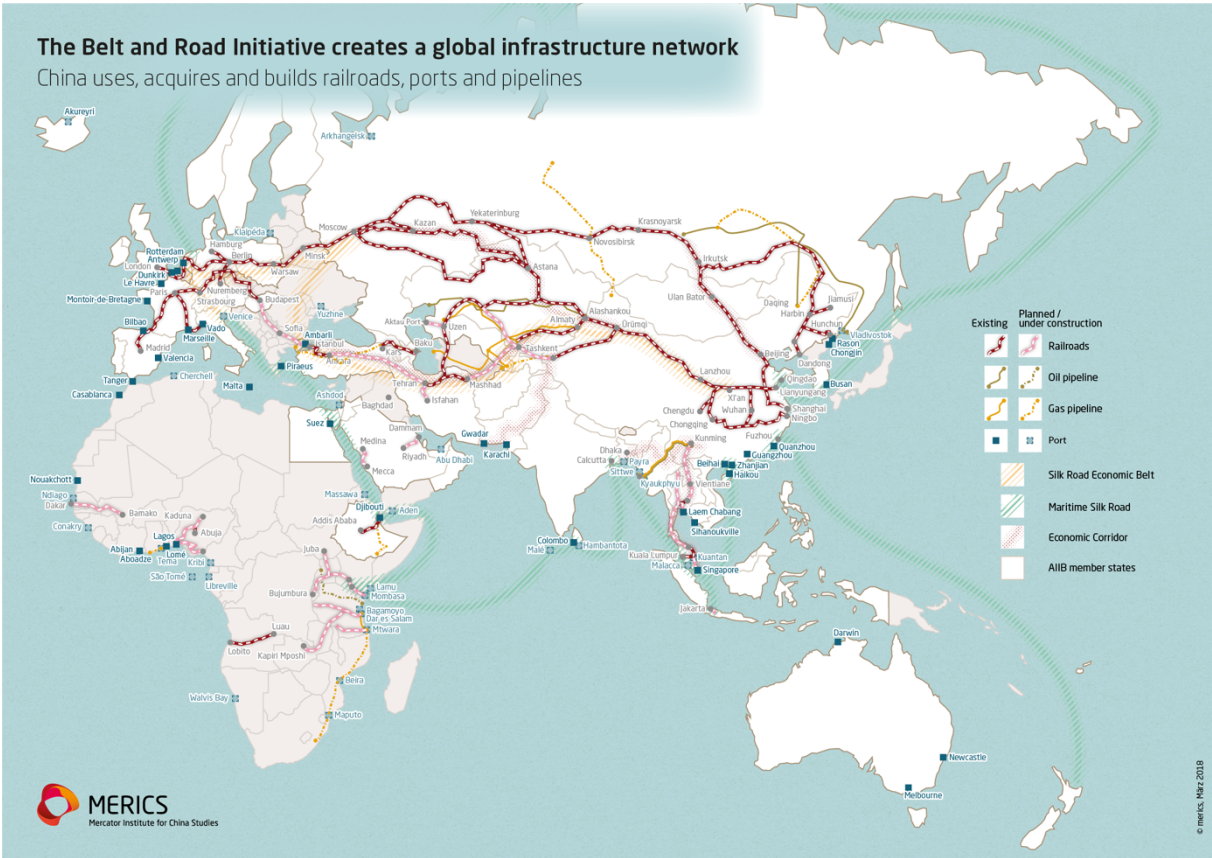


Figure 1 : Map of the BRI (Mercator Institute for China Studies, 2018)

In 2023, the BRI includes more than 150 countries that have signed a cooperation agreement with China to work within the BRI framework. Since the launch of the BRI, more than 10 years

ago, BRI investments are estimated at more than one trillion USD. More specifically, approximately 634 billion USD have been allocated to construction contracts and 419 billion USD have been dedicated to non-financial investments (Nedopil, 2024; Financial Times, 2023).

## MAIN COMPONENTS & IMPLEMENTATION

### Infrastructure development and economic growth in participating countries

According to Yunnan Chen, researcher at Overseas Development Institute (ODI), a public affairs think-tank, BRI has different purposes. First, the BRI finances connectivity infrastructures to the developing world to foster trade, growth, and economic development. Second, the BRI is perceived as a way to serve China's own economic and strategic interests. After the global crisis, China has invested a lot domestically: in massive infrastructures, in heavy industries, etc. But in 2011, the Chinese economy was already in excess capacity and seen as an overheated economy. Therefore, China seeks investments abroad. They built railways in Nigeria, Ethiopia, etc., constructed a harbor in Sri Lanka, etc. However, some countries meet problem with the reimbursement of China, and the Chinese government bailout them. Overall, the Chinese investments have brought an increase of the local employment, an increase of the income in some areas and have changed the landscape of some countries by providing them needed infrastructures. In central Asia, the BRI has played an essential role in the development of those countries, especially regarding the transport and energy sector (Financial Times, 2023).

In addition, the BRI is also seen as a mean of developing Chinese investment in western regions and a way to offer them their services and products. It also allows for new reserves of foreign exchange and capital (Carrai et al., 2020).

However, over the past few years, Chinese projects have also shifted to more 'small but beautiful' projects (Appendix 1).

## FUNDING

No specific budget allocated to the BRI has been announced by the Chinese authorities (Rolland 2017, cited by Ablyayev, 2024). However, BRI projects are financed through loans, which are made up of a combination of local financing, loans from the Chinese government and private investment. For the development of BRI projects, the Chinese government plays an essential role by being the principal provider of BRI funds to state-owned policy banks such as People's Bank of China, the Export and Import Bank of China, the China Development Bank and the

Agricultural Development Bank of China. To sustain the BRI, China has also signed business and trade cooperation agreements with more than thirty countries. Funding comes from a variety of sources including multilateral agencies such as the Asian Infrastructure Investment Bank, Asian Development Bank, World Bank, as well as private sector participation. In addition, a special fund named the Silk Road Fund was set up by Xi Jinping in 2014 with 40 billion USD and plans to be increased to 100 billion USD by the Chinese government (Chan, 2017, Chan 2018, Griffiths, 2017; cited by Ablyayev, 2024).

Private companies and state-owned enterprises are the key players in BRI investments. In 2023, BRI investment continues to be led by private companies, while construction contracts are dominated by state-owned enterprises (SOE).

## STRATEGIC GOALS AND MOTIVATIONS

BRI is articulated around five goals: policy coordination, facilities connectivity, unimpeded trade, financial integration, and people-to-people bonds (Nedopil, 2024).

### Impact on the economy

The global economy and the economies of the participating countries in the BRI are impacted by investments in transport. Due to reduced trade times and costs, the production and exports of participating countries are boosted. FDI are expected to rise in parallel with the reduction in trade times, particularly in lower-income nations (Nedopil, 2024).

The BRI contributes to the development of European international trade, the stimulation of foreign investment cooperation and the construction of infrastructure (Carrai et al., 2020). China is one of the main economic partners of the EU. In 2023, the EU trade deficit with China amounted to 291 billion euros. On the one hand, China was the largest partner for EU imports of goods (20.5%). The main goods imported by the EU from China were telecommunications equipment, electrical machinery and apparel and automatic data processing machines. On the other hand, the third-largest partner for EU exports of goods is China (8.8%) (Eurostat, 2024c; World Bank 2019).

Trade costs have decreased with the new transport infrastructure. For corridor economies<sup>2</sup>, shipment times can be reduced by an average of 3.2% and 4% for other corridor economies.

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<sup>2</sup> Economic corridors connect economic actors in a certain geographic area. They serve as connections between economic centers, which are typically found in urban areas where a significant number of economic players and resources are gathered. They connect the market's supply and demand sides (Brunner, 2013).

Countries with a comparative advantage in time-sensitive sectors (e.g., fresh fruits and vegetables, which are perishable) and time-sensitive inputs (such as electronic goods) are the biggest winners (World Bank, 2019).

Overall, the BRI has a positive impact on trade flows according to the computable general equilibrium (CGE) model. An increase of 1.7% in global export volume by 2030 is expected. Due to improved infrastructure, exports from the Belt and Road corridor economies are expected to increase by 2.8%. And a 0.7% growth in exports is also expected for non-Belt and Road corridor economies, as they can take benefit from a better transport network and lower trade costs (World Bank, 2019).

Overall, the BRI transport investment is expected to boost the real economies of the participating countries and the global economy. The impact is expected to be positive overall, but not uniform across countries. Through the BRI, several trade benefits are identified, such as reduced trade times and costs, and an increase in trade (because the BRI corridor economies boost their exports and diversify their production). The amount of FDI<sup>3</sup> also rises. As a consequence of increased trade and investment, the GDP<sup>4</sup> and the welfare are supposed to be boosted, which should reduce poverty. However, some individual projects may fail or that some countries lose because of the high costs of the infrastructure compared to the trade gains (World Bank, 2019).

## Cultural exchanges and Confucius Institutes

The BRI is not only an infrastructure and trade project, but also contains a cultural dimension. Indeed, China perceives culture as a soft power tool to enhance its global image and foster its ties with its partners. Soft power is a concept created by Joseph Nye. He defines it as an “*ability to appeal other nations by attracting them through culture, goods, food, etc*”. Building Confucius Institute is part of the strategy of spreading Chinese influence. It is a place design to promote the Chinese language and the Chinese values (Garlick, 2022).

## CRITICISM

### Debt-trap diplomacy

Debt-trap diplomacy is one the main criticism that the BRI has encountered. It is characterized by the fact that developing countries borrow an unstable level of money that they won't be able

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<sup>3</sup> There is an increase of 4.97% in FDI flows to the Belt and Road corridor economies (World Bank, 2019).

<sup>4</sup> Following the structural model, the world GDP is expected to increase by 2.9% (World Bank, 2019).

to repay because it is an excessive debt, and as consequence, China will turn the debt into equities. At the end, China ultimately acquires the infrastructure for which it has lend money. In the beginning, China was lending enormous amount of money every year (almost a billion a year). But since 2016-2017, it has decreased because China realized that a lot of the loans that they granted were very risky. Due to COVID-19, the number of loans was also reduced. During the last few years, China has also written off a certain number of loans and issues rescue loans (Financial Times, 2023).

### Environmental and social challenges

Nowadays, important challenges that the BRI is meeting, are the environmental protection and sustainable development. It is difficult to balance the industrial development and the environmental pollution. For instance, since the acquisition of Piraeus by COSCO, there is a rise of pollution in the air (due to cars, container trucks, buses, etc.), an increase in the water pollution and a growth of the noise and light pollution (Liu, 2022a).

Nonetheless, the rise of pollution caused by COSCO's acquisition is due to the expansion of the infrastructures of the port of Piraeus, the intensity of port activities (containers, cruise ships, etc.) and insufficient or non-applied environmental regulations. China seemed to treat the environmental issue as a secondary issue to economic development, and as a matter of negotiation (Tsimonis et al., 2019).

However, in recent years, there has been a growing focus on a green BRI, which is more sustainable, and which prioritizes cleaner from of infrastructure investments. China can contribute significantly to climate investments, by supplying renewable energy to the developing countries. China is the world's largest producer and manufacturer of wind turbines, solar panels, and other clean energy and renewable energy technology (Financial Times, 2023).

### Compliance with international standards

Another challenge resides in the compliance processes and in the lack of expertise in the environmental standards of EU countries. When China develops a project in a European member state, it must comply with the European laws and regulations and the member state regulation. As a result, China must adapt to the legislative system and the business environment of the EU. However, some Chinese companies sometimes overlook the local regulations because they perceive them as negotiable rather than compliant. This adaptation might take some time (Liu, 2022a; Tsimonis, 2019).

# CHAPTER 2: Greece in the BRI

## DRIVERS OF THE SINO GREEK RELATIONS

### Historical origin

Since the 5<sup>th</sup> and 6<sup>th</sup> centuries BC, the Chinese and Greek civilizations have been key players in the development of ethics and rationale discipline (such as philosophy, history and political sciences). Diplomatic relations between China and Athens started in 1972 but remained limited until the mid-2000s. These were strengthened in 2006, with the establishment of the Comprehensive Strategic Partnership designed to promote cooperation in trade and investment (with a focus on shipping and shipbuilding). The purpose of this agreement is to make Greece a gateway to Europe, giving Chinese products access to markets such as Central and South-Eastern Europe (Liu, 2022a).

### Greek economic crisis

#### *Context*

In 2009, the public deficit of Greece was revised and reached 15.4%. This was the result of a combination of internal and external factors as well as structural factors and the global economic crisis. On one hand, the most important internal factor is the high level of Greek public debt due to cumulative public budget deficits. These were caused by tax evasion, financial privileges granted to various entities, tax breaks for high incomes, excessive military spending, protecting private businesses and banks, and the growing gap in social security. In addition, Greece joined the eurozone in 2001. During this period, interest rates were very low, allowing Greece to take on a large debt. On the other hand, the 2009 crisis resulted in major changes from the banking sphere to governments, evolving from a financial crisis to a fiscal crisis. It led to an increase in the risk associated with Greek public debt. As a result, investors have shifted their investments away from securities issued by the most indebted countries towards securities considered to be safer. This resulted in the growth of spreads on Greek state obligations. Moreover, the lack of financial market regulations has allowed excessive speculation (Kamamessini, 2010).

From 2010 to 2018, three economic adjustment programs (EAP) were implemented by the Troika (composed of the EU, European Central Bank, and International Monetary Fund) in response to the crisis. These EAP have had various impacts (Appendix 2).

## DIRECT IMPACT OF THE BRI ON GREECE

### Infrastructure development

BRI has developed or improved and modernized infrastructures in Greece, such as ports, roads, bridges, railways and energy facilities. All these large-scale infrastructure projects are aimed at minimizing transport costs, time and logistics along the route. The different infrastructures will be described in the chapter on infrastructure projects in Greece. Furthermore, in the telecoms sector, Chinese companies such as Huawei, the Zhongxing Telecommunication Equipment Corporation, and the Pacific Century CyberWorks are also now operating in Greece. Other Chinese companies have also established businesses, branches, and representative offices in Greece, including major Chinese corporations like Alibaba and ICBC (Stroikos, 2024).

### Economic recovery

#### *Economic Growth*

The BRI is a source of economic growth. The BRI infrastructure projects affect European production and supply chains (Gruebler, 2021; cited by Liu, 2022a). Various studies, including Jackson & Shepotylo, 2021, and Rahman & Rahman, 2019, show that the BRI has the potential to deliver significant welfare gains, especially if it is combined with other trade integration schemes and to offset aggressive trade policies (Liu, 2022a).

The acquisition of the Port of Piraeus is one of the largest foreign investments in Greece. COSCO's presence in Piraeus is viewed as a signal of economic recovery. Initially, the privatization of Greece's most profitable economic sector generated disagreements but was supported by Greece's major shipowners (who hoped to benefit from favorable loan conditions from Chinese banks and use of Chinese shipyards). The evolution of the port of Piraeus is considered to be a win-win cooperation between China and Greece (Apostolopoulou, 2021). Many jobs will be created for Greeks as a result of the BRI's development, which will also put pressure on local firms to compete (Liu, 2022a). Due to the development of Piraeus, especially with the container terminal, many local jobs are created. Other Chinese companies investing in Greece also have an impact on the local business and labor market.

#### *Increased trade*

Thanks to the BRI, there has been rapid trade growth. China has become one of the key trade partners of Greece. In 2021, China became Greece's third-largest trade partner, accounting for 7.7% of Greece's total trade. However, trade remains unbalanced: China's imports are much larger than the Greek exports to China (Liu, 2022a; Stroikos, 2024).

The port of Piraeus plays an essential role in Greece's trade expansion, because it aims to be a pivotal gateway for Chinese products entering Europe. It connects markets from Asia, Africa and Europe, and its development has enabled to rise of the Mediterranean as a significant hub for Chinese products (Liu, 2022a).

The BRI aspires to increase China-Greece economic and trade cooperation. This includes boosting bilateral trade, investment, and cooperation, enhancing the two economies' complementarity, and encouraging the import and export of goods and services. Chinese President Xi Jinping stated that China would "*take the Piraeus port project as a leader to expand the scale of cooperation and investment*" and strengthen its cooperation with Greece in several other areas (Liu, 2022a).

### *Increased investments*

According to Iftikhar & Zhan's research (2022), China has an opportunity to make major investments in Greece as a result of the EU's tough policy toward the country. Chinese investments in Greece target the following sectors: infrastructure development, shipping, energy, and real estate.

For both Greece and China, the BRI represents an opportunity to expand markets and investment opportunities. Greece is considered as an important gateway country, and the BRI can provide sources of external finance, particularly from Chinese companies. In 2014, China and Greece signed a Memorandum of Understanding on Strengthening Bilateral Economic and Investment Cooperation (Liu, 2022a).

### **Tourism**

Tourism is one of the biggest Greek industries, and it contributes to 19.7% of the national GDP. In 2018, 32 million tourists are predicted to visit Greece (Shehadi, 2018).

The development of the BRI is boosting the tourism industry in Greece, and the number of Chinese visitors to Greece is increasing (before the disruptive effects of the pandemic on the tourism sector). In September 2017, Air China had launched direct flights between Beijing and Athens. In addition, a Joint Tourism Action Plan (2022-2024) was launched, to foster a wide range of collaborations and exchanges (in the fields of tourism promotion, specialized tourism, education and training, investment, etc.) between China and Greece (Liu, 2022a; Stroikos, 2024).

## Golden Visa & Real Estate

In 2013, the Golden Visa<sup>5</sup> program was introduced. Greece proposed an attractive Golden Visa scheme for non-European investors, offering a five-year renewable residency permit to investors who purchase real estate valued at least €250,000. Nowadays, a modified version of the golden visa has been introduced, but its principles remain the same. With Greek property yields being very high (7 to 8%), investors are attracted to Greece. In 2013, 7,800 visas were issued, 70% of which have been acquired by Chinese investors. These programs have an impact on the real estate market and can potentially lead to housing crises (Stroikos, 2014; Shehadi, 2018; CE Noticias Financieras, 2023).

The BRI has also impacted real estate. Due to investments in Piraeus, rent prices have risen, causing growing housing insecurity for low-income residents of the city. It has also reinforced inequality and labor instability, leading to port labor insecurity (Apostolopoulou, 2021).

## INFRASTRUCTURE PROJECTS IN GREECE

### Piraeus Port

#### *Overview*

Piraeus port is considered as one of the flagships of the BRI. It is the main port of Athens since 500 BCE, is nowadays one of the busiest ports in Europe. It serves as a gateway to “Maritime Silk Road” and the “Land Silk Road” in the European region (Iftikhar & Zhan, 2020; Kahveci-Özgür & Duan, 2022). Piraeus is strategically located because it connects the railways to Central and Eastern Europe and is the closest Mediterranean port to the Suez Canal-Gibraltar shipping route on the European continent. Piraeus facilitates trade and investment between China and Europe, promoting economic growth and cultural exchange (Comerma, 2023). Ports play a key role in the economic development and global overseas expansion of China (Appendix 3).

#### *Acquisition by COSCO*

Originally, the port of Piraeus was under the control of the Greek state. In 1999, it was transformed into a publicly traded company, but the Greek state still retained 75% of the shares and a majority stake in the management (Koenig et al., 2023).

But in 2008, the financial crisis hit Greece hard, leading to a massive sovereign debt and lack of revenue. The Greek government was forced to introduce budget reforms and privation

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<sup>5</sup> A Golden visa is a fast-track residence rights for the foreigners who invest large sums (The Economist, 2024).

programs. In November 2008, a concession agreement was concluded with the Chinese SOE COSCO. It involved in operating two container terminals at Piraeus for 831.5 million euros, with an initial deposit of 50 million euros and a long-term investments plan. As a result, terminals 2 and 3 are operated by COSCO, and Terminal 1 remains managed by the Greek state. But in 2016, COSCO bought a 51% stake in the Port of Piraeus for €280.5 million, with a further 16% to be purchased over the next five years for €88 million. It is a full privatization of PPA (Iftikhar & Zhan, 2020).

Following the acquisition, COSCO has invested more than 600 million euros into PPA. The objectives of these investments were to upgrade the port facilities, increasing capacity and improving efficiency. It consisted in the construction of a logistics center and improvement of Terminal 1, new cranes, new handling equipment, etc. As a result of COSCO's investments, PPA is the 9th European port and a major trans-shipment hub in the Mediterranean (in terms of gross tonnage) (Koenig et al., 2023).

### **Budapest-Belgrade-Skopje-Athens railway**

In November 2013, the project to modernize the railway line (approximately 350 kilometers long) between Budapest and Belgrade was announced by the Chinese, Serbian, and Hungarian prime ministers. The project for the Hungarian section is 85% financed by loans from the state-owned Chinese bank Export-Import Bank of China. One of the objectives of the development of the railway is to connect the Balkans with the EU and to shorten freight transit time to Europe. Subsequently, a larger project involves developing a railway line linking Budapest-Belgrade-Skopje-Athens, known as the China-Europe land-sea express line. This new route allows products to enter Europe via Greece, considerably reducing transit times (from 30 to 20 days) compared with previous routes through Western European ports such as Rotterdam, Antwerp and Hamburg (Rencz, 2019).

The Budapest-Belgrade railway project is expected to be completed by September 2025, reducing shipping times from 8 hours to 3 hours and 10 minutes (About Hungary, 2024).

### **Acquisition of 24% of Greek power grid operator**

In 2016, a 24% stake in Greece's power grid operator, ADMIE, was acquired for a 320-million-euro deal by the State Grid Corporation of China. Greece's Public Electricity Corporation (PPC), which owns, operates, and maintains the country's electricity transmission network, is the owner of ADMIE. ADMIE's sale is part of Greece's international bailout. It is considered to be the second-largest Chinese investment in Greece after the acquisition of the port of Piraeus (Reuters, 2017; Xinhua, 2017)

## Shenhua's acquisition of a 75% stake in four Wind Parks of Copelouzos

En 2017, the first Chinese investment in Wind Parks in Greece was achieved. Shenhua Group<sup>6</sup> Corporation Limited and Copelouzos Group<sup>7</sup> collaborate in areas such as green energy and environmental upgrading of power plants in Greece and neighboring countries. Together, they have signed two main agreements. First, Shenhua Renewable Co., a subsidiary of Shenhua, acquired 75% of the shares in four Wind Parks in operation or under construction by Copelouzos Group. Secondly, a three-party agreement was signed by Shenhua, PPC, and Copelouzos Group enabling Shenhua to become a partner in PPC and Copelouzos Group 's joint venture, PPC Solar Solutions (Copelouzos Group, 2017).

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<sup>6</sup> Shenhua Group is a Chinese SOE, and is the largest coal producer worldwide and one of China's main generators of electricity, both from traditional and renewable sources

<sup>7</sup> COPELOUZOS GROUP is an investment group that works on a variety of projects, including infrastructure and energy

## CHAPTER 3: RESEARCH DESIGN

### RESEARCH QUESTION

Since its integration into the WTO in 2011 and the launch of the BRI, euroscepticism in Europe has intensified. China's ascendancy as a global power divides the opinions of scholars. Some perceive it as an opportunity while others see it as a potential threat. The optimists claim that China will not challenge the liberal order, since it is a major beneficiary of it. China is integrated into international organizations and works with existing institutions rather than against them. Therefore, they suggest that as economic interdependence grows, these institutions will strengthen. This belief has guided the EU's policies towards China until the late 2010s. In contrast, the pessimists claim China is likely to maintain the current economic order, which relies on free markets and investment flows if the West turns not to protectionism. They believe that China's aim is to reshape the international order to serve its own interests; that can challenge the West and its institutions as well as the formation of coalitions against the US. Those different perceptions have built EU-China relations for the last decade (Dell'Aguzzo & Diodato, 2022).

Initially, when the first diplomatic ties between the EU and China were established, China represented an enormous economic opportunity, and the EU institutions encouraged the member states to develop ties with Beijing. The development of the relationships led to increased trade exchanges at the expense of respecting human rights. In 2013, Xi Jinping launched the BRI with ambitious scope and geographical reach raising both opportunities and challenges. The project stands at the same time to contribute to the economic growth in the countries in which it is developed but is still a Sino-centric project facilitated by China-led institutions. Therefore, the EU's response is skeptical, divided into the opportunity of economic development and the threat to EU's unity. (Dell'Aguzzo & Diodato, 2022)

Nevertheless, Greece has integrated into the twenty-first century Maritime Silk Road, which is supposed to benefit the countries with harbors in the Mediterranean Sea. After the financial crisis, Chinese investments were welcomed because the influx of foreign capital was much needed.

Consequently, it is clear that the European opinion on the emergence of the BRI is divided. In the literature, some authors claim that there will be economic gains for the members of the BRI. Therefore, I have decided to study the Greek case by studying economic indicators to verify if

the European statistics are aligned with the literature. My research question is: **How to measure the impact of the Belt and Road Initiative on the Greek economy? A study of indicators.**

## METHODOLOGY

The purpose of my research is to assess the impact of the BRI on the Greek economy through an analysis of indicators.

I have started to analyze documents to understand the context of the BRI and its implementation in Greece. Therefore, I have analyzed different research papers, think-tank papers, and documents from the European institutions. Most of the time in the literature, the BRI is described as a major project designed to change the world economy.

Afterwards, I analyzed statistical indicators from different databases (Eurostat, Hellenic Statistics, World Bank, OEC, OECD, etc.). The selected indicators were chosen based on their relevance to the literature's assumptions about the BRI's impact on the Greek economy. Other indicators considered relevant were also analyzed. The trends of the different indicators were studied. Following this analysis, I conducted a discussion comparing the statements in the literature with the chosen statistical indicators. In this thesis, I try to determine if Chinese investments have a significant impact on the selected indicators.

# CHAPTER 4: INDICATOR ANALYSIS

I conducted an analysis of quantitative indicators from various reliable data bases such as: Eurostat, OECD, OEC, the World Bank, WITS, UNCTAD, and the Hellenic Statistical Authority. These indicators were selected for their relevance in evaluating the evolution of the impacts that the BRI may have on the Greek economy. Together, they offer a comprehensive and multifaceted view of the BRI's effects on the Greek economy.

## GROSS DOMESTIC PRODUCT

To contextualize the Greek economy, I started to analyze Greece's GDP using World Bank data. The GDP indicates the total amount of value that each of its producers has added, and it is measured at the purchaser price. GDP growth in Greece has not been uniform. It grew until 2008, reaching 351,121.4 million USD, before dropping because of the 2008 economic crisis (World Bank, 2024a). Then, from 2009 to 2015, GDP contracted because of the sovereign debt crisis and budget reforms imposed in Greece. This is followed by a recovery in GDP from 2016 to 2022, despite the effects of the pandemic.

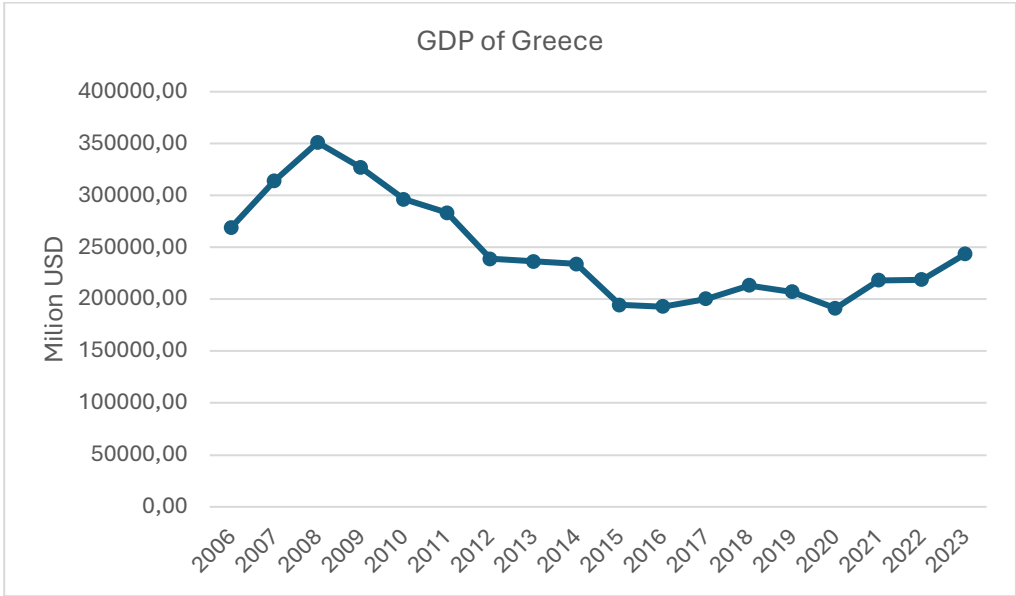


Figure 2: GDP of Greece. Data retrieved from the World Bank

### Gross added value

Furthermore, it is essential to understand the structure of the economy, and this can be done by looking at the percentage of the gross added value by type of economic activity. Given the data from UNCTAD in 2022, the service sector<sup>8</sup> was the most important (76.59%), followed by

<sup>8</sup> Service sector includes: wholesale, retail trade, restaurants and hotels; transport storage and communications; and other activities.

industry<sup>9</sup> (19.12%), and lastly the primary sector (agriculture, hunting, forestry, fishing (4.28%)). Over the last 15 years, the trends in the various sectors have remained largely consistent, despite slight variations in the figures (UNCTAD, 2024g).

Nevertheless, between 2008 and 2022 in the industrial sector, there has been a 4.53% increase in value added in mining, manufacturing and utilities, while construction recorded a 3.12% decline in gross value added. No major changes have been noted in the percentages of value added in the BRI investment sectors. Greece is a service-based economy, with gross value added of 146,352 million USD in 2022 (UNCTAD, 2024g).

However, the ISIC 3 categories remain broad, and it is complicated to determine the precise impact of an infrastructure or acquisition with these data. A more detailed view is needed. An approach to GDP based on production, generated by the OECD, provides a more in-depth approach (Appendix 4).

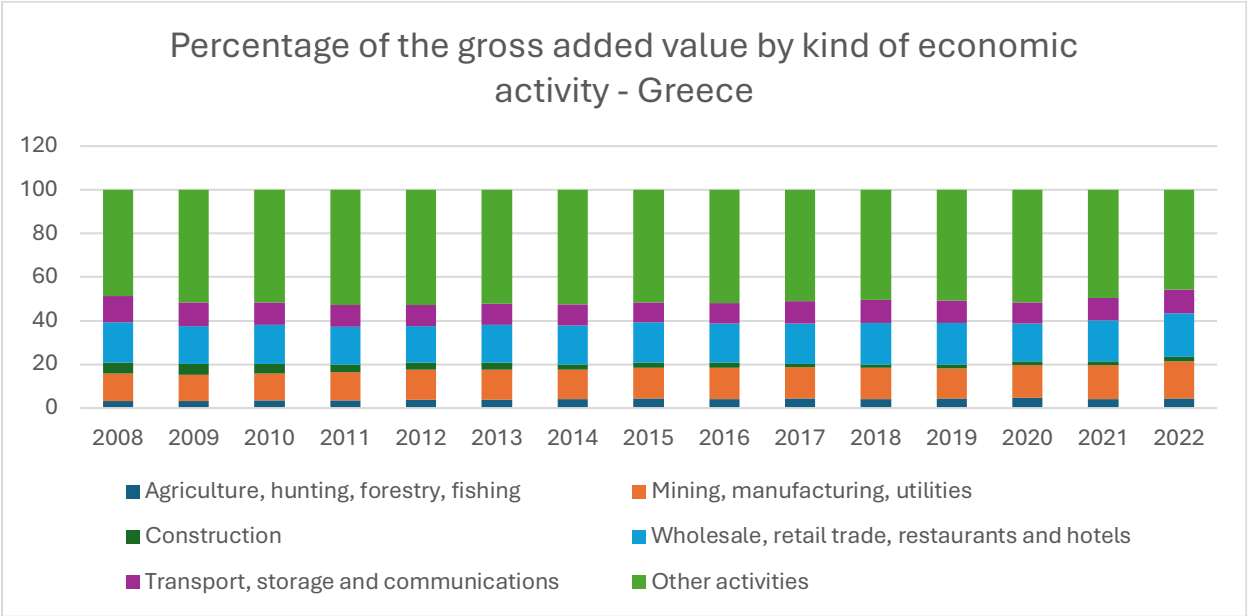


Figure 3: Percentage of the gross added value by kind of economic activity - Greece. Data retrieved from UNCTAD.

### R&D

A key indicator to develop a competitive advantage in science and technology is the percentage of the GDP spent in R&D. This data is also provided by the World Bank. From 2010 to 2019, the percentage of the GDP spent in R&D has risen from 0.68% to 1.27%. This increase can be linked to the Horizon 2020 project, led by the European Union. Horizon 2020 is a project for research and Innovation, which happened between 2014 and 2020. The aim is to build an economy based on research and innovation by developing research. The program targeted of

<sup>9</sup> Industrial sector includes mining, manufacturing, utilities; and construction.

spending 3% of EU GDP on research and development. Greece has a lower percentage of GDP spent in R&D than the European average (estimated at 2.2%) (Alfieri, 2017; *Horizon 2020 Country Profile: Greece*, s. d.; World Bank, 2024). However, it is complicated to establish a link between the increase in GDP spent in R&D and Chinese investments.

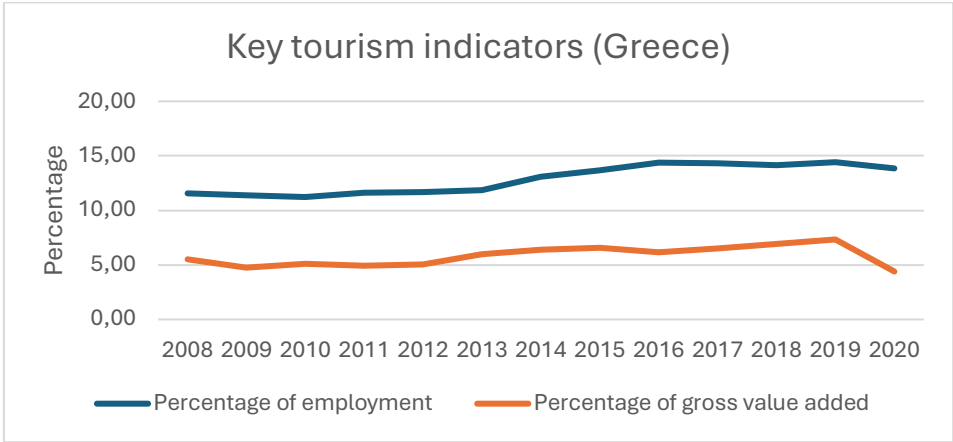
## SERVICE SECTOR

Tourism and maritime transport are the most important sector in the Greek economy and are both supposed to be impacted by the BRI.

### Tourism

#### *Key tourism indicators*

From 2008 to 2019, the gross added value generated by tourism has grown continuously, reaching 7.228% in 2019. It reflects the crucial importance of tourism in the Greek economy. Tourism also accounts for a significant percentage of Greek employment. Tourism employment increased from 2008 to 2019, reaching a peak in 2019 of 14.421% of total employment in Greece. Afterwards, tourism in Greece will be affected negatively by the COVID crisis (OECD, 2024b).



**Figure 4:** Key tourism indicators. Data retrieved from the OECD.

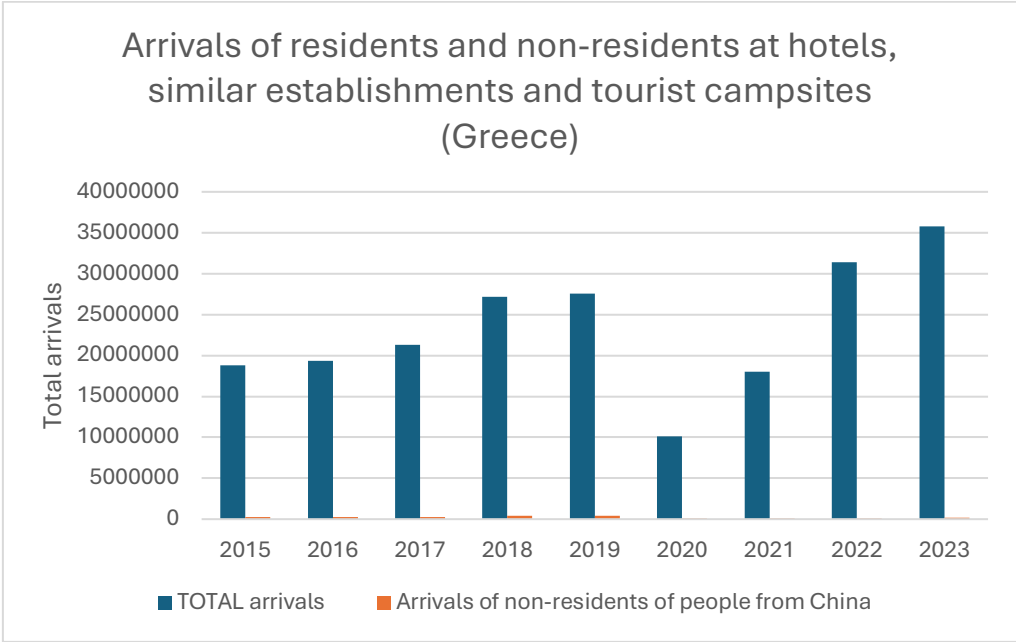
#### *Arrivals of residents and non-residents at hotels, similar establishments and tourist campsites*

I decided to use the arrivals of residents and non-residents at hotels, similar establishments and tourist campsites indicator from the Hellenic Statistical Authority database because it enabled me to identify the number of Chinese non-residents arriving in Greece.

Firstly, the number of arrivals of residents and non-residents at hotels, similar establishments and tourist campsites rose from 18,821,179 in 2015 to 27,539,434 in 2019. In 2020, the arrivals of residents and non-residents experienced a decrease, due to the pandemic. Afterward, this

indicator started to rise again to reach a number of arrivals of resident and non-resident without precedent: 35,782,424 (Hellenic Statistical Authority, 2023).

Secondly, I look at the arrivals of non-residents from China. This increased from 2016 to 2019, and then experienced a fall. It is important to note that the number of arrivals of non-residents from China represents between 2.2% and 0.1% of the total arrivals of non-residents at hotels, similar establishments and tourist campsites in Greece. En 2023, 0,6% of the total arrivals of non-residents at hotels, similar establishments is recorded for the people of China. As a result, the share of Chinese tourists in Greece is small (Hellenic Statistical Authority, 2023).



**Figure 5:** Arrivals of residents and non-residents at hotels, similar establishments and tourist campsites. Data retrieved from Hellenic Statistical Authority.

### Maritime Transport

Maritime transport is one of Greece's leading service sectors. According to the OEC, sea transport is the top service exported (representing \$14.3B<sup>10</sup>) and top service imported (\$7.85B) in 2020. Observing the importance of sea transport, it might be interesting to study its evolution over time. There was a decline in sea transport imports and exports between 2010 and 2013, and a recovery between 2016 and 2020 (OEC, 2024c). The increase in sea transport export, estimated at \$2.6B, and a part of it may be associated with COSCO's investments in the Port of

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<sup>10</sup> B represents billions

Piraeus, which could have stimulated the sector. There is a trade surplus, reflecting Greece's key role in maritime transport. Maritime transport will be further analyzed.

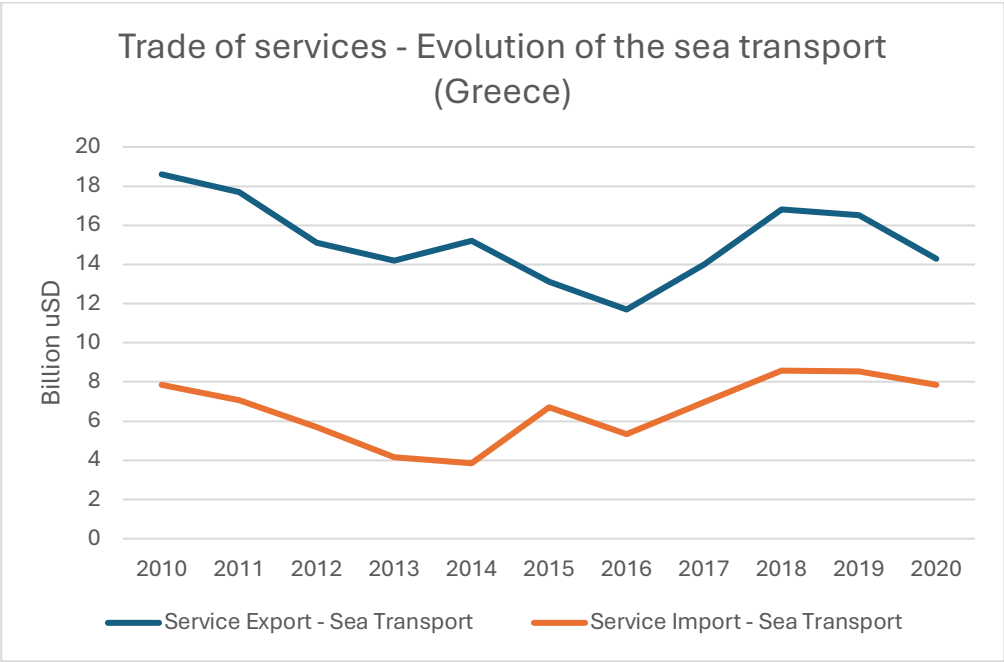
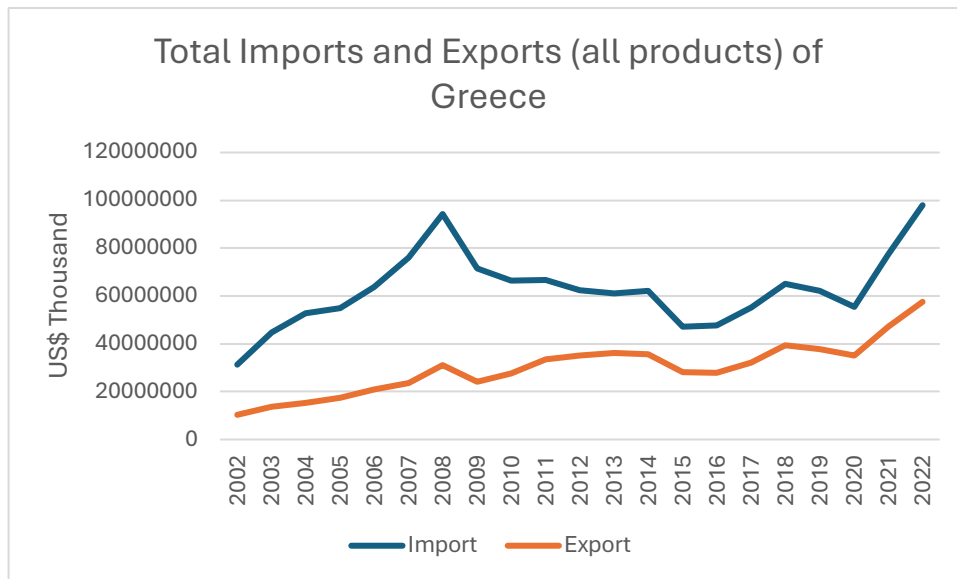


Figure 6: Trade in services. Data retrieved from OEC.

### TRADE OF GOODS

Furthermore, I have studied the total imports and exports of Greece with the world using data from WITS. Between 2002 and 2022, exports and imports of goods have risen, while imports have always remained larger than exports. As a result, the balance of trade in goods is negative, and has grown over the years. In 2022, it is estimated at -40,402,270.90 thousand USD. In 2022, Greece was the 57th economy in terms of total exports, and the 45th for total imports (WITS, 2022).

On one hand, the total imports of goods have risen between 2002 and 2022, and two peaks are observed. The first one occurred in 2008, and was followed by a decrease until 2015, which is succeeded by a recovery to reach the second peak in 2022. On the other hand, exports have been rising steadily since 1992 and peaked in 2022 at 57,568,024.97 thousand USD (WITS, 2022). Part of the increase in exports and imports since 2016 may be facilitated by the development of Piraeus' infrastructure and its role as a transit hub. Maritime trade obviously plays a key role in product imports and exports, considering that approximately 90% of them transit by sea (Martinis, 2024).



**Figure 7:** Total imports and exports of all products. Data retrieved from WITS.

## Trade of goods with the world

### *Analysis of the type of products and partners for the imports*

In 2022, the most imported products of Greece were Crude Petroleum (\$13.1B), Petroleum Gas (\$8.38B), Refined Petroleum (\$6.69B), Packaged Medicaments (\$2.57B), and Cars (\$2.16B) (OEC, 2024c). I analyze that mostly mineral products (crude petroleum, refined petroleum and petroleum gas) are imported. Greece imports a lot of energy resources to meet its needs, transform them (refining) or to export them again. Next, packaged medicaments and cars are finished products, but they represent much smaller amounts than the raw materials imported. Imports of machinery are also significant, representing \$12.38B.

Greece's most important import partners are China (\$11B), Germany (\$8.78B), Russia (\$8.74B), Italy (\$6.73B), and Iraq (\$6.27B). Russia and Iraq are countries that provide mainly energy resources. The products imported from Germany and Italy are more varied, including chemical products, machinery and transport (OEC, 2024c). The proximity of Italy can explain its strong trade relations with Greece, while the emerging importance of China could be explained by COSCO's new relations with Greece. Russia's is likely to decrease because of the war in Ukraine.

Since Greek imports are so important, it is interesting to understand whether they are a source of added value and whether they are just products in transit or products for Greek consumption. Given that the import and export curves follow the same trends, and that the level of imports is higher than exports, I can assume that a proportion of goods is in transit, and another part is for consumption. Some products may also be processed and then exported.

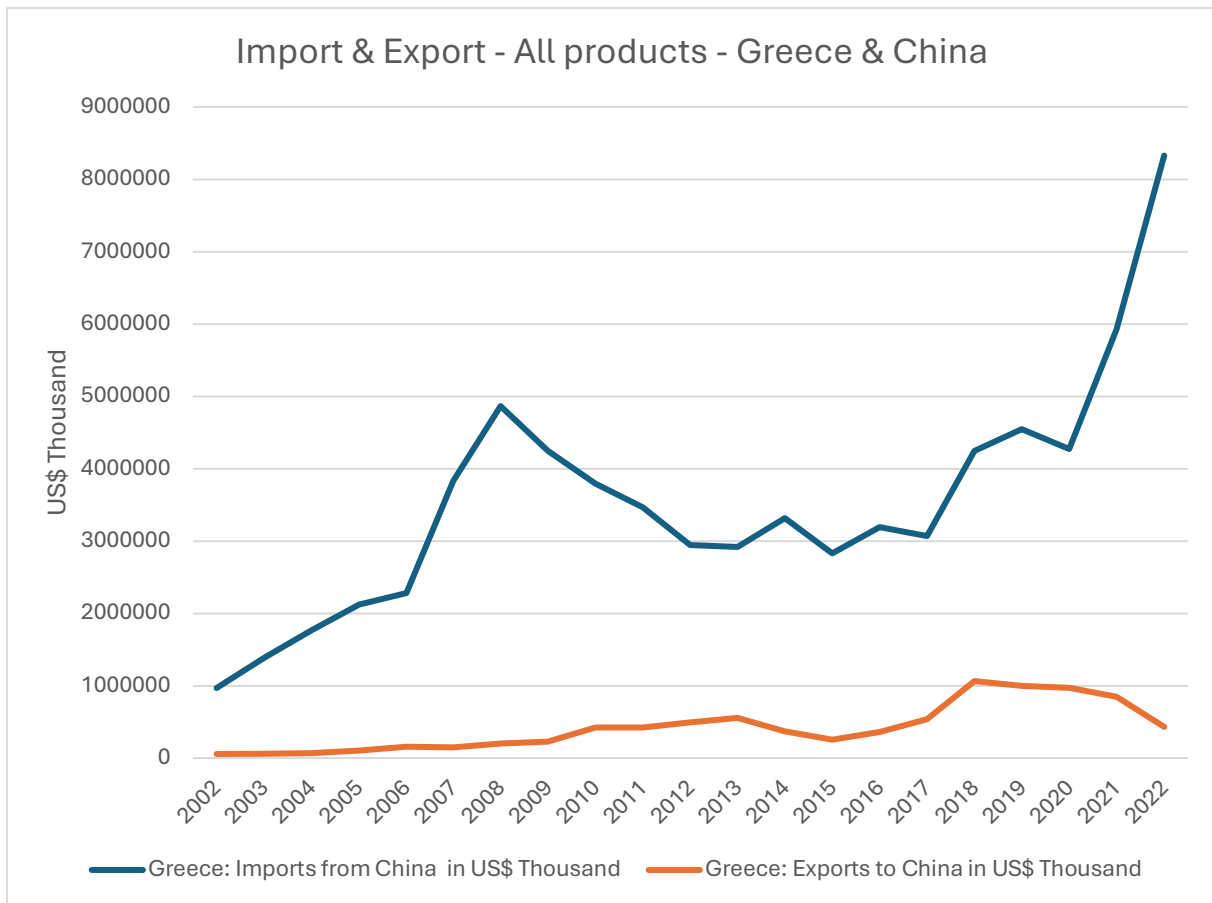
### *Analysis of the type of products and partners for the exports*

In 2022, the leading products exported from Greece are: Refined Petroleum (\$16.4B), Packaged Medicaments (\$2.74B), Petroleum Gas (\$1.85B), Aluminum Plating (\$1.17B), and Pure Olive Oil (\$863M) (OEC, 2024c). Products such as packaged medicaments, aluminum plating and olive oil are value-added products, which contribute to the diversification of Greece's products and the use of the manufacturing industry.

The most common destinations for the exports of Greece are Italy (\$5.82B), Bulgaria (\$3.62B), Germany (\$3.45B), Cyprus (\$2.92B), and Turkey (\$2.54B). Since 2016, exports to these countries have increased. However, a growth has been recorded since 2020 for Italy, and since 2021 for Bulgaria (OEC, 2024c). It is possible that the increase of exports to Italy is due to the extension of the port of Piraeus, and/or to the establishment of the rail link to Central Europe for Bulgaria. Moreover, by analyzing the amount dedicated to packaged medicaments of Greek imports and exports in 2022, it appears that they are similar, and it allows to suppose that these are products in transit.

### **Sino Greek Trade relations**

Then, I analyzed the evolution of Greece's imports and exports with China, to understand their dynamics. It can be noted that imports of products clearly exceed exports. Between 2002 and 2022, China's import partner share increased by 2.74 times, from 3.1% to 8.5%. Imports from China represent 8,327,452.14 thousand USD, or a value 8.59 times higher more than in 2002. There were two phases of growth in imports: from 2002 to 2008, and from 2015 to 2022 (WITS, 2022). The second rise could potentially be the result of global economic recovery as well as a BRI effect (facilitating imports transiting through Greece). Nevertheless, Greek exports to China have remained much lower over the years, representing 429,341.491 thousand USD. The Greek exports to China recorded a significant drop since 2020, probably due to COVID-19 (WITS, 2022)



**Figure 8:** Imports and Exports - Greece and China. Data retrieved from WITS.

By analyzing bilateral trade between China and Greece, different types of products are being traded. In 2022, Greece's main exports to China were mineral products (such as marble, travertine, and alabaster (\$92.6M), precious metal ore (\$85.9M), refined petroleum (\$63.4M), dolomite (\$46.9M), etc), chemical products (including packaged medicaments (\$64.9M)) and machines (such as centrifuges (\$45.4M)) (OEC, 2024a). As a result, Greece's exports to China are largely dependent on mineral products and a bit of some processed products, which limits Greece's profits. Although more complex products, such as chemical products, are a source of added value, these are more limited. However, Greece's imports from China are diverse and reflect a strong diversification of sectors. The largest imports are machinery (\$3.96B) (electrical machinery and electronics & machinery, mechanical appliances & parts), followed by textiles (\$2.1B), footwear and headwear (\$964.9M<sup>11</sup>) (OEC, 2024a). It shows that a significant share of imported products is processed products, where China provides products with higher added value. Consequently, Greece imports high value-added manufactured products from China, while exporting to China mostly low value-added products.

<sup>11</sup> M represents million



**Figure 8:** Type of goods exported from China to Greece in 2022. Data retrieved from OEC.

## ECONOMIC COMPLEXITY

Economic Complexity Index (ECI) is a measure that captures the sophistication of activities in a geographic distribution (Stojkoski et al., 2022). In terms of ECI in trade, Greece is ranked 55th worldwide, with a score of 0.33, reflecting its relatively low/average economic complexity. On a European level, this is an intermediate position: behind strongly industrialized countries such as Switzerland (1.97) but ahead of countries more reliant on raw materials. Currently, Greece exports rather low-complexity products and is dependent on traditional sectors (such as tourism, agriculture, and shipping) (OEC, 2024a).

### Greek exportations: specialization and complexity

Greece exports a diverse range of products, but these are mainly not complex products such as minerals, metals, foodstuffs, animal products, etc. Specialization is measured through the revealed comparative advantage. Greece has a high degree of specialization in a few products: olive oil, pure olive oil, and some mineral products (marbles, travertine and alabaster and

dolomite) and copper pipes (OEC, 2024c). These specialized products are raw materials or slightly processed products, which do not require a high degree of industrialization, generating a limited added value.

Nevertheless, Greece also exports some more complex products, such as chemical products and machinery, which require more technical skills, but these exports are less significant. The most complex products that Greece exports according to PCI are machinery, instruments, stone and glass and plastics and rubbers. Nonetheless, the PCI scores for these products, ranging from 1.22 to 1.05, indicate a limited and potentially niche presence of complex industries. Moreover, the products offered by Greece are generally also available to other countries. Furthermore, according to research publication data, computed through ECI Research, Greece ranks 29<sup>th</sup> (OEC, 2024b).

### Evolution of the ECI (trade) in Greece (2015-2022)

Studying the evolution of the ECI (in trade) in Greece, it fell between 2015 and 2020, followed by an increase until 2022 (OEC, 2024). The decline in the ECI can be explained by the long-term effects of the economic crisis, as well as the low complexity of exported products (mainly raw materials and low-added value product). The impact of Chinese investment appears to have been limited in terms of reducing the ECI because, firstly, the investments targeted logistics infrastructures (such as the port of Piraeus) rather than innovative industries, and they did not contribute to the diversification or complexity of the products exported. Secondly, exports driven by Chinese investment mainly consisted of raw materials.

Between 2020 and 2022, there is a rise in the ECI. This can be explained by an increase in exports to Europe, but also to new markets in Asia (notably Cyprus, Lebanon, and Turkey) and Africa (especially Libya), as well as an increase in exports of more complex and diversified products (such as pharmaceutical goods, machines and instruments), and an increase in exports of less complex products (OEC, 2024). Some Chinese investments have helped to modernize certain industrial infrastructures, particularly in renewable energy sector (solar and wind farms).

## PRODUCTIVITY

To study productivity, the OECD's Productivity by industry<sup>12</sup> indicator is used. Based on an index set in 2015 (=100), it measures the gross value added per hour worked. Overall, the productivity index declined for all ISIC activities between 2008 and 2022. The index fell significantly in 2012-2013, followed by a recovery after 2015, but remains below the level obtained in 2008. This could be justified by the global financial crisis and its consequences. Productivity in the wholesale and retail trade; repair of motor vehicles and motorbikes; transportation and storage; accommodation and food service activities sector dropped significantly (between 2008 (130.62) and 2022 (83.52)) (OECD, 2024c) (Appendix 5).

To identify whether this fall in productivity was linked to transport and storage, I analyzed the data provided by Eurostat on labor productivity and unit labor costs at industry level. The index of transport and storage (valued at 100 in 2015) fell from 2008 to 2015, then improved from 2016 to 2018. The decline could be linked to the economic crisis in Greece, while the rise could reflect a positive impact from COSCO's investments. In contrast, real labor productivity per person measured in the EU changed only slightly between 2008 and 2021 in the transport and storage industry (Appendix 6). Few changes were observed manufacturing sector and industry productivity (Eurostat, 2024e).

The Professional, scientific and technical activities; administrative and support service activities sector obtained the highest index, reaching 125.67 in 2022, potentially indicating a shift toward an economy with higher value-added activities. The construction sector showed a productivity decline until 2017, followed by an increase until 2022 (OECD, 2024c)

Thus, Chinese investments seem to have a limited impact on productivity.

## MARITIME TRANSPORT

Greece has historically relied on maritime transport. Following the Second World War, maritime sector provided a stable source of employment. Furthermore, the maritime sector provides exposure to international trade, a source of various opportunities and income. Greece is the world's largest ship owning country, with a merchant fleet of over 5,000 vessels. By 2023, Greece's global maritime cargo transport capacity was estimated at 426 million deadweight tons

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<sup>12</sup> The productivity database provides data on labor productivity, measured by employment or hours worked, and the components of capital and labor inputs

(DWT<sup>13</sup>), representing 0.2% of global GDP. In Greece, the maritime sector is responsible for 6% of jobs and generates around 150,000 direct and indirect jobs (Martinis et al., 2024).

## Gross weight tonnage handled

- In Greece

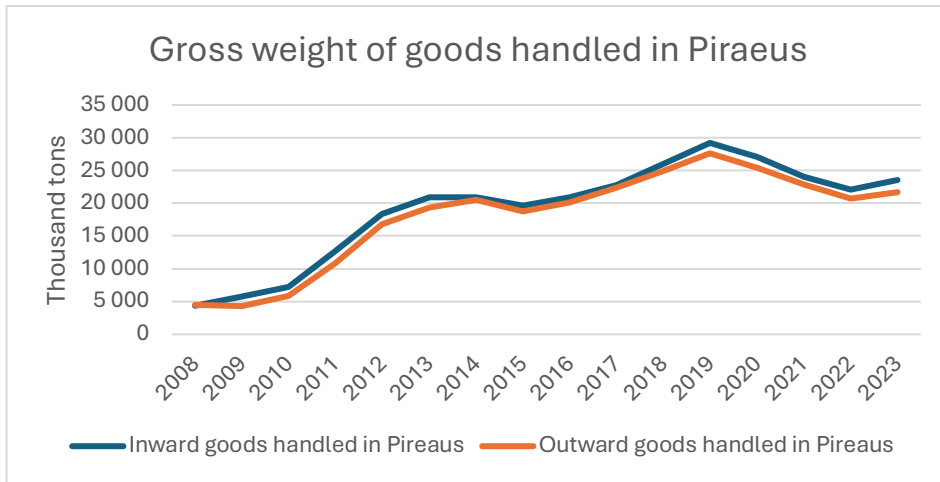
Starting with an analysis of the gross weight of goods handled by countries would seem to be a good approach. The gross weight of goods handled in a port is the total gross weight of goods exported or imported (in tons) that have transited through the country's ports. It enables studying a country's global port activity and commercial and logistical trends. Using Eurostat data, Greece is ranked 9th in Europe, with a gross weight of goods of 1,719,116 thousand tons. Over the last 15 years (from 2008 to 2023), this figure has increased by 19,418 thousand tons. Since 2013, the gross weight of goods handled by Greece has changed only slightly, which suggests that Chinese investment seems to have had little impact on this indicator. However, this indicator does not take into account the type or value of goods, or the different types of vessels used, and is the total for all Greek ports (Eurostat, 2024a) (Appendix 7).

- In Piraeus

Between 2008 and 2020, there is a significant increase in the gross weight tonnage of goods, for both inwards and outwards goods handled, rising respectively from 4,359 to 27,047 thousand tons (inwards) and 4,447 to 25,374 thousand tons (outwards). A part of the total increase in the gross weight tonnage between 2016 and 2020 (11,200 thousand tons) could be explained by COSCO's investment (due to its investment in the modernization of the port and its management). However, both inwards and outwards gross tonnage of goods has fallen between 2020 and 2022. This could be a consequence of the COVID-19 crisis on Greek maritime trade, as supply chains have been affected and trade volumes reduced. From 2022 onwards, we again see growth, with the total gross weight of goods handled reaching 45,238 thousand tons (Eurostat, 2024d).

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<sup>13</sup> Deadweight tonnage: is a measurement of a ship's maximum weight that defines its capacity and operational capabilities (Martinis et al., 2024).



**Figure 9:** Gross weight of goods in Piraeus. Data retrieved from Eurostat.

By comparing the inward and outward flows of the gross weight of goods handled in Piraeus, I can identify that they follow a similar trend, with the inward flow averaging 1 and 1.5 thousand tons higher (Eurostat, 2024d). However, this similarity only applies to the weight handled, not necessary the same goods. I can assume that Piraeus serves as a transit harbor, where goods arrive and are distributed to other destinations.

### Greek merchant fleet

In 2022, Greece held a market share of 18% of world fleet tonnage, followed by China (13%). Asian firms owned half of the world’s tonnage while the European owners controlled 39% (UNCTAD, 2022). Therefore, I have decided to study its merchant fleet<sup>14</sup> registered with its flag<sup>15</sup> and its fluctuations.

Between 2008 and 2023, the number of vessels decreased by 5,105, reducing total carrying capacity by 312 thousand DWT. In 2024, the fleet consisted of 1,211 vessels, including 280 oil tankers, 127 bulk carriers, 80 general cargo ships, 3 containers and 720 other types of ships. From 2011 and 2024, the number of ships decreased, except for the other types of ships, which grew by about 100 ships (UNCTAD, 2024c).

<sup>14</sup> The figures cover “seagoing propelled merchant ships of 100 gross tons and above, excluding inland waterway vessels, fishing vessels (from 2011 onwards only), military vessels, yachts, and offshore fixed and mobile platforms and barges” (UNCTAD, 2022).

<sup>15</sup> Numerous vessels are registered under foreign flags. For example, 25% of Greek-owned vessels are registered under the Liberian flag. The Marshall Islands, Liberia, and Panama have the highest registration rates in terms of DWT. Originally for financial and legal reasons, factors including cybersecurity, efficiency, and services now also play a role. Important issues like environmental preservation and safety are regulated by the flag state. (UNCTAD, 2022; UNCTAD, 2023).

Analyzing carrying capacity helps understand the fleet's operational size. Oil tankers, followed by bulk carriers, are largest vessels by capacity of the Greek fleet. Despite a significant reduction of almost 3,000 thousand DWT, they are still the vessels with the greatest carrying capacity. Therefore, it can be suggested that Greece specializes in this type of ship. Other types of ships have increased in capacity since 2008, but this can be explained by the growing number of these ships. General cargo vessels and containers have seen a decline in capacity. In 2024, the carrying capacity of general cargo vessels is estimated at 154 thousand DWT, and for containers at 413 thousand DWT. This could suggest the relocation of these activities to other flags or more competitive international ports (UNCTAD, 2024c).

In addition, there is a general decline in the carrying capacity for all ships from 2018 onwards (except for other types of ship) which may be attributed to various factors, such as the COVID crisis, aging fleet which needs to be modernized, the need to adopt green technologies (and alternative fuels), and to comply with IMO regulations. More specifically for containers, this is a sector in overcapacity, so carriers are looking to manage capacity by staggering deliveries, placing vessels in inactivity or opting for their demolition (UNCTAD, 2023).

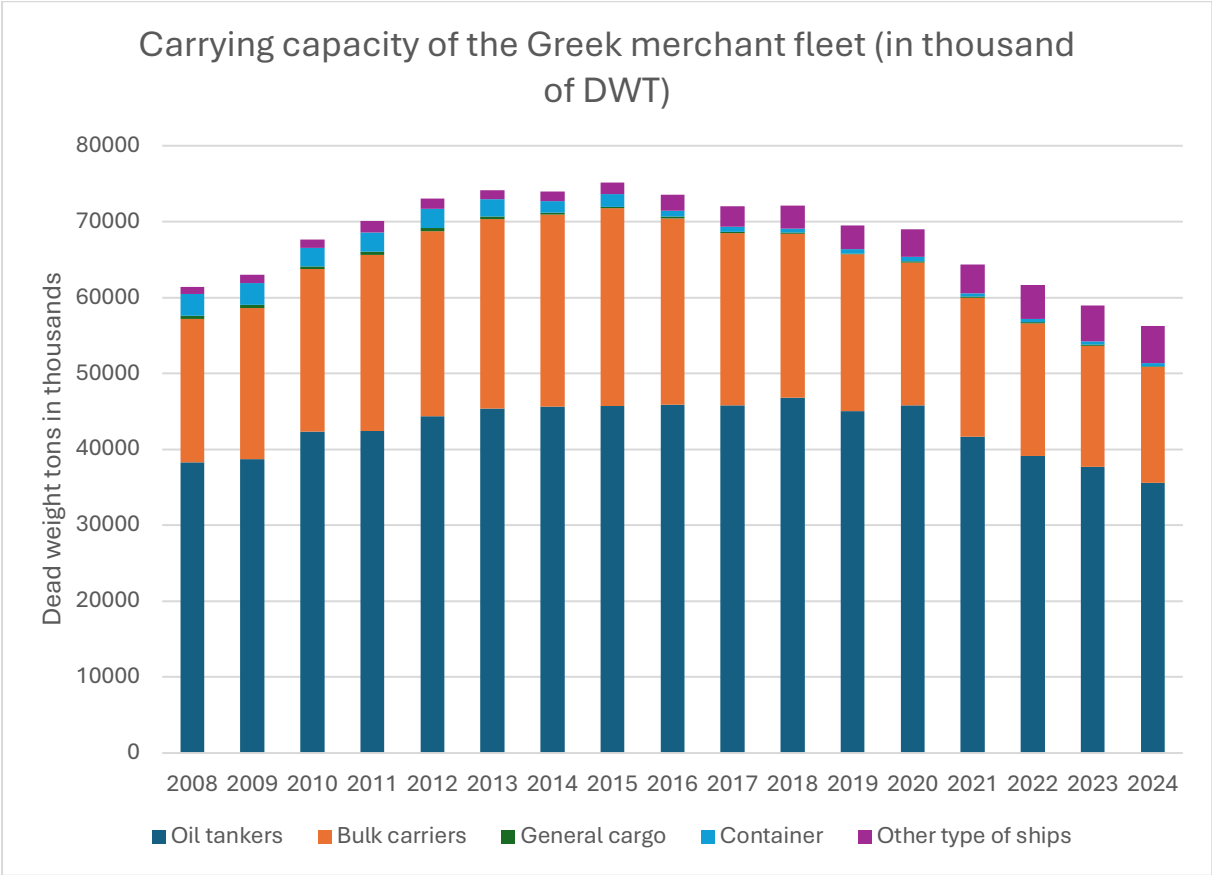


Figure 10: Carrying capacity of the Greek merchant fleet. Data retrieved from UNCTAD.

## Port calls

The number of port calls per year is summarized in the table Port Call and Performance Statistics: number of port calls, from the UNCTAD. Between 2018 and 2023, the number of port calls increased by 16,879. This trend is marked by an increase in 2019, followed by a decrease in 2020 and then a rise until 2023. In 2023, Greece recorded 171,951 port calls, and 142,297 of them were generated by passenger ships. The variation in the number of port calls is therefore intimately linked to passenger ships. Between 2018 and 2023, there was an increase in the number of port calls for liquid bulk carriers (241), liquefied petroleum gas carriers (83), liquefied natural gas carriers (43) and roll-on/roll-off ships (1,395). Similarly, the number of port calls generated by dry bulk carriers and dry breakbulk carriers fell by 51 and 223 respectively. There were also 353 fewer port calls from container ships (UNCTAD, 2024d).

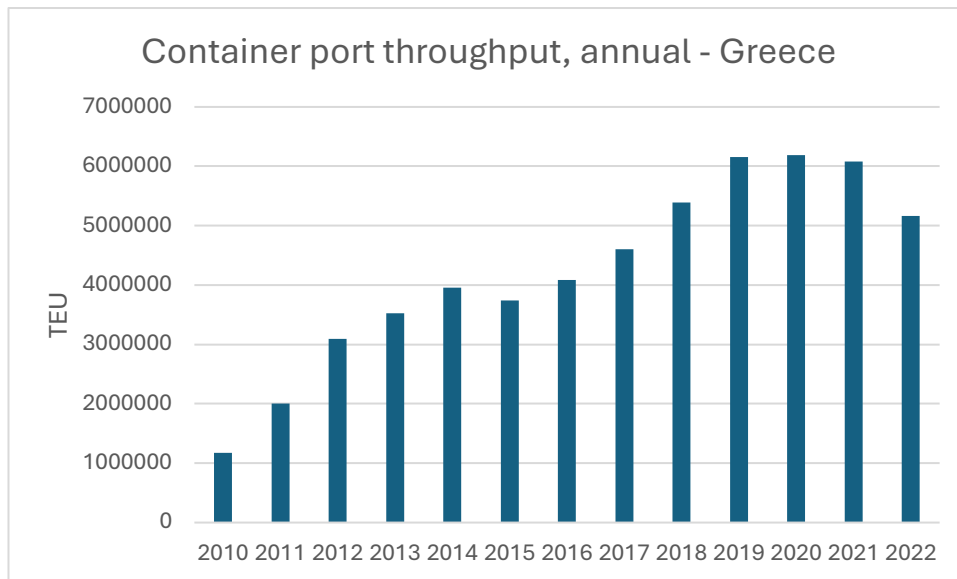
## Containers handled

Port throughput is the sum of the estimated total containers handled expressed in twenty-foot equivalent units (TEUs<sup>16</sup>). The data includes the sum of port calls for the ports of Piraeus, Heraklion, Thessaloniki, Volos, Eleusina, Kavála and Laurium.

Between 2010 and 2019, there was very strong growth in the number of containers handled, rising from 1,177,767 TEU to 6,151,556 TEU. This was followed by stagnation in 2020 and 2021, and then a decline in 2022 (UNCTAD, 2024a). This stagnation and decline are not specific to Greece but are a global trend. In the aftermath of the pandemic, supply chains have been affected and container markets have slowed (also due to trade and geopolitical tensions) (UNCTAD, 2023).

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<sup>16</sup> TEU represents the volume of a standard 20 feet long intermodal container used for loading, unloading, repositioning and transshipment.



**Figure 11:** Container port throughput - Greece. Data retrieved from UNCTAD.

A part of the increase between 2016 and onwards (2,099,636 TEUs) could be a consequence of the Chinese investment in Piraeus. However, this increase also takes into account containers arriving at other Greek ports.

#### *Port Calls & COSCO's role in Piraeus*

Data on port calls are limited and not always accessible. Therefore, I have used the results obtained in the study of Koenig et al (2023).

Piraeus ranked 6th in the EU for port calls. Between 2015 and 2019, the number of port calls increased significantly, from 130 calls monthly in 2015 to 190 in 2019. A potential link between the increase in port calls and COSCO's acquisition can be established, as the timing corresponds. In terms of average monthly visits, Piraeus is the second-largest central Mediterranean port (177), behind Valencia. For Piraeus, the proportion of calls made by ships leaving Europe is estimated at 90, and 36 for those going to China (Koenig et al., 2023).

Between 2015 and 2019, MSC Mediterranean Shipping was responsible for 19.5% of Piraeus calls, followed by COSCO Shipping Lines (17.6%) and Evergreen Marine Corp (9.6%) (Koenig et al., 2023). By 2022, COSCO became the leader with 24.2% of monthly calls in Piraeus, followed by MSC Mediterranean Shipping with 19.3% (Vaggelas & Pallis, 2023).

TABLE 1 Main operators in European ports (2015–2019).

Operator	Country	Number of ships	Share in %	Share by capacity (TEU)		Operator share in number of port calls (in %)	
				3000–10,000	≥ 10,000	Europe	Piraeus
MSC Mediterranean Shipping	Italy-Switz.	458	18	54	23	22.7	19.5
Maersk	Denmark	384	15	47	22	17.3	4.2
CMA CGM SA The French Line	France	246	10	42	17	11.5	8.2
Hapag-Lloyd	Germany	209	8	55	22	10.9	6.6
COSCO Shipping Lines	China	156	6	42	44	4.7	17.6
Ocean Network Express	Japan	114	4	58	33	4.4	5.9
Evergreen Marine Corp	Taiwan	90	4	54	37	2.3	9.6
APL LLC	US-France	59	2	54	44	2.1	0.9
Yang Ming Marine Transport	Taiwan	47	2	40	45	1.7	7.5
X-Press Feeders	Singapore	45	2	11	0	1.7	0.4
Orient Overseas Container Line	Hong Kong	43	2	51	37	1.7	0.6
Unifeeder	Denmark	38	1	0	0	1.5	0.1
Zim Integrated Shipping	Israel	35	1	69	3	1.2	4.7
Hamburg Sudamerikanische	Germany	35	1	94	0	1.3	0.2
Arkas Denizcilik ve Nakliyat	Turkey	30	1	3	0	1.1	5.6
HMM	South Korea	28	1	61	39	0.5	0.6
Cumulated total		2017	79	49	25	86.7	92.1

Note: Authors' computations based on fully-cellular ships calling in the European ports covered in our AIS data. Operators are identified using the Lloyd's list and are restricted to those with more than 20 container ships during the 2015–2019 period.

Table 1: Main operators in European ports (2015-2019). Reprinted from Koenig et al. (2023), retrieved from <https://doi.org/10.1111/roie.12675>

In the study, the containers are divided into two different groups according to their capacity: feeders below 3000 TEUs and bigger vessels. In general, feeders pick up shipping containers in different ports and return them to the central container terminals to be loaded into bigger vessels. COSCO's fleet is composed of a few feeders (14%) in Europe. This leads to the assumption that goods coming from China are unloaded and then transferred to smaller vessels operated by other European operators to the final destination (Koenig et al., 2023).

Koenig et al., (2023) built a difference-in-difference equation to study the impact of COSCO's acquisition on port calls. Different results were obtained from this study. Firstly, an overall increase in port calls to the port of Piraeus is observed after 2016, with a peak 8 months after the acquisition. Secondly, a different impact is found depending on the shipping operator, with a bias in favor of ships operated by COSCO. Between 2017 and 2019, there is an average increase of 20 port calls monthly for vessels operated by COSCO. However, an increase in port calls for other shipping operators was only observed in 2017, stopping in 2018. Furthermore, the increase in the number of vessels calling at Piraeus is limited to vessels over 3,000 TEUs,

also operated by COSCO. This positioning gives Greece an advantage in international maritime logistics chains, but smaller operators and smaller vessels are not benefiting as much from this transformation.

Nevertheless, COSCO's increased activity in the port hasn't reduced the activity of other operators in the port. The increase in calls by COSCO ships in Piraeus is added to COSCO's original activities, rather than replacing calls in other European ports. However, there has been a slight decrease in the use of COSCO's large vessels in the North Sea. The trend of increased port calls for COSCO vessels is not observed in other European ports (Koenig et al., 2023).

### *Connectivity Index*

According to the analysis of CBRE (2022), Piraeus is ranked 27th in United Nations Port Liner Shipping Connectivity Index. The port is specialized in global container traffic, offers transshipment feeder services to ports to the Balkans and the Black Sea, but has also developed onward freight traffic via road and land.

- Liner shipping bilateral connectivity index (LSBCI<sup>17</sup>)

LSBCI measures maritime transport connectivity between two countries. A higher index reflects a better level of connectivity between the two countries.

Overall, LSBCI for most of Greece's economic partners improves between 2008 and 2021. Two key stages are significant. From 2016 to 2021, the LSBCI increases faster for several partner countries such as China, Germany and Belgium. The rise of the index may be a consequence of the modernization of Piraeus infrastructure. During the pandemic period (2019-2020), the LSBCI remained stable (UNCTAD, 2024b).

LSBCI evolution differs by partner country. Between 2008 and 2021, the LSBCI between China and Greece climbed from 0.319 to 0.428, with a notable increase of this index from 2015 onwards. China is a strategic actor for Greece regarding maritime transport and has the highest LSBCI score. Singapore and Malaysia also experienced a significant increase in their LSBCI scores, although this increase was less significant than that with China. Over the same period, bilateral maritime connectivity between Greece and Turkey remained strong. Turkey is a major trading partner for Greece, and has the second-highest LSBCI score with Greece. This

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<sup>17</sup> The index is computed according to the number of transshipments required between the countries, the number of direct connections common to both countries, the number of common connection, the level of competition on services that connected the two countries and the size of the largest ship on the weakest route connecting the two countries (UNCTAD, 2024b).

connectivity is facilitated by the geographical proximity of the two countries. Greece's maritime connectivity with Belgium, Germany, the Netherlands and the UK is also important and has increased over the years. Additionally, Greece's LSCI with Egypt and Saudi Arabia increased by about 0.1. The routes between the Mediterranean and the Orient are important (UNCTAD, 2024b).

Based on the LSBCI, Chinese investments may have had a positive impact on Greece's bilateral connectivity. In fact, the index recorded an increase in many of the countries studied after 2016. The Port of Piraeus plays a key role in the integration of Greek maritime transport. However, other events may also influence the evolution of the index

- Port liner shipping connectivity index (PLSCI)

I used the PLSCI, published by the UNCTAD, to express a port's integration in the global shipping network. Imports and exports heavily rely on transport connectivity and harbors play a key role in it. Therefore, studying the evolution of Greek ports is important. UNCTAD provides data for Piraeus, Thessaloniki, Volos and Heraklion (UNCTAD, 2024f).

Obviously, Piraeus Port has the highest PLSCI score. Examining Piraeus' PLSCI score, four phases can be noted. From 2006 to 2008, there was a decline, probably reflecting the effects of the economic crisis. This is followed by two periods of growth: a slow recovery from 2009 to 2013, followed by significant growth from 2014 to 2019. A positive correlation can be established between the period of COSCO's investments in the Port of Piraeus and its PLSCI score of Piraeus. Over the period 2020-2022, PLSCI remained high, but no longer change drastically. Despite the effects of the pandemic, the Port of Piraeus seems to remain integrated into the important maritime routes. Between the first trimester of 2006 and the last trimester of 2022, Piraeus' PLSCI increased from 296.06 to 462.51 (UNCTAD, 2024f).

Compared to Piraeus, Thessaloniki, Heraklion, and Volos have much lower scores. On the one hand, the PLSCI for Thessaloniki has evolved from 146.99 in the first trimester of 2006 to 100.51 in last trimester 2022. On the other hand, the index for Volos and Heraklion reflects very weak connectivity. These ports seem to have little or no international ambitions but seem to be used mainly for local flows (UNCTAD, 2024f).

Comparing the PLSCI scores of the four ports, Piraeus has a much higher connectivity index than the other three, and has experienced significant growth, which may have been facilitated by COSCO's investments (from which the other three ports have not benefited).

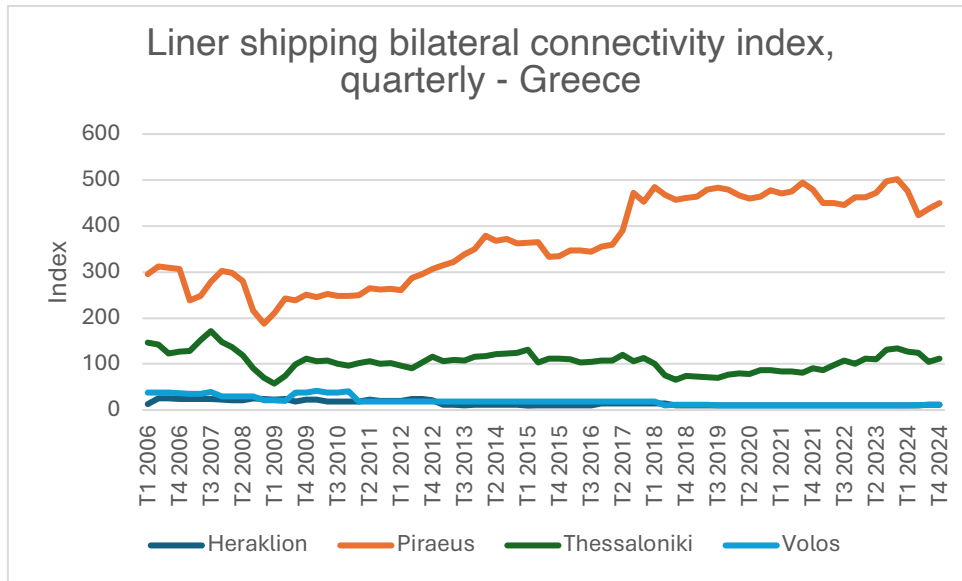


Figure 12: LSBCI, quarterly - Greece. Data retrieved from UNCTAD.

## FOREIGN DIRECT INVESTEMENT

I decided to study net FDI (inward and outward) using OECD data, because it allows us to analyze bilateral flows, which are not accessible on all platforms, and the amounts of FDI destined for economic activity. This study is based on data from 2013 onwards, as earlier data is not available. The dynamics and amounts of Greece's inward and outward FDI differ.

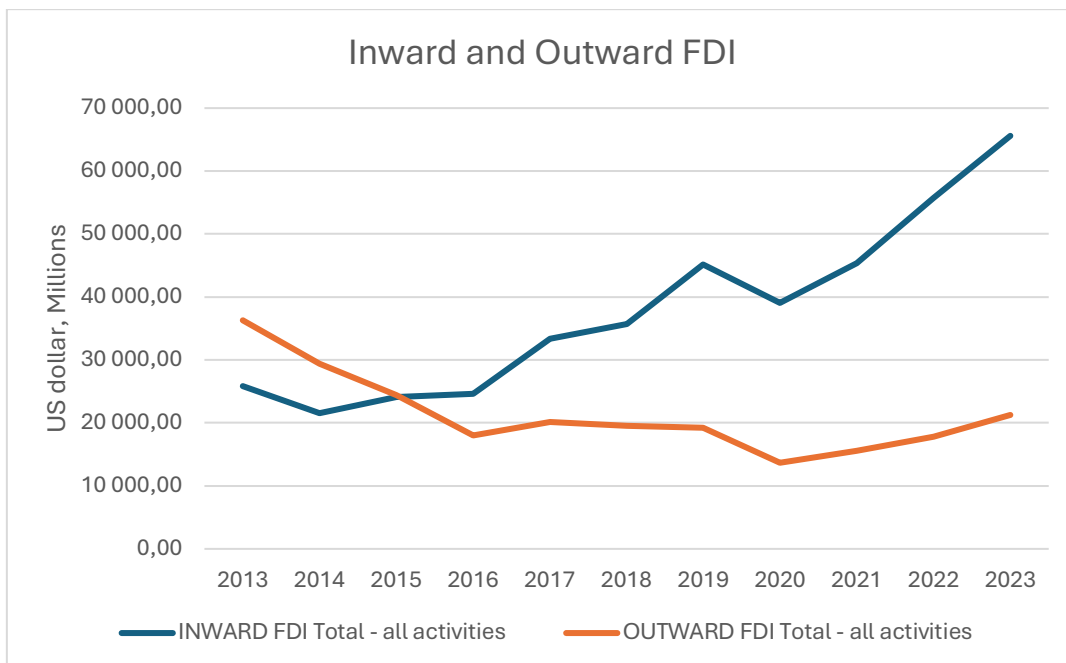


Figure 13: Inward and Outward FDI in Greece. Data retrieved from OECD.

## Economic activities

On the one hand, from 2013 to 2021, Greece's inward FDI increased from 25,85 billion USD to 65,50 billion USD. The most attractive economic activity for inward FDI is services, accounting for 36.67% (2013) to 55.11% (2021) of total inward FDI. Among the services, those that benefit most from inward FDI are wholesale and retail trade, repair of motor vehicles and motorbikes and information and communication, despite the amounts allocated to these services being reduced over the years. Transportation and storage have been the third largest FDI beneficiary since 2015. In 2021, 10.55% of inward FDI are dedicated to transport and storage. The manufacturing sector is the economic activity losing the most inward FDI between 2013 and 2021, accounting for almost 20%. In 2021, only 20.38% (equivalent to 9,252.4 million USD) is attributed to the manufacturing sector, compared with 44.34% in 2013. Since 2016, private real estate has benefited more from FDI inwards. However, since 2014, economic activities electricity, gas, steam, and air conditioning supply have benefited less from foreign investment (OECD, 2024a) (Appendix 8).

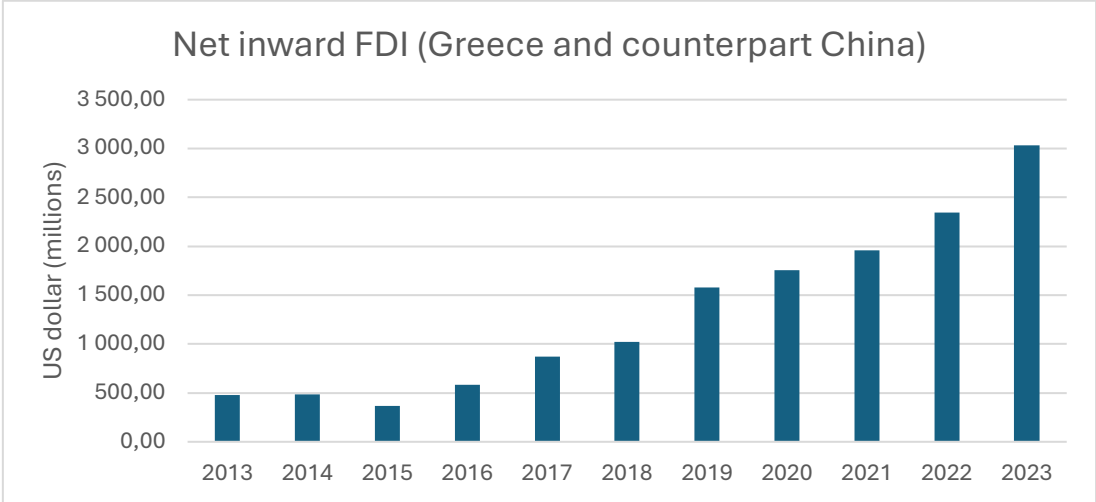
On the other hand, net outward FDI are much smaller. There is a decline in outward FDI from 2013 to 2020, followed by an increase from 2021 to 2023. In 2023, outward FDI amounts to 2,234.36 million USD. Most of the outward FDI is dedicated to services, ranging from 88.74% in 2013 and 71.44% in 2021. Services remain the main economic activity of net outward FDI, although the amount of outward FDI spent in services decreases every year. Among these services, the three most important categories in 2021 were financial and insurance activities (47.14%), for wholesale and retail trade; repair of motor vehicles and motorbikes (7.17%) and real estate (9.91%) (OECD, 2024a) (Appendix 9).

## Counterpart areas

Based on data provided by the OECD, I have identified Greece's most important counterparts for inward and outward FDI.

In 2021, 75.97% of inward FDI came from EU countries. The most important counterpart areas were Luxembourg (17.59%), Germany (13.45%) and the Netherlands (10.03%), although the importance of their investment has been declining since 2013. However, there has been a strong increase in net inward investment by Cyprus, with the percentage of total net FDI rising from 2.64% in 2019 to 11.01% in 2023. In addition, the amount of inward FDI from China (combining the People's Republic of China, Hong Kong & Macau) has increased significantly since 2013 (except for 2015). Between 2013 and 2021, inward FDI from China to Greece

increased by a factor of around 6, reaching 3,032.41 million USD in 2023 (OECD, 2024a). Chinese investment in Greece is growing, but the OECD does not provide any information on the economic activities for which it is allocated. However, certain assumptions can be made. The rise to 2023 may reflect investment in infrastructure and logistics, given that Greece is a member of the BRI. Following the 2008 financial crisis, Greece was open to foreign investment in various sectors (such as infrastructure, tourism, energy, etc.), allowing China to invest at attractive prices. In addition, Greece’s strategic location in the Mediterranean has been key to China’s interest in accessing European markets.



**Figure 14:** Net inward FDI in Greece (with China as counterpart). Data retrieved from OECD.

In 2021, Greek net outward FDI for all activities and counterparts is estimated at 1,524.61 million USD. From 2013 to 2023, Cyprus has been the country benefiting from the most outward Greek FDI, rising to 42.1% in 2020. This could be explained by the tax advantages and tax structures offered by Cyprus (Sotiropoulou, 2024). In addition, several European countries such as Romania, Bulgaria and Luxembourg benefit from significant outward FDI. While Luxembourg as an important counterpart area could be explained for tax reasons, FDI in Romania and Bulgaria might be due to infrastructure and supply chain projects under the BRI. These countries could serve as relay points between Greece and the rest of Europe. To confirm these assumptions, it would be essential to have data on the economic sectors of the outward FDI from Greece to these countries, but this data is not provided by the OECD. Moreover, the share of outward FDI from Greece to Turkey has fallen sharply, from an initial estimate of 17.56% in 2013 to 1.77% in 2023. China does not play a significant role in Greece's outward FDI (OECD, 2024a) (Appendix 10).

# EMPLOYEMENT & UNEMPLOYEMENT

I chose Eurostat data to study employment and unemployment because it was more detailed (especially on the evolution of the number of employees in the different sectors).

Following the 2008 crisis, the unemployment rate soared, peaking in 2013 at 27.6% of the population in the labor force (representing 1,344 thousand workers). Since 2013, the unemployment rate has been declining, reaching 11.1% in 2023. However, despite this significant drop, Greece still has the second highest unemployment rate in the EU after Spain (12.2%). The average unemployment rate in the EU is 6.1% (Eurostat, 2024f).

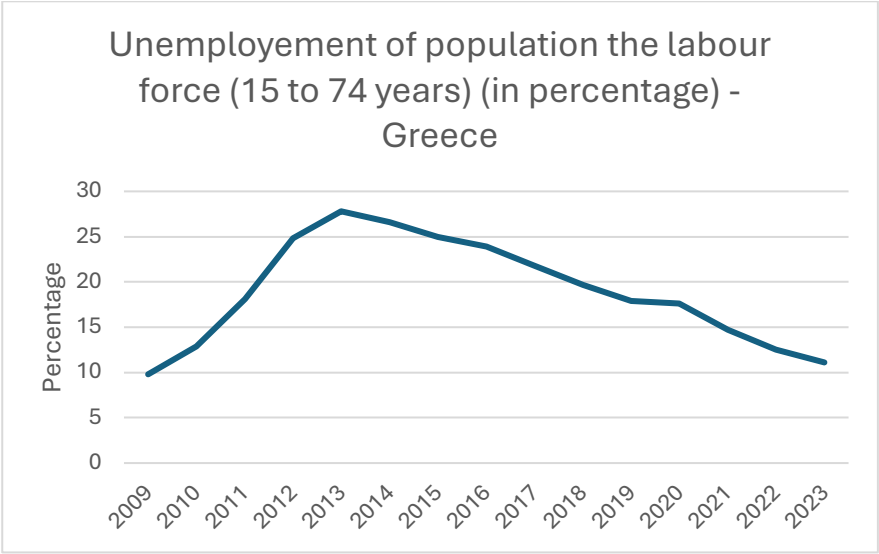


Figure 17: Unemployment in the labor force (Greece). Data retrieved from Eurostat.

In parallel, the employment sector has also changed significantly between 2013 and 2023, rising from 3,513.2 thousand to 4,193.5 thousand workers. From an economic sector point of view, the areas employing the most people in 2023 are: wholesale and retail trade, repair of motor vehicles and motorbikes (16.55%), followed by agriculture, forestry and fishing (11.47%) and then manufacturing (9.94%). Between 2008 and 2013, the construction sector experienced a sharp decline, from 397.3 thousand workers in 2008 to 165 thousand workers (Eurostat, 2024b). One question raised by Chinese investment was whether it would create jobs, as suggested in the literature. By analyzing the results between 2013 and 2023, the percentage of the total number of jobs in the transport and storage, telecommunications and information, and electricity, gas, steam and air conditioning supply sectors has increased slightly, by 0.43%, 0.35% and 0.13% respectively (representing a total of 91.6 thousand jobs). A part of the increase in the number of jobs created may be influenced by Chinese investment in Greece. Together, these three economic activities represent 8.79% of total employment in 2023 in Greece (Eurostat, 2024b) (Appendix 11).

## CHAPTER 5: DISCUSSION

In this discussion, I compare the statements in the literature review with selected statistical indicators to measure the impact that Chinese investments may have on the Greek economy. Additional literature is provided to better understand the trends. Not all statistical changes result from Chinese investments; they are also influenced by global events (e.g., the economic crisis, COVID-19) and Greece-specific events (e.g., the debt crisis, reforms, 2004 Olympics). Some Chinese investments focused on the development and modernization of infrastructure, and their effects are long-term and can take time to appear. In my thesis, I focused on the economic effects. Different statistical indicators such as GDP, trade, maritime transport, FDI, employment and tourism will be confronted with the literature.

### GDP

The literature and statistics agree that GDP dropped between 2008 and 2014 due to the economic crisis, combined with a high level of debt. From 2016 to 2023 (except for 2020 due to COVID), GDP increased. Various factors contributed to the increase in GDP, such as economic reforms and budget adjustments, increased exports (enjoying gains in competitiveness resulting from labor market reforms), an increase in employment and household income, a return to international debt markets, etc. Following the COVID-19 crisis, Greece's economic activity was quickly restored. The recovery of tourism and exports, a rise in consumer and investor confidence, and the actions taken by public authorities have all contributed to a recovery of the demand. Reforms enhance the business environment and help attract more FDI (OECD, 2018; OECD 2020). Analyzing the share of the different sectors in the gross added value, it hasn't changed significantly. Greece is an economy relying on the service sector. By using the output approach to GDP, it appears that wholesale and retail trade; repair of motor vehicles and motorbikes; transportation and storage; accommodation and food service activities are the economic activities that contribute most to gross added value.

Through the years, the share of tourism's gross added value increased as the percentage of GDP spent on R&D. However, the share of the GDP spent in R&D remains 'low' compared to other European countries.

The literature review assumes that the GDP is expected to grow due to the impact of BRI infrastructure. Due to rising FDI, improved infrastructure (improving connectivity), increased

exports, job creation, etc., I can establish a link between the increase in Greek GDP and the BRI.

## TRADE

### Imports and exports

In the literature, the BRI intends to increase trade in Greece. In the statistics, a rise in the value of all products of Greek imports and exports is observed. Between 2016 and 2022, Greek imports of all products increased by 50,375,260 thousand USD while Greek exports of all products increased by 29,757,100.13 thousand USD (WITS, 2022).

The increase in the value of exports can be attributed to the recovery in tourism, the rise in world demand for maritime transport and its rising prices, the diversification of the Greek export basket (recent additions of pharmaceuticals, special metal products and agricultural products) and policies aimed at boosting exports (OECD, 2023). In the literature review, I learned that the increase in imports may be justified by economic growth, tourism, FDI stimulating projects requiring imports, and improvements in infrastructure reducing shipping costs and increasing the volume traded.

Note that the surge in energy prices is also influencing import and export prices. There are global factors (such as the economic recovery, Greek government reforms, the recovery in tourism, the coronavirus, etc.) influencing Greek exports and imports. But, through the improvement in infrastructure at Piraeus (which has been transformed into a European transport hub) and the increase in FDI from China, it could be argued that these BRI components have contributed to some of the increase in Greek import and export value of all products since 2016.

### Type of goods imported and exported

#### *Imported goods*

According to the literature from Eurostat (2024), the goods that were the most imported by the EU are telecommunications equipment, electrical machinery and apparel, and automatic data processing machines. According to the statistics of the OEC (2024), it is also the case for Greece, which imports a large variety of goods from China. Greece mostly imports added value goods, and particularly machinery (electrical machinery and electronics and machinery, mechanical appliances, and parts) valued at \$3.96B, followed by textiles (\$2.1B).

### *Exported goods*

The literature and statistical data highlight the fact that Greece relies mainly on traditional sectors. In Greece, technologies are not very innovative, which limit productivity gains. Greek exports consist mainly of mineral products (particularly refined petroleum) and metals. However, there has been an increase in exports of chemical products (particularly packaged medicines), miscellaneous manufactured goods and transport equipment to other EU markets (OECD, 2023).

It should also be noted that Russia's war with Ukraine has affected Greece's energy supplies. Greece is reducing its energy imports from Russia, and is seeking supplies from other countries (OECD, 2023).

### **Bilateral trade: China & Greece**

As the literature suggests, Greek imports from China exceed Greek exports to China, resulting in a negative trade balance for Greece (Liu, 2022a).

Between 2017 and 2022, the trends for exports and imports are different. On the one hand, from 2017 to 2022, Chinese imports to Greece increased by 5,256,846.06 thousand USD. On the other hand, from 2018 to 2022, Greece's exports to China fell by 106,027 thousand USD.

China is one of the largest trade partners of Greece. However, Greek exports to China only represent a small portion of the Chinese imports. Bilateral trade between the countries has been facilitated through Piraeus, the most important transit port of the Mediterranean. The port of Piraeus stimulates trade and has a positive influence on Chinese exports to Greece. The port connects Europe, the Balkans, the Middle East and China. Moreover, trade and investment treaties have made bilateral trade between the two countries easier (Interesse, 2024; OEC, 2024a). Greece mostly imports machinery and textiles from China, while China imports mineral products, refined petroleum and dolomite. Consequently, the products traded by China are value-added products, generating greater value.

Piraeus (being the flagship of the BRI in Greece) contributes positively to the bilateral trade between Greece and China.

## **MARITIME TRANSPORT**

In the area of maritime transport, various indicators have been studied, and certain links with Chinese investment have been established.

## Gross weight tonnage handled

An increase in gross weight tonnage has been recorded in the port of Piraeus. The literature aligns with the statistics about the impact of Chinese investment on the increase in gross weight tonnage in the port of Piraeus. Several factors can explain this growth, including the modernization of the Port of Piraeus' infrastructure (more specifically: 6 rubber-tired gantry cranes, 30 terminal tractors, and 30 terminal chassis; modernization of the terminal operating system to handle increased traffic and anticipate new medium-term services). These infrastructures improve loading and unloading times, resulting in an increase in the volume of goods handled in the port (UNCTAD, 2019).

Moreover, inward and outward goods handled in Piraeus follow a similar trend, suggesting that the port of Piraeus is a transit hub. The role of the port as a transit hub has a positive influence on gross weight tonnage. Other factors such as the economic recovery and the pandemic crisis also played a role in fluctuations in the gross weight tonnage handled in Piraeus. A part of the total increase in Piraeus' gross weight tonnage between 2016 and 2020 (11,400 thousand tons) can be attributed to Chinese investments in the BRI, while taking other factors into account.

## Greek merchant fleet & containers handled in Greece

It is difficult to establish a direct link between the composition of the Greek merchant fleet and BRI investments. Overall, there has been a decline in the number of merchant vessels operated under the Greek flag. Furthermore, there has been a rise in the number of port calls in Greece, but most of this increase is due to passenger ships. In addition, between 2011 and 2019, the number of containers handled in Greece rose sharply, and part of this increase can be attributed to the development of infrastructure at the port of Piraeus (in particular the increase between 2016 and 2019, estimated at 2,063,131 TEUs). However, other factors need to be considered, and it is important to recognize that this increase reflects the number of TEUs handled in a variety of Greek ports, not just Piraeus. This increase is therefore not entirely attributable to Chinese investment in BRI.

## Port calls and COSCO's role in Piraeus

Koenig et al. (2023) carried out a study (specifically a difference-in-difference equation) and demonstrated that a significant increase in traffic (for COSCO's vessels) in the port of Piraeus is linked to the increase in port capacity due to the modernization and expansion of the port by Chinese investment.

In their study, they noted that the number of port calls increased from 130 calls to 190 calls monthly between 2015 and 2019. However, this increase in port calls cannot be generalized to all shipping operators. It is biased in favor of the large ships (over 3,000 TEUs and, more specifically, the largest of them) operated by COSCO. For these vessels, the probability of stopping in Piraeus increases significantly and sustainably. According to these developments, the Port of Piraeus is now serving as COSCO's primary transshipment port, with a rise in the use of both its large vessels for intercontinental trade and its intermediate-sized vessels for collection and redirecting to neighboring ports. The trend of increasing port calls at Piraeus for other shipping companies lasted only for a period of 8 months after the acquisition. But COSCO's expanding presence in Piraeus does not appear to have any crowding out effects on other companies operating there.

Therefore, we can say that the privatization of Piraeus led to an increase in port calls (20 additional monthly) but is specific to the transshipment vessels (over 3,000 TEUs) operated by COSCO and is not a general trend. In 2022, COSCO's port calls accounted for 24.2% of monthly calls in Piraeus. The number of COSCO's port calls has increased over the years and can be attributed to the Chinese investment in Piraeus.

### Connectivity index

Two connectivity indexes are studied: the LSBCI and the PLSCI.

The LSBCI index shows that Greece's connectivity score with many of its partners is increasing. China is the country with the highest score in 2021 (equal with Turkey). The score increased from 2016 to 2018 and continued to rise through 2021. This increase in Greece's connectivity is in line with the objectives of the BRI identified in the literature. As Greece (through the Port of Piraeus) becomes a European transshipment hub (point of entry for Chinese goods and an increase in container flows) and as Piraeus is one of the most efficient ports in the Mediterranean, the bilateral connectivity index of Greece increases (UNCTAD, 2023).

The highest PLSCI score in Greece corresponds to Piraeus, among the other Greek ports studied by UNCTAD. Between the first quarter of 2014 and the last quarter of 2019, the index rose from 378.34 to 478.66, reflecting greater connectivity. Part of the improvement of the PLSCI score is explained by the Chinese investments, but not exclusively. The central position of Piraeus helps to improve its PLSCI score. The port is located at a crucial junction between Europe, Asia and Africa. In addition, Piraeus is connected to regular shipping lines (such as Maersk, MSC, and others) with a high frequency. Moreover, with the expansion of its

infrastructure, connectivity is being improved. Additionally, the port of Piraeus plans to be connected to the Budapest - Belgrade - Skopje - Athens railway, which is also likely to increase its connectivity index, considering that it will provide a new route to the countries of Central Europe.

The most direct route to China is via the port of Piraeus, and COSCO's significant presence probably contributes to the strengthening of this relationship. Piraeus is highly ranked due to its rapid services, ability to manage large quantities, and connections to both China and Europe. It may also become an important player in Europe due to its strategic position and established trade connections. (Liu, 2022b).

## TOURISM

Tourism is one of the most important sectors in the Greek economy and is expected to be boosted through the BRI according to the literature. The number of Chinese people<sup>18</sup> visiting Greece is also expected to rise (Liu, 2022a; Stroikos, 2024).

Overall, up until 2019, the share of tourism in the general added value was significant and rising (reaching 7.338% in 2019), and the share of people working in tourism was also increasing (reaching 14.421% in 2019). From 2015 to 2019, an increase in the arrivals of residents and non-residents at hotels, similar establishments and tourist campsites was recorded. Afterwards, the tourism sector experienced a shock in 2020, and a decline in results due to COVID-19.

The number of arrivals of Chinese people increased from 2015 to 2019, reaching a peak of 400,807 arrivals. As a result of COVID-19, a drop was recorded, and Chinese tourism in Greece began to recover in 2022. In 2023, there were 165,987 arrivals in hotels of Chinese people, representing 0.6% of the total arrivals in Greece. Analyzing the share of Chinese people in the arrival of non-residents, it is small and ranges between 2% and 0.1% of the total arrivals of non-residents at hotels, similar establishments and tourist campsites over the period 2015-2023.

Therefore, the percentage of non-residents from People's Republic of China spending a night in a hotel in Greece is rather low. The impact of the BRI on tourism in Greece therefore seems limited. Nevertheless, the effects of the Joint Tourism Action (2022-2024) have not yet been reflected in the data.

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<sup>18</sup> From People Republic of China

## FDI

In the literature, we learn that BRI is supposed to stimulate FDI. Due to the tough European policy toward Greece, this has led to opportunities for China to make major investments in Greece in the following fields: infrastructure development, shipping, energy, and real estate. Several infrastructure projects were acquired, such as the Port of Piraeus, 24% of the Greek power grid operator, 75% of the four Wind Parks of Copelouzos, the development of a railway linking Piraeus to Central Europe, etc. Moreover, several Chinese brands are expanding in Greece (such as Huawei or Alibaba).

I observe that the statistics are aligned with the literature. In the OECD data, I observed an increase in inward FDI in Greece since 2013. In 2021, the level of inward FDI was unprecedented and reached 65,596.489 million USD. The inward FDI are mostly dedicated to services (55.11% in 2011), more specifically: wholesale and retail trade, repair of motor vehicles and motorbikes and information and communication, and transportation and storage. However, this is true for global inward FDI.

Looking at the counterpart areas providing the inward FDI, there are various (and the most important ones being Luxembourg, Germany, and the Netherlands). Zooming in more specifically on China, it appears that the inward FDI are increasing, as the literature predicted. In 2023, the inward Chinese investments reached 3,032.41 million USD, but there is no information about which economic activity they are allocated to (OECD, 2024a). However, I assume they focused on the target sectors of the BRI (infrastructures, real estate, tourism, etc.).

## EMPLOYEMENT - UNEMPLOYEMENT

Regarding unemployment, both the literature and the statistics have the same statements. In 2013, Greece recorded the highest percentage of unemployment ever (equivalent to 27.6% of the labor force). The unemployment rate is higher among women and the young population. In 2023, the unemployment rate has decreased but has remained high (at 11.1%) (Economou, 2015; Kyriopoulos et al., 2019; Eurostat, 2024b).

The literature stipulates that the Chinese investments stimulate the creation of jobs in Greece (Liu, 2022a). In the statistics, we observe a rise in the number of workers, reaching 4,193.5 thousand workers in 2023. China invested in the following sectors: transport and storage (benefiting from 10.55% of total inward FDI in 2021), telecommunications and information (receiving 15.76% of total inward FDI in 2021), and electricity, gas, steam and air conditioning

supply sectors. But the percentages of the employment in these sectors increase slightly between 2013 and 2023, respectively by 0.43%, 0.35%, and 0.13% (representing a total of 91,600 jobs). Therefore, the impact of Chinese investment in these sectors seems limited. In 2023, the economic activities with the highest employment rate are wholesale and retail trade; repair of motor vehicles and motorcycles (16.55% of the total employment) (benefiting from 13,21% of total inward FDI in 2021), followed by agriculture, forestry, and fishing (11.47%). The inward FDI of these sectors are likely to create jobs, but it is necessary to determine whether China is investing in these sectors to justify their potential impact (OECD, 2024a; Eurostat, 2024b) (Appendix 11).

## CHAPTER 6: CONCLUSION

### Obtained results

The objective of my thesis is to investigate the effects of the BRI on the Greek economy through a study of indicators. Answering the question quantitatively is very complicated; I will limit this study to estimating whether the BRI has a significant or limited impact on the indicators. Variations in the indicators are not only attributable to Chinese investment in the context of the BRI, but are also impacted by external factors such as Greek government reforms, economic recovery, the pandemic, etc. Nowadays, among all infrastructure projects in Greece, the Port of Piraeus is the most impactful BRI project.

As expected in the literature, the BRI has a positive impact on trade, FDI, and maritime transport. An increase in the Greek GDP is also observed. There has been an increase in trade between Greece and the world, and with China. Imports and exports have grown, and the balance of trade is negative for Greece. It continues to rise over the years. Greek exports consist mainly of minerals and metals, while its imports are more complex products such as machinery. Piraeus, which has become a transport hub in the Mediterranean, has facilitated the growth in trade. However, in bilateral trade between China and Greece, Chinese imports clearly outweigh Greek exports. In addition, there is an increase in inward FDI into Greece from the world and from China. They are focusing mainly on wholesale and retail trade, repair of motor vehicles and motorbikes, and information and communication, and transportation and storage, which are sectors also targeted by Chinese FDI according to the literature. COSCO's acquisition and modernization of the port of Piraeus have had a significant impact on Greek maritime trade. The number of containers handled in Greece has risen sharply, and the gross weight tonnage handled in Piraeus has also increased. Since 2016, Greece and the port of Piraeus have obtained better connectivity indexes. Nevertheless, the study by Koenig et al (2023) highlights that the number of monthly port calls in Piraeus Port has increased since its acquisition, and is specific to large vessels" (superior to 3000 TEUs) operated by COSCO.

However, the effects of the BRI on tourism and job creation appear to be limited. Tourism indicators in Greece are on the rise: higher added value generated, higher percentage of employment, more arrivals in hotels registered, etc. Although, a more precise study of the number of Chinese arrivals at hotels reveals that this figure is not significant on the scale of overall tourism in Greece. Furthermore, despite employment growth in Greece, the employment rate in the Chinese FDI sectors (transport, storage, and manufacturing) is modest.

In conclusion, the BRI has a positive impact on trade, FDI and maritime transport, while the influence on tourism and employment appears to be more constrained. Nonetheless, the evolution of these indicators is also influenced by external factors.

## Limits

I have identified several limitations in my work.

First, document accessibility is a constraint. Some data sources were not accessible to me as an “outsider”, such as the AIS, Marine Traffic and the Lloyd List databases for maritime transport. Additionally, some statistical sources are in Greek or Chinese. Although translation tools exist, important nuances can be lost in translation, and for this reason I have used very few non-English sources. This linguistic and data accessibility constraint therefore limits the study of certain sources.

Secondly, my research relies on European statistics or from international databases, with limited data from Greece and none from China, again due to accessibility and language barriers. A complementary study using Chinese statistical sources and comparing them with global and European sources could be interesting.

Lastly, the number of indicators studied is limited. In the framework of my thesis, it was not possible to study all the indicators related to the development of the BRI in Greece. Some indicators could be treated more in-depth (e.g. tourism), and other new ones could be used (e.g. migration flows in Greece, real estate, pollution, etc.).

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# APPENDICES

## Appendix 1

### Evolution of the BRI: Small and Beautiful projects and a ‘Green’ BRI

Over the past few years, China has put the emphasis on the development of a “green” and “high-quality” BRI. Since 2017, the BRI has incorporated ‘ecological civilisation’, ‘green development concepts’, ‘principles of resource efficiency and environmental friendliness’ into its 5 objectives. (Nedopil, 2024)

Moreover, the Chinese types of projects have also shifted to more ‘small but beautiful’ projects. They put more an emphasis on the quality of the project, which results often in smaller project in terms of size and capital invested. This shift is also reflected in the figures. For instance, in 2016, the Chinese loan to Africa was \$28.4 billion and amounts to \$1.9 billion in 2020. They have decided to invest less in infrastructure but more into the digital stuff, in the environmental protection with clean technology and education (Financial Times, 2023). It is also reflected in the average deal size of BRI projects, which has dropped from \$500 million to \$300 million since 2020 (Nedopil, 2023).

## Appendix 2

### Economic Adjustment Plan (EAP)

From 2010 to 2018, three economic adjustment programmes were implemented by the Troika (composed of the EU, European Central Bank (ECB) and International Monetary Fund (IMF)) in response to the crisis. A total of €110 billion was allocated to the first EAP, €172.6 billion to the second and €86 billion to the third programme. The two key objectives of the EAPs were, firstly, to resolve the economic imbalance of Greece and, secondly, to prevent the expansion of the crisis to the Eurozone. To meet these objectives, Greece faced three major challenges: restoring the confidence on the Greek financial market and fiscal sustainability, preserving the stability of the financial sector and stimulating economic growth and restoring competition (via structural reforms) (Andruszkiewicz et al., 2020; European Court of Auditors, 2017). Following these EAPs, the European Commission is still requiring Greece to implement reforms such as continuation of privatization, management of pensions, and the labor market, etc. (Rohart, 2022). These EAP have various impacts: economic, social and political. In the framework of my thesis, I have decided to focus on the economic impact.

### Economic impact

From 2008 to 2014, the economic situation in Greece was very complicated. The country has experienced a normal GDP fall from €242.1 billion to €79.1 billion. Moreover, in 2013, Greece was facing a high unemployment rate reaching 26.4%. Most of unemployed were facing long term unemployment and this rate seems higher among the women and the young population. Furthermore, a higher percentage of unemployment has a positive relationship with a rise in uncertain job situations and an increased probability of poverty. Currently, the unemployment rate is around 10%. (Economou, 2015; Kyriopoulos et al., 2019).

However, in 2023, Greece remains the most indebted country in the EU even though public debt now represents only 170% of GDP (compared with 206% of GDP in 2020). However, the Greek Prime Minister aims to reduce the debt to 140% by 2027. In addition, the country's credit rating improved in 2023 to BBB- by Scope Ratings (Collen, 2023).

### Appendix 3

Ports play a key role in the economic development and global overseas expansion of China. By 2019, China has invested in 42 ports across 34 countries. Ports contribute to the Chinese overseas expansion and serves economic and geopolitical goals (Chatin 2016; Ding 2010; Gao 2011; cited by Iftikhar & Zhan, 2020). However, before its opening-up to the world, China was considered to be the factory of the world but is nowadays focusing to move towards the service sector. Since the development of the BRI, trade is critical for China and must fulfil several duties such as supply raw materials, semi-finished products, and finished products for infrastructure projects across Asia, Europe, and Africa (Iftikhar & Zhan, 2020).

The Port of Piraeus is a model of Sino-Greek cooperation regarding maritime and logistic cooperation. For both Greece and China, the shipping industry is one of their strengths, and their relations have improved. Greece is the largest country in the world in terms of shipping capacity. China is the world's largest shipbuilder. The two countries are cooperating across the entire industry and service sector, with shipping being the most important. These include design, marketing, transport, logistics and warehousing, financial insurance and other sectors (Kahveci-Özgür & Duan, 2022).

#### Economic interests

COSCO has various economic motivations for acquiring the port of Piraeus. First of all, it reduces the shipping costs. Furthermore, it enables COSCO to provide access to overseas markets, a safe supply of industrial inputs and exports of Chinese products in South-eastern product. Since 2008, China's imports and exports have been growing continuously. The

most exported goods to Europe are machinery and manufactured goods. In addition, China has a strong foothold in international shipping. In terms of fleet ownership, China is ranked second globally (measured by dead-weight tonnage), behind Greece. COSCO has decided to invest massively in the port of Piraeus with the aim of attracting multinationals to choose Piraeus as their port of entry to Europe. This benefits not only Chinese companies, but also Asian companies such as Samsung, Hyundai, Toyota and others that export to Europe. The goal of COSCO's massive investments is to make the port of Piraeus the gateway to Europe. Ultimately, one of the major interests is to ensure a safe energy supply to China. China is the world's largest consumer of energy, and its production is now lower than its consumption. Currently, China is the world's largest net oil importer, and this is threatening its economic security. China needs to diversify its sources of oil imports: from Middle East, North Africa (including Iran, Iraq, Oman, Saudi Arabia, Angola), and try to also include suppliers such as Russia and Venezuela. (Iftikhar & Zhan, 2020)

#### Geopolitical interests

The acquisition of the port of Piraeus also raises geopolitical interests. As a consequence of the 2008 crisis, the Greek economy deteriorated, resulting in the implementation of austerity measures and the privatization of state-owned assets. This enabled China to invest and strengthen its position in the region. Specialists such as Van der Putten believe that without the crisis, COSCO would not have been able to acquire the PPA. Firstly, massive Chinese investment could increase China's influence in the host country, and then create dependencies. There are also political and military gains. Since the acquisition of Piraeus, the Chinese and Greek delegations have visited each other, and worked together on various projects such as rescue, maritime security, naval exercises, and naval ship calls. (Iftikhar & Zhan, 2020) Moreover, Greece has also shown its support for China in political decisions. For instance, in 2016, Greece blocked an EU decision criticizing Chinese actions in the South China Sea by using its veto to block an EU resolution to condemn China at the UN Human Rights Council in 2017 (van der Putten, 2019 ; Iftikhar & Zhan, 2020). However, the fact that Greece is part of the EU and NATO restrains and complicates military-political interactions as well as a strategic

## Appendix 4

In addition, the OECD also provides an output approach to GDP, enabling the identification of sectors that are sources of added value for countries. Wholesale and retail trade; repair of motor

vehicles and motorbikes; transportation and storage; accommodation and food service activities are the economic activities generating the greatest gross added value, despite the fact that it has been declining since 2008. In 2021, this gross added value will represent 44,416.191 million US dollars (World Bank, 2024b). There was a significant decline between 2008 and 2013, followed by a recovery after 2013, which a part of it may be linked to Chinese investment in the Port of Piraeus infrastructure (since 2016). Next, we analyze that the real estate sector is the third largest source of gross added value in Greece. This value dropped between 2008 and 2017, before flattening out in 2017, coinciding with the introduction of the Golden Visa program and investment in infrastructure at the Port of Piraeus. Moreover, the gross added value in the industrial sector has grown 2020 and 2022.

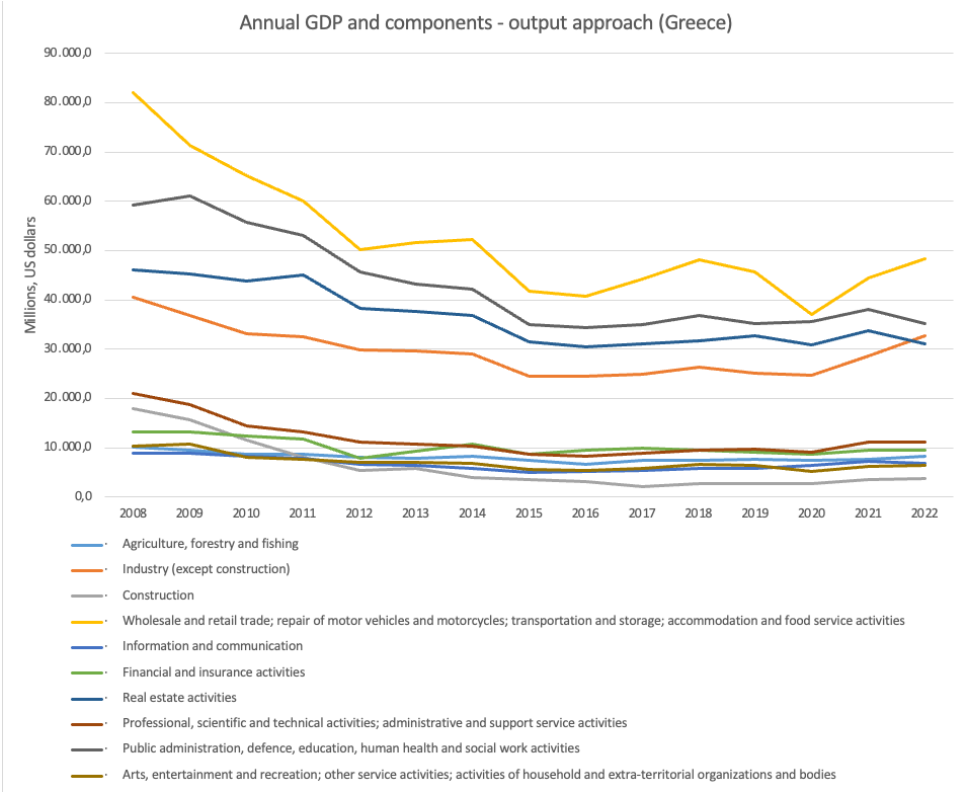
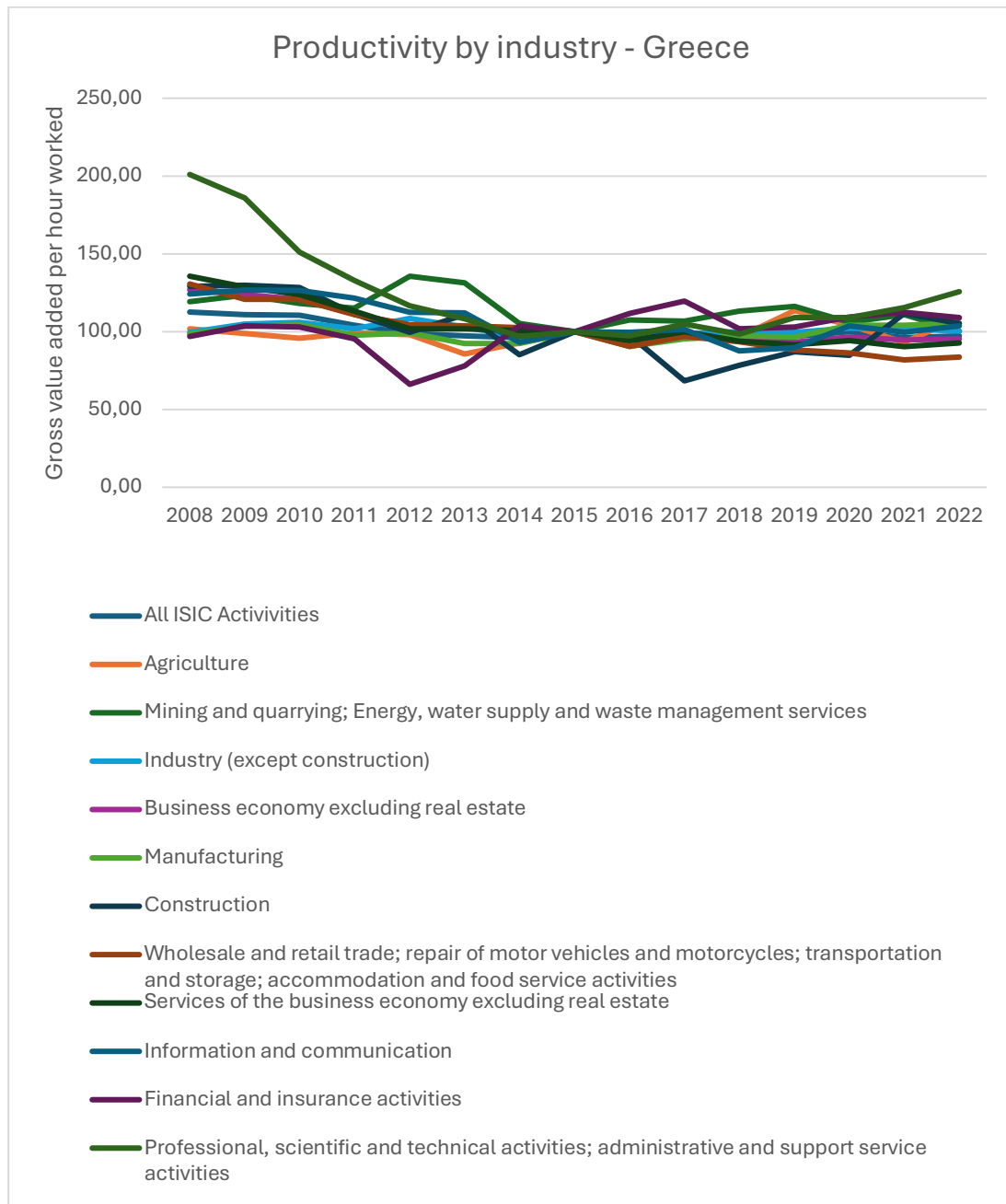


Figure 18: Output approach to GDP- Greece. Data retrieved from the OECD.

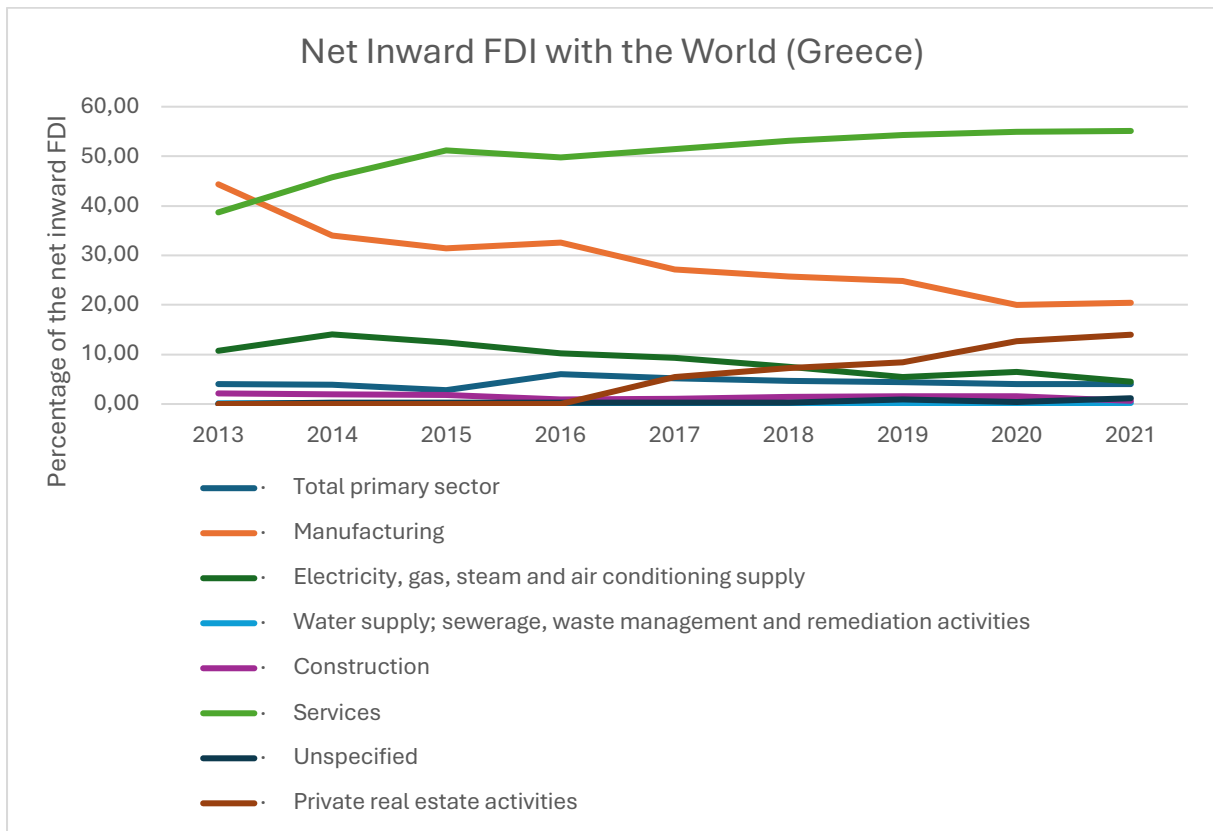
## Appendix 5



**Figure 19:** Productivity by industry (by index) - Greece. Data retrieved from the OECD.

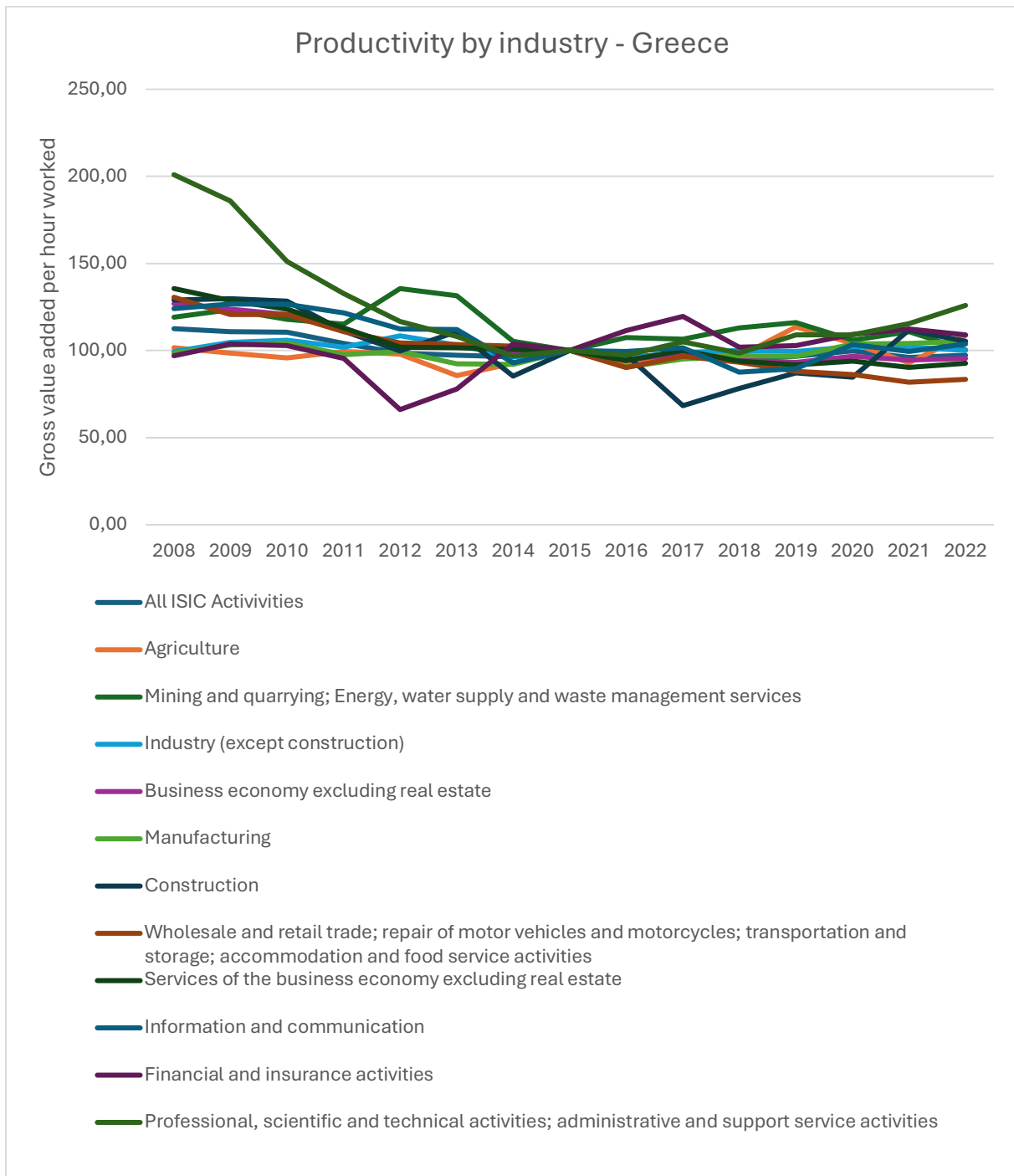


## Appendix 8



**Figure 22:** Net Inward FDI with the World (Greece). Data retrieved from the OECD.

## Appendix 9



**Figure 23:** Productivity by industry - Greece. Data retrieved from OECD.

### Appendix 10

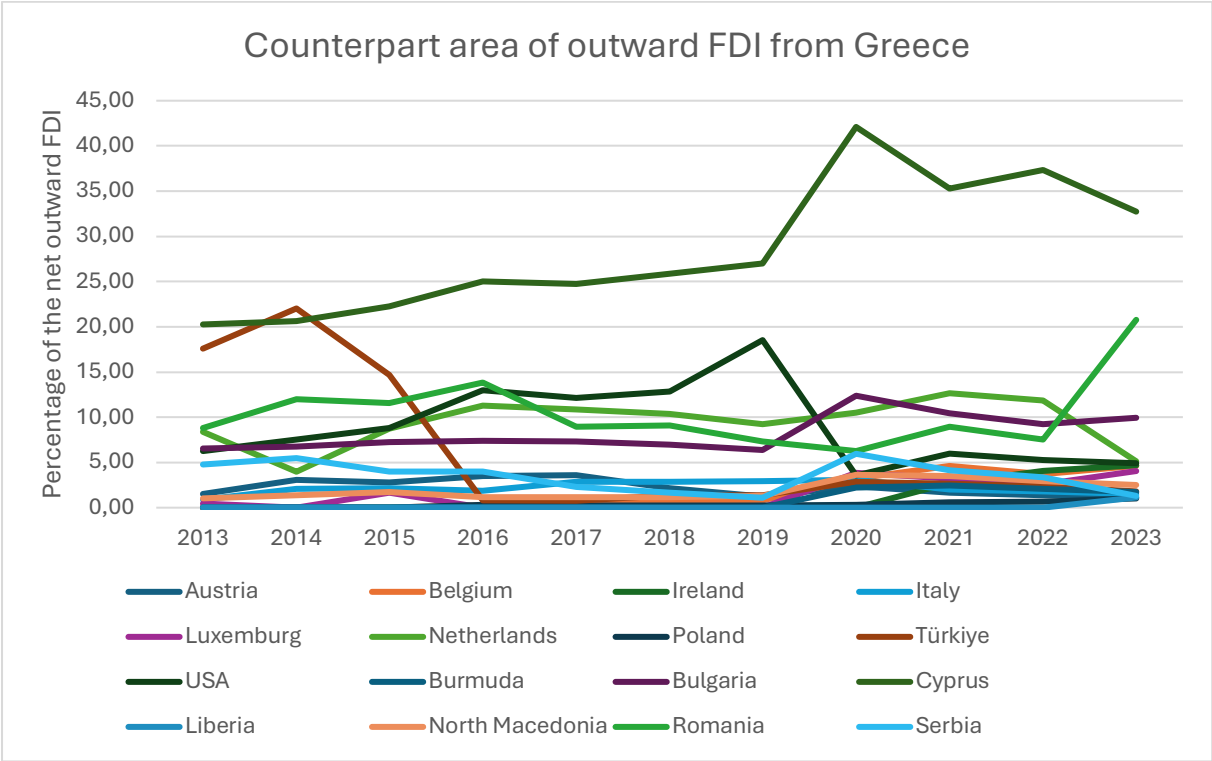


Figure 24: Counterpart area of outward FDI from Greece. Data retrieved from the OECD.

### Appendix 11

I think it is important to add a nuance the rise in employment in Greece. Between 2013 and 2023, 680.3 thousand jobs were created. Among the 680.3 thousand jobs created, 91.60 thousand (or 13.46%) have been created in the following economic activities<sup>19</sup>: Electricity, gas, steam and air conditioning supply (10.70 thousand jobs), transportation and storage (51.5 thousand jobs), information and communication (29.40 thousand jobs). For each of these economic activities, this increase in the number of jobs is significant, and considerably increases the percentage of workers in these sectors (see Table 2).

However, three other elements also need to be taken into account. First, only part of the increase in employment can be attributed to Chinese investment, as other external factors must also be considered. Secondly, although this increase is considerable for each of the activity, it should be borne in mind that it is spread over ten years. And thirdly, these three economic activities represent a small fraction of total Greek employment<sup>20</sup> (8.79% of total employment in 2023

<sup>19</sup> These economic activities are targeted by the Chinese FDI  
<sup>20</sup> In 2023, in percentage of total employment, electricity, gas, steam and air conditioning supply represents 0.92%, transportation and storage accounts for 5.35%, and information and communication comprises 2.52%.

(less than the percentage of employment in agriculture or the manufacturing sector)). Nevertheless, I note that employment in these 3 sectors is growing strongly. Among the three economic activities, the employment of transportation and storage is the most important. Therefore, I can identify an impact of Chinese investment on the employment sector, but it is limited for the moment. However, investment in infrastructure is long-term, so other variations may arise.

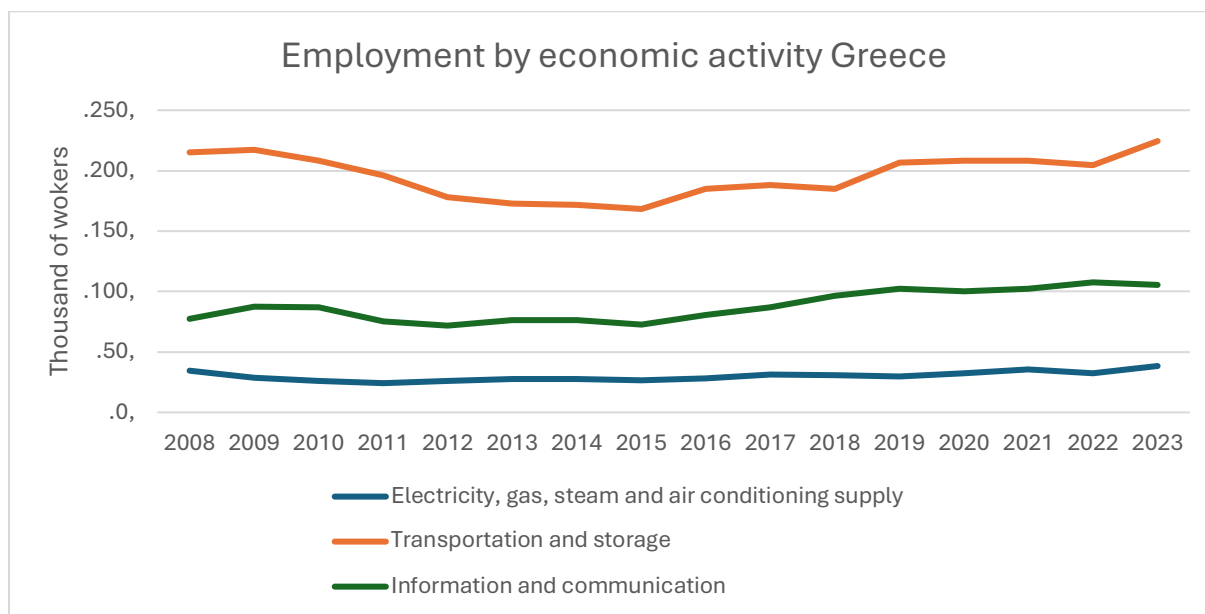
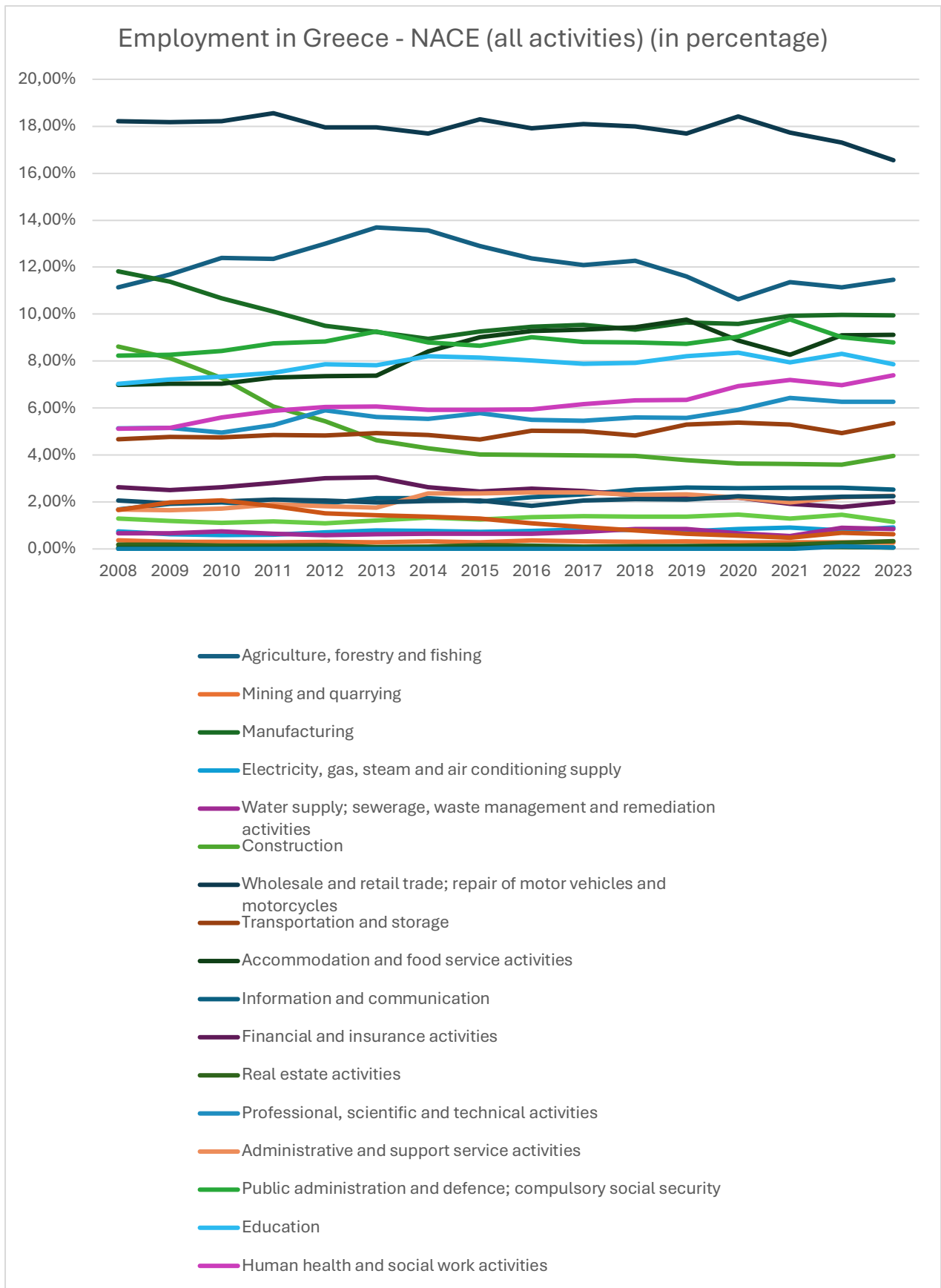


Figure 25: Employment by economic activity (in thousands of workers) - Greece. Data retrieved from the Eurostat.

	Number of Workers in 2013 (in thousand)	Number of Workers in 2023 (in thousand)	Variation in the number of workers (in thousand)
Agriculture, forestry and fishing	481,	480,9	-0,10
Mining and quarrying	9,6	11,4	1,80
Manufacturing	324,7	417,	92,30
Electricity, gas, steam and air conditioning supply	27,7	38,4	10,70
Water supply; sewerage, waste management and remediation activities	22,3	35,9	13,60
Construction	162,3	165,8	3,50
Wholesale and retail trade; repair of motor vehicles and motorcycles	630,5	694,2	63,70
Transportation and storage	173,	224,5	51,50
Accommodation and food service activities	259,2	382,6	123,40
Information and communication	76,2	105,6	29,40
Financial and insurance activities	107,1	83,9	-23,20
Real estate activities	2,9	13,9	11,00
Professional, scientific and technical activities	197,4	262,5	65,10
Administrative and support service activities	62,	94,8	32,80
Public administration and defence; compulsory social security	325,1	368,4	43,30
Education	274,8	329,6	54,80
Human health and social work activities	212,8	310,1	97,30
Arts, entertainment and recreation	42,9	48,4	5,50
Other service activities	69,8	94,	24,20
Activities of households as employers; undifferentiated goods- and services-producing activities of households for own use	50,4	26,4	-24,00
Activities of extraterritorial organisations and bodies	1,3	2,3	1,00
No response	0,	2,8	2,80
<b>TOTAL</b>	<b>3.513,</b>	<b>4.193,4</b>	<b>680,4</b>

Table 2: Variations in the number of workers by economic activity (in thousands of workers) - Greece. Data retrieved from the Eurostat.



**Figure 26:** Employment by economic activity (in percentage) - Greece. Data retrieved from the Eurostat.

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