ΙΔΡΥΜΑ ΟΙΚΟΝΟΜΙΚΩΝ & ΒΙΟΜΗΧΑΝΙΚΩΝ ΕΡΕΥΝΩΝ
FOUNDATION FOR ECONOMIC & INDUSTRIAL RESEARCH

Τσάμη Καρατάσου 11, 117 42 Αθήνα, Τηλ.: 210 92 11 200-10, Fax: 210 92 33 977, *www.iobe.gr*
11 Tsami Karatassou, 117 42 Athens, Greece, Tel.: +30 210-9211 200-10, Fax: +30210-9233 977

THE CONTRIBUTION OF OCEAN-GOING SHIPPING TO THE GREEK ECONOMY:

PERFORMANCE AND OUTLOOK

January 2013

Project team:

Svetoslav Danchev

Elias Demian

The study team wishes to thank Navios Maritime Holdings Inc. and Aggelos Tsakanikas, head of IOBE's research for their contribution to the study.

Foundation for Economic and Industrial Research (IOBE)
11, Tsami Karatasou Str, 117 42 Athens,
Tel. (+30210 9211200-10), Fax:(+30210 9233977)
E-mail: iobe@iobe.gr - URL: http://www.iobe.gr

Table of contents

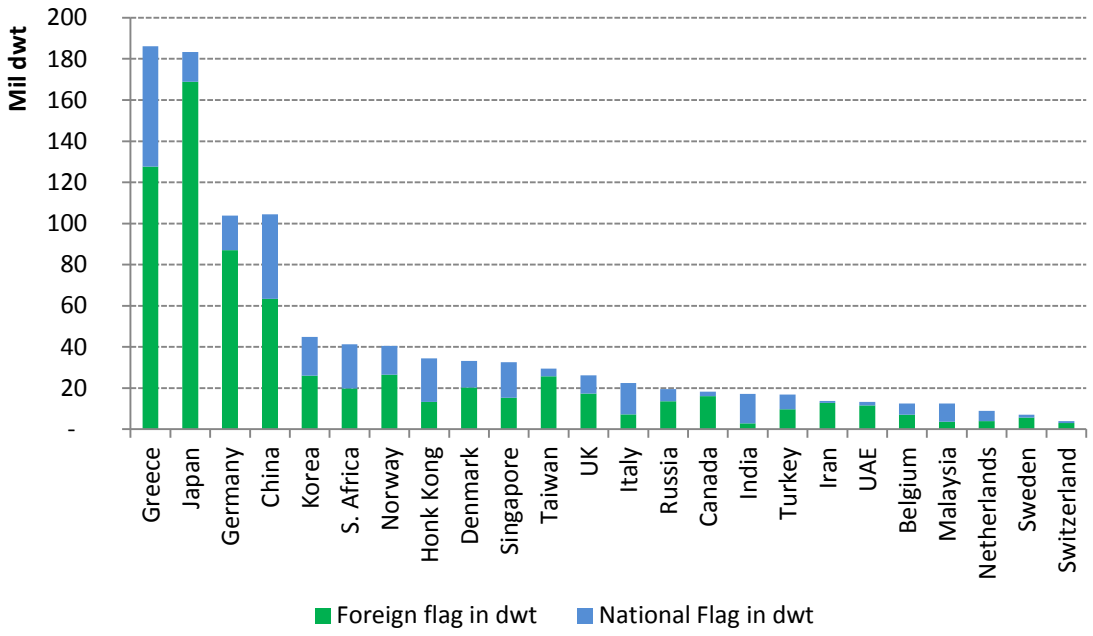
Table of figures

Executive summary

Introduction

Greek shipping holds a leading position in the global shipping market. Greek shipowners control more than 4.065 commercial vessels, 3.760 of which are estimated to be oceangoing vessels (IHS Fairplay World Shipping Encyclopedia, 2012). In terms of capacity, the Greek fleet is also considered to be ahead of other major shipping forces like Japan and China (Figure 1). The majority of Greek-owned vessels are registered under foreign flags, which is a common practice among the major shipping nations. Another indication of the Greeks' leading role in global shipping is the fact that more than 52% of shipping companies listed in NYSE and NASDAQ are owned by Greek nationals.

Figure 1: Global fleet per nation 2010



Source: ISL

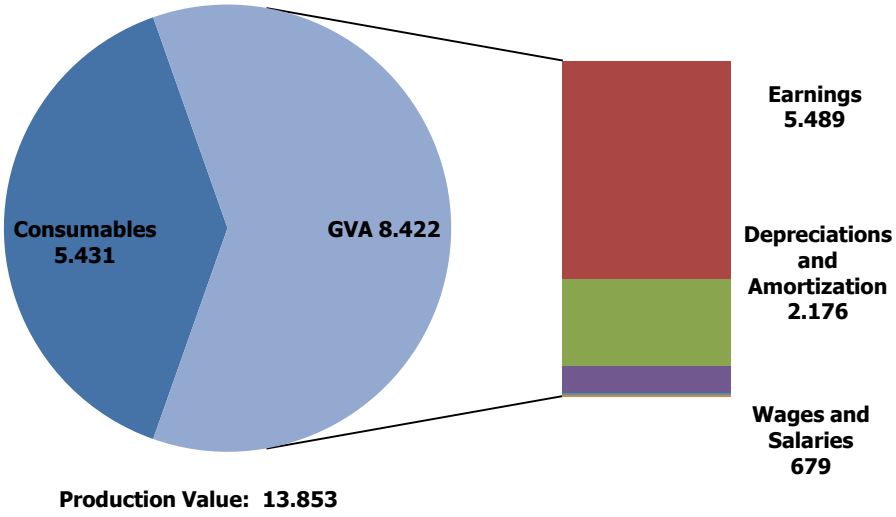
The contribution of Water Transport in the Greek Economy today

Shipping is one of the most important sectors in the Greek economy. Indicatively, water transport contributed over 4% to the Greek economy's gross value added.

The biggest share of the value added of water transport is attributed to oceangoing shipping. In particular, more than 93% of the total output value of water transport services in 2009 corresponded to exports, which implies that the remaining modes of water transport that serve exclusively the domestic demand (coastal and inland) had

a much smaller share in the sector's value added. According to data published in Eurostat's ESA tables, water transport had the highest foreign trade surplus among the branches of the Greek economy (net exports accounted to €12.7 billion in 2009 and €14.5 in 2010). Greek shipping is a high productivity sector, second only after the real estate sector in terms of value added per employee.

Figure 2: Water transport's GVA in 2009 (in thousand €)



Source: ESA tables, Eurostat

Water transport's contribution to the country's economic performance is augmented if we take into account the interrelations between the Greek economy's sectors (by applying an input/output model). The final demand for water transport services created more than €13.3 billion of domestic added value in 2009 (accounting to more than 6.1% of GDP[1]) directly and indirectly across the sector's supply chain.

The sectors that benefit indirectly from the ocean-going shipping's economic activity are those that are serving the demand of the sector, (such as storage, cargo handling, travel agencies, consulting and legal services, wholesale trade, oil products etc) and other industries that provide consumer goods and services, purchased by the households with the additional income that is being created along the value chain (real estate, food and beverages, health services, hotels, restaurants etc.). These sectors are most vulnerable if –for any reason- management of the shipping activity emigrates to foreign countries with a more favorable business environment.

[1] Given the considerable economic contraction in Greece between 2009 and 2012, and the fact that economic activity in shipping follows the global economic cycle, water transport's total contribution to GDP might have increased substantially since then.

According to data published by the Greek statistic agency (ELSTAT), employment in water transport reached approximately 34.000 jobs in 2009. The relatively high percentage of foreigners employed at the Greek-owned fleet is a notable feature of the sector. According to ELSTAT, in 2008 42% of the total onboard workers, on ships contracted with the Seamen's Pension Fund (NAT), were of foreign origin. At the same time, the official employment data account only for those vessels that are contracted with NAT, which implies that the total direct employment in Greek-owned ocean-going vessels is significantly higher.

That said, the total benefit for the Greek economy in employment terms (both direct in the sector and indirect as a result of the households spending the income generated along the supply chain) reached more than 192,000 jobs in 2009. At the same time, the household annual income generated as a result of the ocean-going shipping activities in Greece is estimated at €2.7 billion.

Oceangoing shipping enjoys a favourable tax framework compared to other sectors of the economy. The corporate profits are not taxed; instead a tonnage tax is levied per ton of capacity, with the rate depending on the vessel's age and capacity. Similarly favourable treatment, however, is observed throughout the European countries with developed shipping, due to the globalised nature of the specific activity. The actual maritime transportation takes place in international waters, often far away from the offices that manage this activity. For this reason, the managing activity can fairly easily migrate from one country to another with a more favourable tax regime, as long as the host country has a good quality of human resources and an adequate business infrastructure.

An abrupt – and without due care – change of the taxation regime in the shipping sector may lead to reduction of the economic activity in the sector and across the economy, significant job losses and even lower net tax revenues. We should keep in mind, that despite the aforementioned favourable taxation regime, shipping contributed directly and indirectly more than €790 million of tax revenues in 2008 (Table 1).

Table 1: Total shipping's contribution to the Greek Economy, 2009

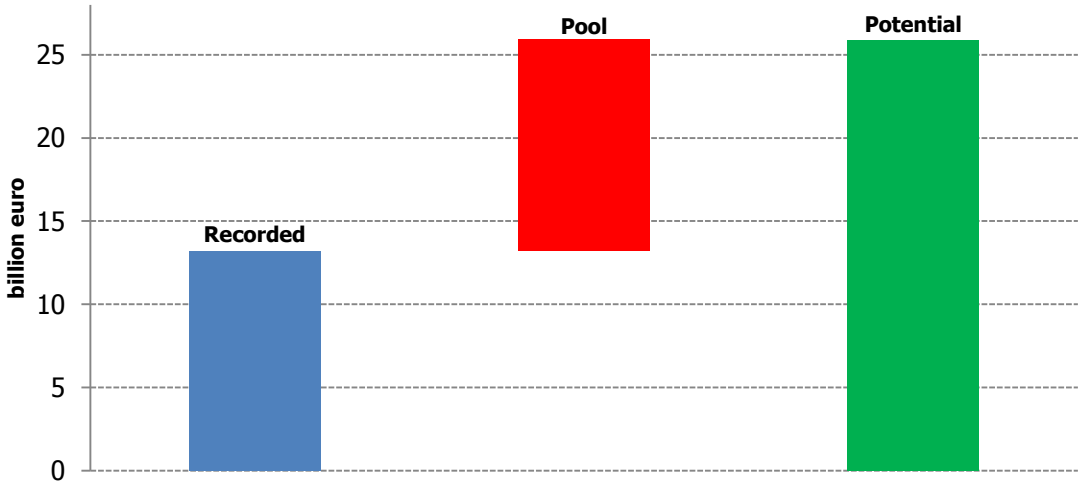
mil. €	Direct Effect	Indirect Effect	Total
Domestic GVA	8.422	4.847	13.269
Labour income	732	1.949	2.681
Taxes	559	231	790
Employment (in thousands)	34	158	192

Source: Greek Statistics Agency (ELSTAT), Eurostat, IOBE I/O model

The potential contribution of oceangoing shipping to the Greek Economy

Given the relative ease of migration that characterises the maritime managing activities and the fact that Greek-owned maritime companies have significant presence abroad, there seems to be a great potential to increase the volume of shipping activity managed from (domestic and foreign) shipping offices on Greek territory. In order to assess this potential, we estimated a scenario where we assumed firstly that the output of the Greek-based maritime offices is such that it equals the output of the Greek-owned oceangoing fleet and secondly that the rest of the Greek economy reacts adequately to the increased demand for goods and services from this boost. This scenario corresponds to repatriation of the shipping activity by Greek nationals to Greek territory or more realistically to a balanced state of affairs where the economic activity of foreign maritime companies in Greece equals that of Greek companies abroad.

Figure 3: Recorded and potential contribution comparison to value added



Source: I/O model, IOBE

The potential contribution of the oceangoing shipping in terms of value added is expected to exceed €26 billion in this scenario (additional €12.7 billion). This corresponds to a boost of GDP by about 5.8% annually (Figure 3). At the same time, the contribution to employment could exceed 550.000 people, implying that 360,000 new jobs could be created under this scenario.

A considerable share of the onboard employment positions would most likely be covered by non-Greek nationals, unless the severe economic crisis in the country alters the existing employment patterns. Still, this does not negate the fact that there are significant potential benefits to employment on Greek territory, as 86% of the potential employment effect would take place in sectors that supply oceangoing shipping (i.e. logistics, storage, consultancies, legal services etc) or serve the households' domestic demand (agriculture, hotel-restaurants, retail trade, foods and beverages etc).

Policy proposals and indicative timetable

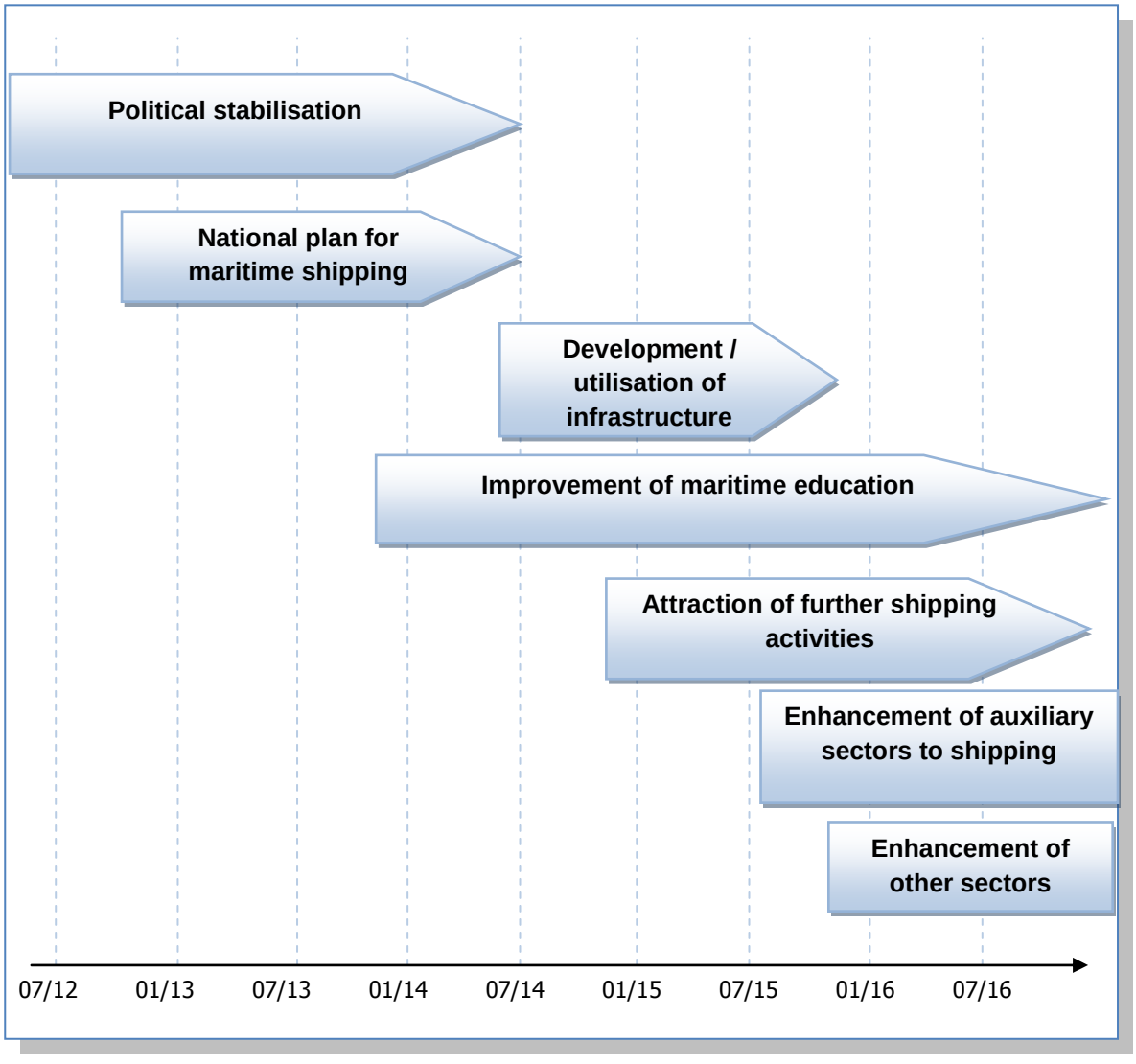
The vision to attract more of the foreign-based shipping companies and agents to operate on Greek territory requires first and foremost political and economic stability. The re-establishment of a Ministry for the sector is a strong indication of the new government's intentions for more effective support of the sector. Nevertheless, maritime policy should become independent of the election cycle, through the adoption of a strategic development plan with a broad political and social support.

Additionally, Piraeus and the wider area should be further developed into a major maritime cluster, transforming the region into a competitive pole for global shipping. This requires enhancement of the entrepreneurial shipping, alongside investment in the creation of a modern pool of Greek seafarers. In any case, best practices already adopted in other maritime economies must also be implemented in Greece in order to enhance further the sector's contribution to the economy.

The application of these policy proposals is a process that must be initiated immediately by setting targets to be accomplished within a specific time horizon. Favourable conditions for a boost of the shipping activity on Greek territory may start materialising by the end of 2014 (Figure 4). Given the necessary adjustment period (i.e. the time that the rest of the cluster will need in order to be able to support the increased demand), the first tangible benefits may arise from 2015.

Meanwhile, the strengthening of healthy entrepreneurship through a strategic policy framework that will remove various obstacles would favour the development of innovative services and business structures, boosting considerable the prospects for the development of the maritime cluster overall. As a result, the competitiveness of the auxiliary sectors to shipping (ship chandlers, maintenance, shipbuilding etc.) could improve, resulting in even stronger benefits for the Greek economy. In contrast, if a relatively stable environment for maritime entrepreneurship is not secured, this might push shipping companies to move to countries with more favourable regimes, which would have a negative impact on employment and value added in the sectors linked directly or indirectly with the activity of the Greek-based maritime offices.

Figure 4: Indicative timetable for the development of shipping policies



1. Scope of the study

The exit from the Greek economic crisis demands coordinated actions towards the adoption of a new model of development. It is a common belief that this model should emphasize the exploitation of the comparative advantages of the country, boosting exports and investment, so that the Greek economy returns back to a path of high growth.

The growth prospects of the Greek economy are focused on a strategic boost of the exports of goods (agricultural and industrial) and on the further developing of the tourism industry. In this context, we consider that the role of shipping has not been fully recognized and adequately evaluated.

While the contribution of shipping to Gross Domestic Product (GDP), employment, investment and the balance of payment is generally known, the contribution of activities connected with shipping and the unexploited potential of the sector have not been studied at sufficient depth.

Consequently, recording and analyzing the factors that can maximize the potential contribution of shipping to the Greek economy is pressing, especially given the severity of the current economic crisis. This after all, is the objective of the current research, in which we attempt:

- To highlight the contribution of shipping to the Greek economy.
- To record and evaluate those factors that contribute or prevent a wide use of the unexploited growth potential of shipping to the benefit of the Greek economy.
- To outline a strategy and available policy options that will boost the contribution of shipping and its related activities to the recovery effort of the country.

1.1 Structure of the report

The current trends of global shipping are being described in the next chapter. Particular emphasis is given to the period from 2008 onwards, as the onset of the global crisis has dragged down the global maritime industry as well. The chapter ends with a presentation of the efforts by Greek shipping interests to remain competitive in the constantly declining global market.

In the third chapter, data published by the European statistical office Eurostat and ELSTAT (the Hellenic Statistical authority) are presented in order to assess the direct contribution of shipping to the Greek economy. These data feed the input / output model which is used to estimate the contribution of shipping both to the Greek economy and to domestic industries.

Possible underestimation of the above data, but also the inability to assess the real contribution of oceangoing shipping leads the research in a new direction, which is described in Chapter 4. Data published by official marine research centers (IMO, Lloyd's, etc.) are used in order to estimate both the potential direct contribution, and the potential total contribution of shipping to the economy and its sectors.

Finally, the research findings and some policy recommendations that will increase shipping's contribution to the Greek economy are summarized in the last chapter.

2. Greek Shipping and the Global Crisis

- **Today, *more than 90% of the commercial trade is being transported by sea.***
- **The unprecedented global financial crisis depressed the volume of goods transported by sea around -4.2% in 2009.**
- **The significant contraction of transportation demand, combined with fleet overcapacity caused shipping freight rates ~~fares~~ to contract at a rate not experienced for decades.**
- **The growth rate of the world economy is projected to increase marginally during 2013.**
- **Greek shipping holds a leading position in the global shipping market, based on fleet capacity data for 2010.**
- **About 52% of the shipping companies listed in the US stock markets belong to Greek nationals.**
- **The Greek-owned fleet increased significantly during the period 1990 - 2008, with the growth rate slowing down since then.**
- **Sharp increase was observed in the orders of LNG carriers in 2011, by Greek shipowners.**

2.1 Major shipping trends worldwide

Today, more than 90% of world trade is being transported through sea (1), while the global shipping has grown outstandingly over the past few decades. However, the global economic recession, along with a series of other developments presented later in this chapter, led to a sharp decrease of the relevant activity indicators of the shipping industry, since 2008.

In addition to the economic crisis, global shipping is facing a series of problems which are inextricably linked to the economic climate. Industrial production (raw material extraction, energy production) is subdued while the demand for industrial and consumer products is sluggish, dragging down the demand for maritime transportation of goods.

The significant reduction of seaborne transportation demand downgraded the international shipping industry, leading to a reduction of newbuild prices.

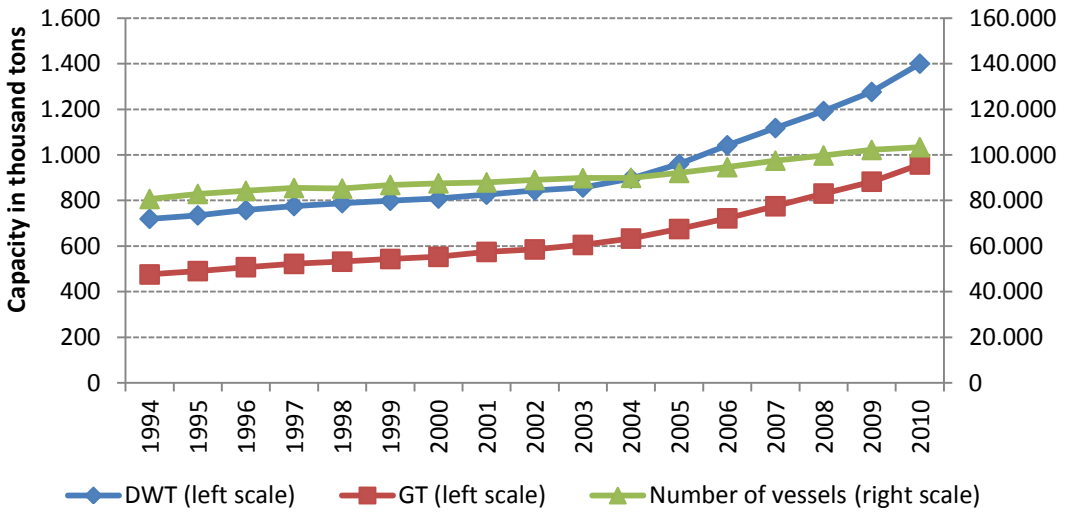
As a result overcapacity and low cargo demand prevail in the market, which is pushing the freight rates into extremely low levels. Positive trends in the global market before the recession led the shipowners to increase their newbuilding orders dramatically, as it can be seen in Figure 2.1. Orders (according to the world order book) increased during the period 2007-2009, while in 2010 the growth rate was rather limited. Bulk carriers and container ships dominate the new orders. However, the significant amount of new building contracts together with the limited capacity of the major shipyards (China, Korea, Japan) led to unprecedented delays over the past years.

In addition to the above problems, the credit crunch which has limited the ability and the willingness of the financial institutions to finance new and current investments is threatening the future survival even of major shipping companies.

As a result, the Baltic Dry Index[2] has dropped vertically since the fourth quarter of 2008, and despite the subsequent recovery efforts, the freight rates in the market for dry cargo vessels are at historically low levels. In particular, in February 2012 the index fell to 703, reduced by 32% compared with January of the same year, remaining below 1000 points, its lowest at levels since August 1986 (2).

[2] Baltic Dry Index is a daily index that estimates the cost of transport of basic raw materials (coal, iron ore, wheat, etc.) by sea.

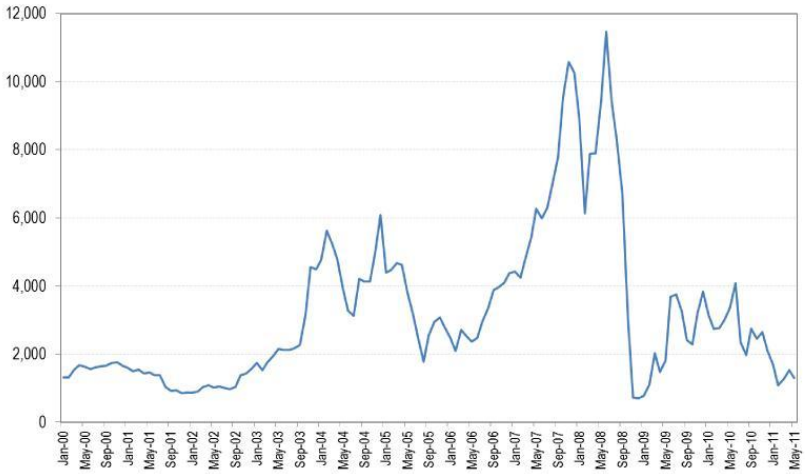
Figure 2.1: Global maritime fleet, 1994-2010



Source: Registered World Fleet, Lloyds 2010

A similar picture is observed in the market of container ships, with the corresponding indicator HARPEX recording significant losses. It is evident that global shipping has entered a new era, dominated by low demand for transport services (Figure 2.2 and Figure2.3).

Figure 2.2: Baltic Dry Index 2000-2011



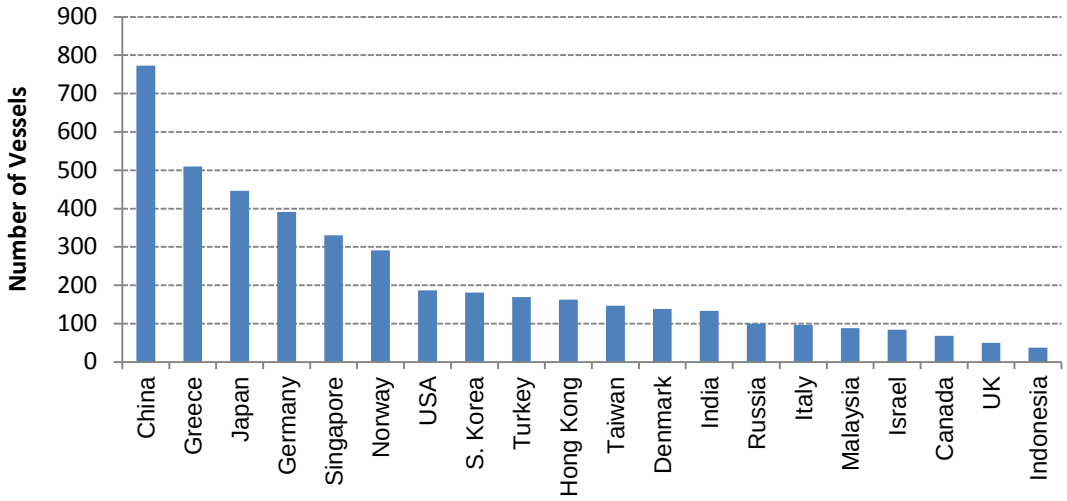
Source: Bloomberg, http://www.bloomberg.com/apps/cbuilder?ticker1=BDIY%3AIND, 2011

Figure2.3: HARPEX Index2001-2011

Source: Harper Petersen & Co,2011

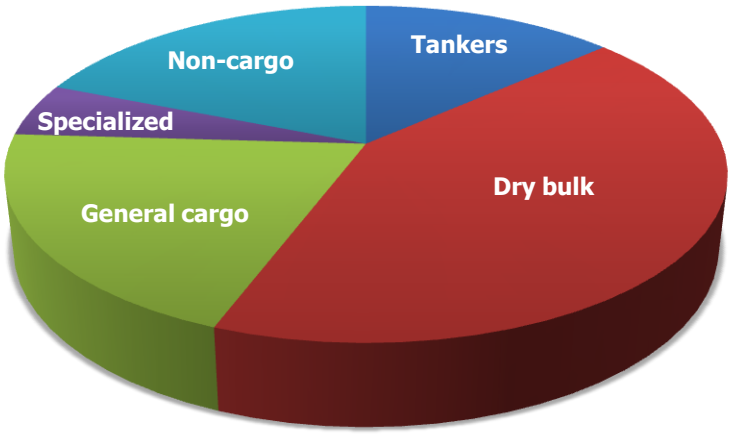
Despite the sharp decline in freight rates and the pessimistic forecasts, the shipping companies continued to order newbuildings in an effort to take advantage both of the lower building prices and of potential excess demand when the market fully recovers (Figure 2.4). During 2011 $96.3 billion were invested in 1,354 newbuilding vessels of a total capacity exceeding 54,400 tons, the majority of which are oceangoing (3). The structure of orders globally remains similar to previous years, with the majority orders concerning dry bulks and tankers (Figure 2.5).

Figure 2.4: Orders by country of origin in 2011



Source: (2)

Figure 2.5: Type of newbuildings globally, 2011



Source: (3)

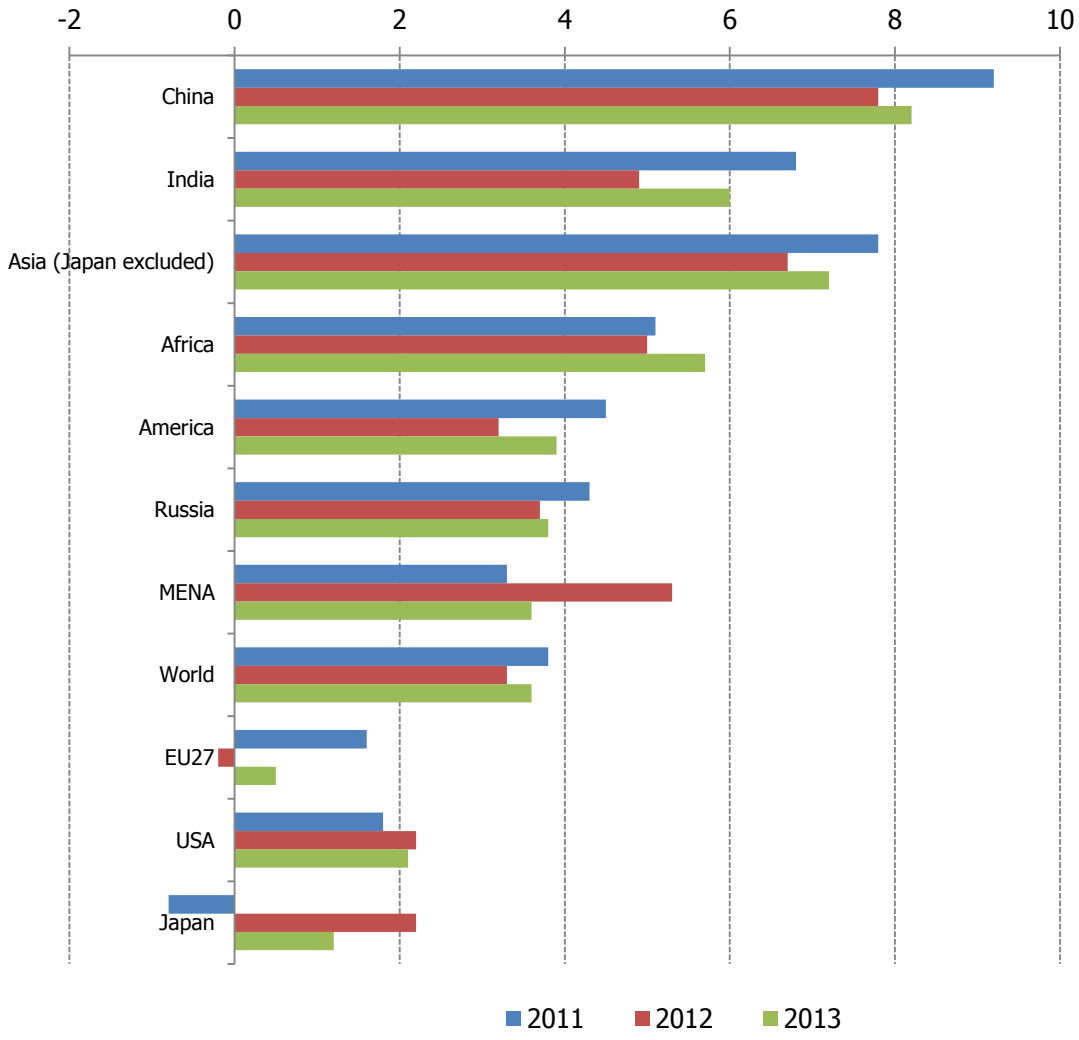
Expansion of the available tonnage, may have led to overcapacity conditions but on the other hand the average age of the world fleet improved significantly, which is associated with benefits both for the management companies (new technologies, more efficient freight transport, smaller operating costs) and for the natural environment. According to data published in March 2012, the average age of the world fleet (regardless of type of ship) is 20.6 years, while the average age of Greek oceangoing vessels does not exceed 16 years (2), (4).

At the same time, the extremely low freight rates do not cover the daily running costs of older vessels. This resulted in an increased rate of ship recycling in the first few years of the crisis, even though this rate has slowed down since then. In particular, during 2011 the demolition sales exceeded 1,078 vessels with a total capacity of 25,600 tons, representing about 1.5% of the world fleet (3).

Regarding the future of the global freight market, business expectations point to a recovery that will need to last for at least three years so as to meet the pre-crisis levels. According to Moore Stephens study (5), the business sentiment in the shipping industry is significantly higher today than three years ago (March 2009). Most shipowners, charterers and analysts expect higher prices in the market rates in the near future (in almost all kinds of cargo), however, it is stressed that the market will continue to be at lower levels compared to the pre-crisis era. At the same time, an increased percentage of the analysts estimate that the growth of the operation cost will be limited, improving the industry's financials.

However, estimates for the macroeconomic aggregates associated with the industry, are less optimistic. The growth rate of the global economy is expected to recover only marginally in 2013 (Figure 2.6).

Figure 2.6: The global economy-Growth rates (GDP percentage change)

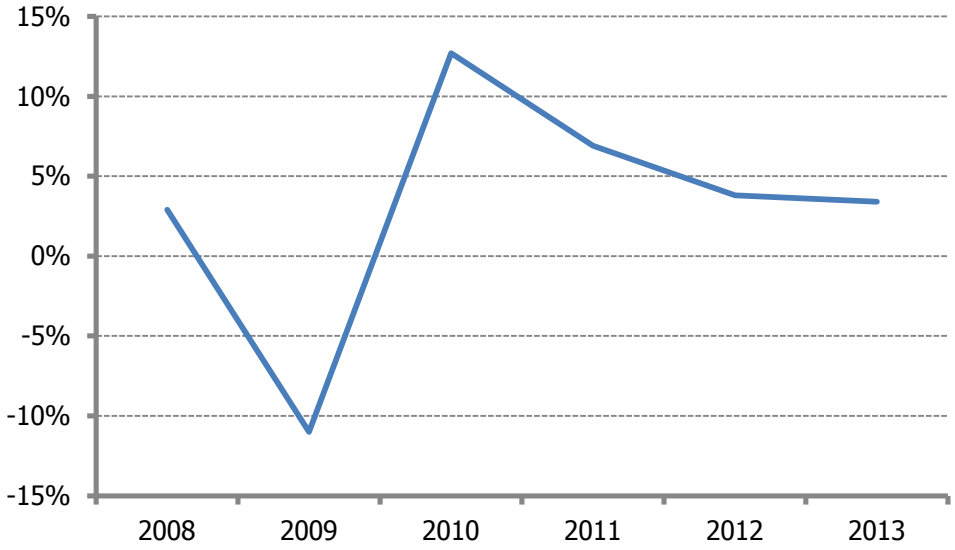


***MENA:** Middle East and North Africa

Source: European Economic Forecast, Autumn 2012, European Commission

A similar situation is expected in countries that hold 45% of transported volumes worldwide (China, India) in which the growth rate has been shrinking further. Moreover, the global trade has significantly slowed down since mid 2008, while in 2009 it decreased by -11.0% (6). The relevant index recovered in 2010 yet the forecasts indicate a continuation of the tendency of stabilization at a rate close to 4% (Figure 2.7).

Figure 2.7: World trade's growth rate



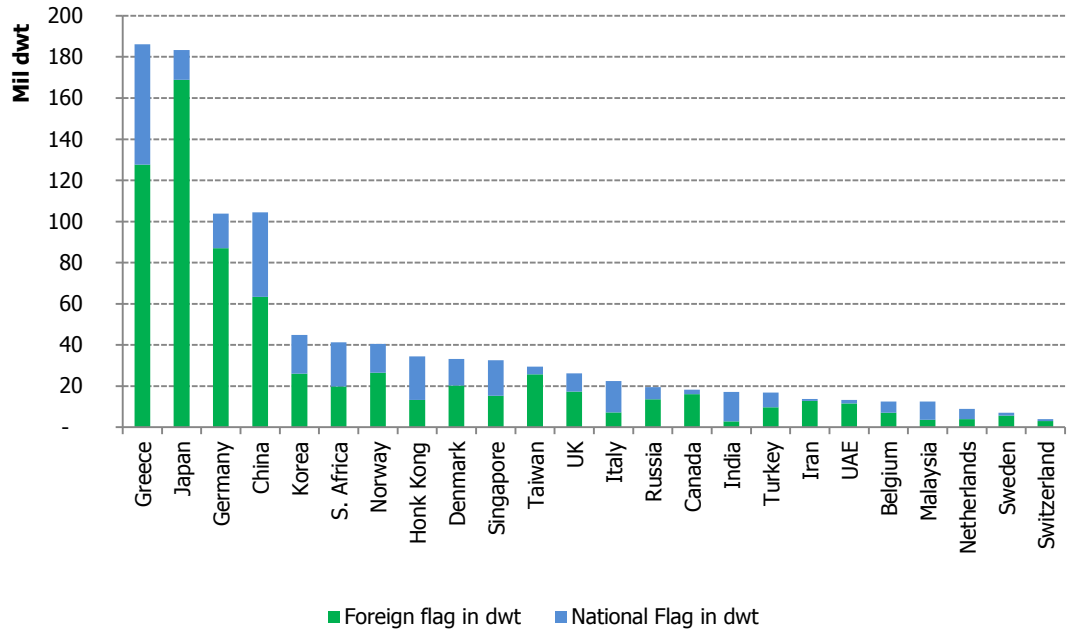
Source: World Economic Outlook, IMF (2010-2012)

2.2 The Greek-owned oceangoing shipping: Brief overview

Shipping is a very important sector of the Greek economy, while Greek-owned shipping is unsurpassed in the world. Greek shipowners control more than 4,065 cargo ships [(3)], 3,760 of which are estimated to be oceangoing. In terms of capacity, the Greek-owned fleet is leading the global marine market (Figure 2.8). More than half (52%) of the shipping companies listed on the US stock markets are of Greek interests.

The Greek-owned fleet was increased significantly during the period 1990 - 2008, both in number of ships and in capacity (Table 2.1 in the Annex). In 2008 the fleet was at its highest point in 20 years (4,161 ships), however, the growth has halted since then (2009-present). This development is a sign of greater flexibility of the Greek shipowners, who seem to quickly adjust to the new market conditions.

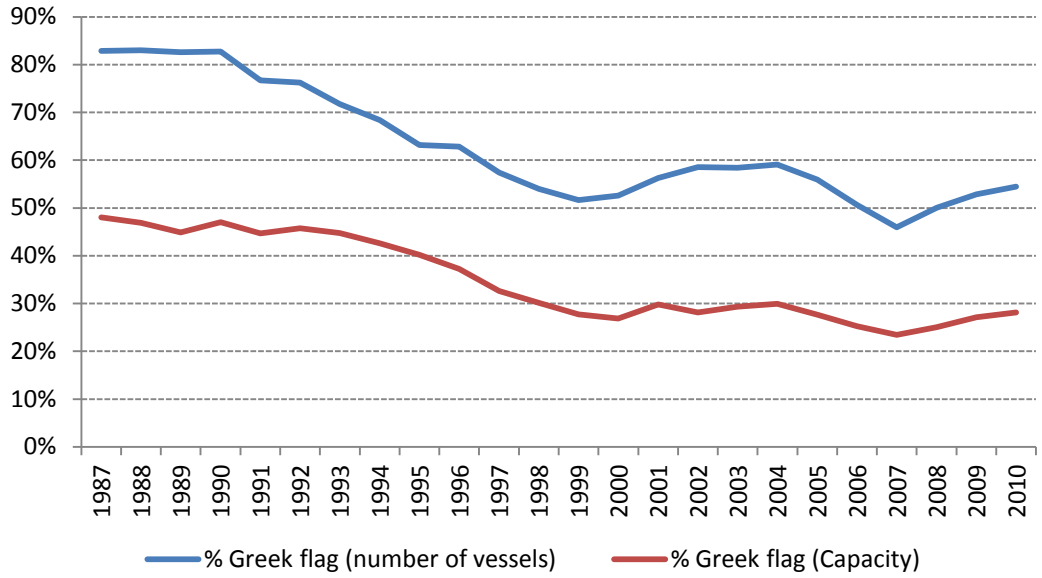
Figure 2.8: Global fleet per nation of ownership in 2010



Source: (4)

Traditionally, shipowners chose the Greek flag for the registration of their fleet, a trend which has weakened considerably over the years. Indeed in the early 1990s, 83% (and about half of the available tonnage - 47%) of the Greek-owned fleet was registered under the Greek flag. Since then, the percentage of Greek-owned ships under national flag has declined significantly. By the end of 2010 only 28% of the available capacity is under Greek flag, a trend similar to other developed countries (Figure 2.9 in Annex).

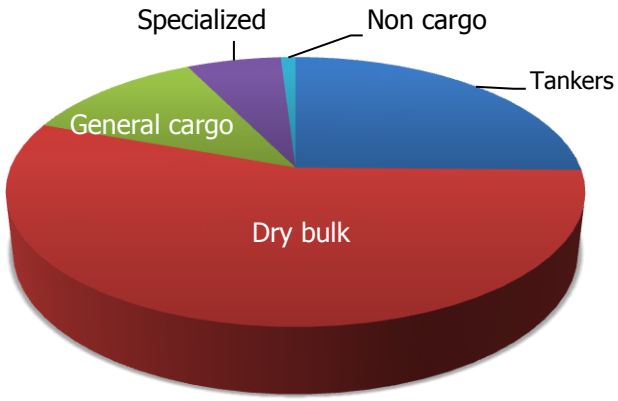
Figure 2.9: Greek-owned fleet, Greek registered 1987-2010



Source: Hellenic Chamber of Shipping, 2012

Despite the historic shipping crisis, Greek shipowners continue to invest a significant share of their profits in orders of newbuildings, diversifying, however, the mix of vessels in relation to previous years. In 2011, according to Clarkson's report "World Fleet Monitor", Greek shipowners invested a total of $ 13 billion for almost 9,215 tons, ahead of every other nation. Particular preference is still shown for dry cargo vessels, followed by tankers and general cargo vessels (3) (primarily container ships). Nevertheless, the order of specialized vessels (i.e. for liquefied natural gas, etc.) has also been noticeable. Newbuilding vessels and replacement of older ships with newer from the secondhand market, contributed significantly to the contraction of the average age of the Greek fleet, which is estimated at 16 years, well below the average age of the world fleet. This boosts further the competitiveness of Greek companies in relation to their competitors (4).

Figure 2.10: Structure of newbuildings by Greek owners, 2011



Source: (2)

2.3 Annex

Table 2.1: Development of the Greek-owned Oceangoing fleet 1990 - 2011

Year	Number of Ships	DWT	% Annual Change (number of ships)	% Annual Change (DWT)
1990	2,426	84.439.159		
1991	2,454	87.102.785	1,2%	3,2%
1992	2,688	98.218.176	9,5%	12,8%
1993	2,749	103.958.104	2,3%	5,8%
1994	3,019	120.650.373	9,8%	16,1%
1995	3,142	126.128.352	4,1%	4,5%
1996	3,246	129.737.336	3,3%	2,9%
1997	3,204	127.782.567	-1,3%	-1,5%
1998	3,358	133.646.831	4,8%	4,6%
1999	3,424	139.255.184	2,0%	4,2%
2000	3,584	150.966.324	4,7%	8,4%
2001	3,618	168.434.370	0,9%	11,6%
2002	3,48	164.613.935	-3,8%	-2,3%
2003	3,355	171.593.487	-3,6%	4,2%
2004	3,379	180.140.898	0,7%	5,0%
2005	3,338	182.540.868	-1,2%	1,3%
2006	3,397	190.058.534	1,8%	4,1%
2007	3,699	218.229.552	8,9%	14,8%
2008	4,173	260.929.221	12,8%	19,6%
2009	4,161	263.560.741	-0,3%	1,0%
2010	3,996	258.121.898	-4,0%	-2,1%
2011	3,848	261.675.981	-3,7%	1,4%

Source: Hellenic Chamber of Shipping, 2011

3. The recorded contribution of Maritime Transport in the Greek economy

- **Shipping is a highly productive sector, with value added that exceeded € 8,4 billion in 2009.**
  - **According to data from the input-output tables of Eurostat, water transport exhibits the highest trade surplus among all sectors of the economy (net exports of €12,7 billion in 2009 and €14,5 billion in 2010).**
  - **46.9% of the services surplus in 2011 came from net revenues of the transport sector.**
- **Employment in oceangoing vessels in 2008, according to data from the Hellenic Statistical Authority, exceeded 17,018 seafarers:**
  - **Of which, 15,414 (91%) were employed on ships registered under the Greek flag.**
  - **Only 44% (7,527 seafarers) were of Greek citizenship.**
- **The entry of young Greeks in the maritime labor market is limited. Taking into account the interactions of the industries to the Greek economy, the contribution of maritime transport is even stronger:**
  - **Final demand for shipping has created (directly and indirectly) €13,3 billion domestic value added in 2009.**
  - **Approximately 6.1% of the country's GDP in 2009 was derived directly or indirectly from final demand for maritime transport.**
  - **Water transport paid (directly and indirectly) for 192,000 jobs in 2009.**

3.1 Methodology

This chapter analyzes the direct contribution of shipping to the Greek economy, as recorded by the official data from the Hellenic Statistical Authority and Eurostat. By using the input / output model, the direct and indirect effects of the sector in Greek economy are also quantified.

3.1.1 Identity of the maritime industry

The quantification of the maritime industry of a country faces serious practical difficulties, as the offered services - the actual transfer of goods - often are performed in international waters and ports, away from the offices of shipping companies. However, in accordance with Regulation No. 2223/96 of the Council of EU adopting the European System of Accounts (ESA 1995), the transport of goods by a resident carrier on behalf of non-residents and the transportation of exported and imported goods outside the territory of a country are included in the national accounts of the country in which the carrier is a resident and are considered as an export of services.

Permanent residents are defined as institutional units (i.e. companies, public sector, households and some NGOs) and local Kind-of-Activity Units (parts of an institutional unit located in a single site or in closely situated sites) "*who have a centre of economic interest on the economic territory of that country.* A local KAU has as a core of their economic interest a country when "*there is a location within the economic territory in which or from which [the KAU] conducts, and intends to continue to conduct financial transactions of a significant scale*", at least for a year. The nationality, the legal status and the physical presence in the economic territory of the country at the time they carry a transaction play no role in the definition of a KAU as a permanent resident in the sense that this term is used within the European System of Accounts.

Practically, this means that when the established office that offers the transportation service is located in Greece, (regardless of whether the company's headquarters are located inside or outside the Greek territory) the value of the offered service, according to ESA 1995, is included in Greece's national accounts. Similarly, seafarers working on vessels managed from an office located on Greek territory are accounted as Greek employment, at least during their employment period, regardless of their nationality or the fact that their employment is mostly performed in international waters.

Regarding the statistical classification of the sector, the oceangoing shipping is included in the activities of the industry[3] H50.2 "Sea and coastal freight water transport." Unfortunately, the available data at this level of analysis are limited. For this reason, we used the cumulative water transport data as a proxy of the oceangoing shipping. Given that the coastal freight water transport is quite limited in Greece, we assume that water transport refers mainly to maritime transport. The above assumption is based on the fact that according to the input-output tables published by Eurostat in 2010, 95% of the production value of water transport offered in 2010 corresponds to exports being mainly attributed to oceangoing shipping.

3.1.2 Input-output model

The input-output model reflects the interdependencies of the sectors in an economy. It is used to estimate the overall impact on an economy of an exogenous change in economic activity, such as making an investment, and to determine the overall contribution of an industry to the national economy. It was developed in the 20th century at Harvard University by the Russian-American economist Wassily Leontief, who took a Nobel prize in economics in 1973 for the development of the model and its application to practical issues.

The model is based on matrices that represent inter-industry relationships within an economy, showing how an output from one sector may become an input to another. The difference between the total value of production and the value of intermediate consumption is the Gross Value Added (GVA) of a sector. GVA corresponds to the resources that the firms of an industry have at their disposal so as to pay wages and salaries, depreciation costs, direct taxes, dividends to their shareholders and finally to create reserves from profits. Summing each sector's GVA with indirect taxes such as VAT equals Gross Domestic Product (GDP). GDP is also calculated as the sum of final consumption (households and public sector), investment (public and private sector) and net exports (exports minus imports).

The analysis of the current study was based on input-output tables from Eurostat for the period 2005-2009, covering 59 sectors of the Greek economy. As mentioned previously, input-output data at a more detailed level of each sector are not

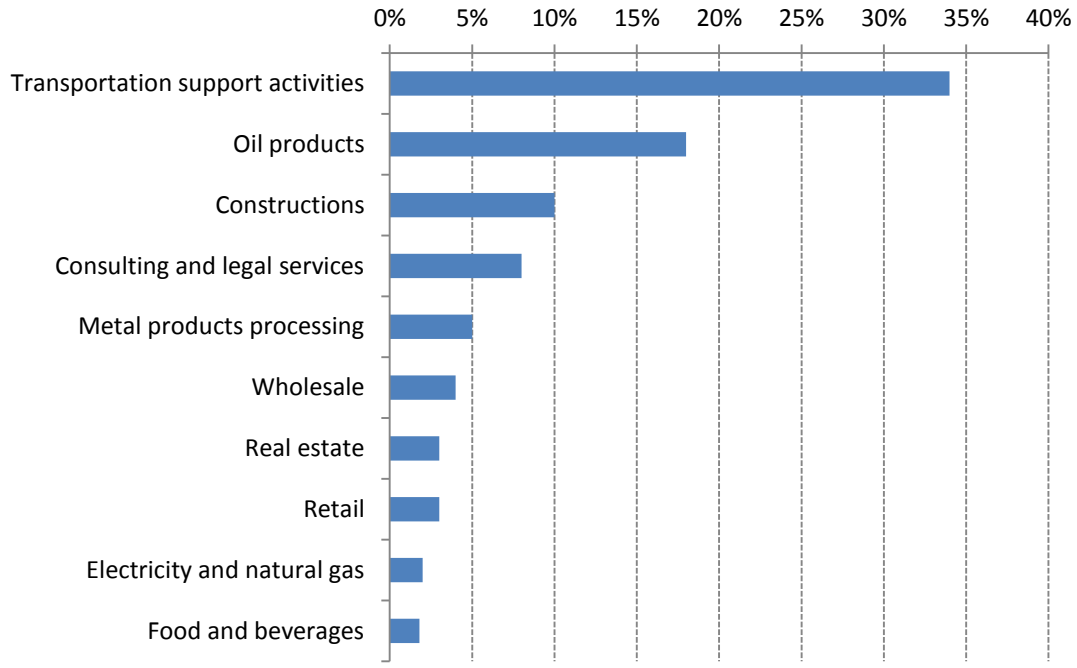
[3] Based on NACE Rev2.2

available, thus we used the data of the Water transport sector, which includes both oceangoing shipping and coastal shipping.

Based on these data, for each €100 that are produced by the Water transport, €53 are added to the country's GDP as an added value, while the remainder (€47) are spent on inputs. Regarding inputs, €21 of the €100 that are produced by shipping transport, go to purchases of products and services from abroad, while €3,48 are collected by the state as indirect taxes. The rest (€22,55) are paid for the purchases of products and services from other sectors of the Greek economy. The highest share of these payments is held by supporting transport activities, petroleum products and construction (Figure 3.1).

Concerning outputs, for each €100 produced by shipping €95,42 come from exports (i.e. oceangoing shipping), €2,91 from domestic household consumption (i.e. coastal shipping) and €1,67 from intermediate consumption of other sectors of the Greek economy (oceangoing and coastal shipping). The highest share of demand for shipping services from domestic sectors of the economy is held by wholesale trade (27%) and land transport (21%).

Figure 3.1: Top 10 sectors with the highest share in the Water transport's inputs



Source: Eurostat

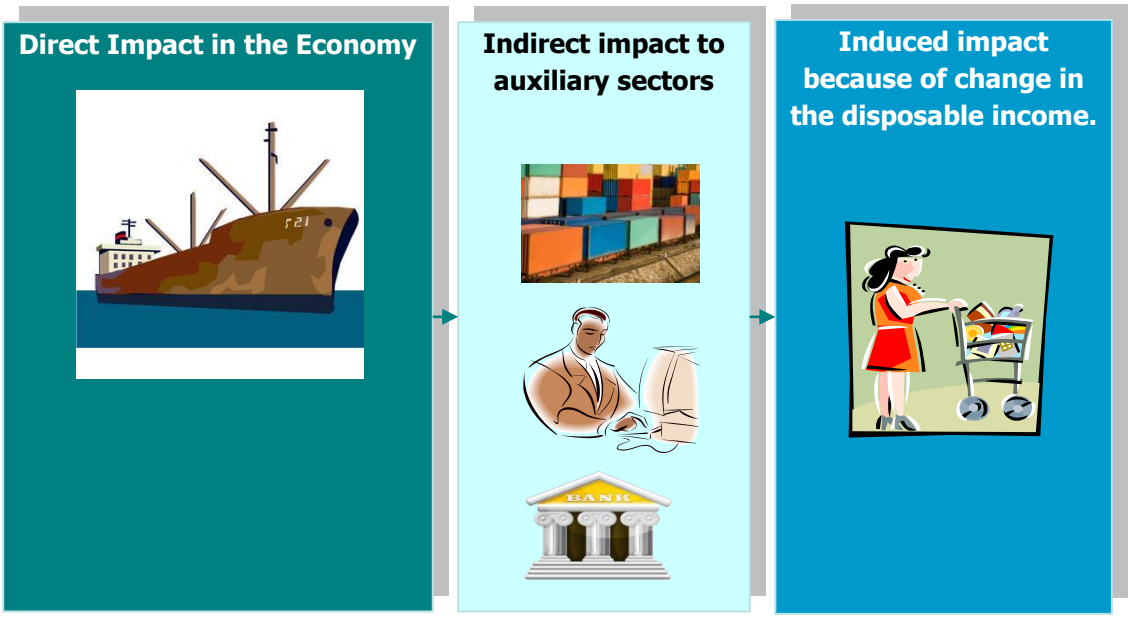
The added value produced by an industry does not reveal its overall contribution to the economy, since it does not take into account interactions between this and other

sectors of economic activity in the economy. In order to take this into account, we used the Leontief's input-output model, where the overall contribution of an industry is considered equivalent to the impact on the economy in the hypothetical scenario where the final demand that is satisfied by the industry is met entirely by imports.

In this hypothetical scenario, not only the value added of the examined sector is depleted, but also the value added of those sectors that serve the final demand of the primary sector is diminished, always depending on the extent of their involvement in serving the examined sector's final demand.

In particular, if the final demand for shipping was exclusively covered by imports, losses for the Greek economy would not be limited only to the value added and employment of the specific sector, but also would expand to the sectors auxiliary to the shipping sector such as transport services, petroleum products, construction services etc. Moreover, the contraction in the household disposable income due to the loss of the value added would reduce further the demand in all sectors of the economy (Figure 3.2).

Figure 3.2: Shipping's Direct and indirect effect to the economy



The economic impact resulting from serving the final demand of the examined sector with domestic production (rather than imports), without taking into account interactions with the rest of the economy, constitutes the direct contribution of the sector (**direct effect** in I/O terms). The increase activity along the value chain is termed **indirect effect** from the domestic activity of the industry. The impact on the

economy from changes in consumption that occurred from the change in the disposable income of consumers is termed **induced effect**.

It is worth mentioning that the input-output model does not examine the use of profits (potential investment or consumption) in the economy, but defines the contribution of the sector to the economy through activities that satisfy the sector's demand. Given the various examples of invested profits from shipping activity in other sectors of the economy, such as real estate and tourism, the estimate for the contribution of shipping to the Greek economy of this study can be considered as conservative.

3.2 Direct contribution to the economy

The following section presents the figures related to the direct contribution of the sector to the Greek economy, such as employment, productivity, value added, taxes and more. As the share of intermediate consumption of the remaining industries of the Greek economy in the total demand for water transport is very small (1.7%), it is safe to assume that the figures published by the statistical authorities correspond to the direct contribution of the sector, as virtually all of its activity is directed at serving final demand.

3.2.1 Employment

The availability and reliability of data, related to employment in shipping, are severely limited by the peculiarities of the industry, such as the foreign flag registration, the fact that most of the activity is carried out in international waters, the absence of an organized system of data collection, etc. According to the methodology of the Hellenic Statistical Authority (ELSTAT), only sailors that are on board Greek-owned ships (registered under Greek or foreign flag) contracted with the Seamen's Pension Fund are counted in employment statistics. In practice, this methodology does not take into account the Greek-owned vessels which are not contracted with the Seamen's Pension Fund. However those vessels constitute a significant fraction of the Greek-owned shipping. To the extent that there are activities managed by domestic shipping firms of Greek-owned vessels that are not contracted with the Seamen's Pension Fund, the number of jobs in the industry is underestimated.

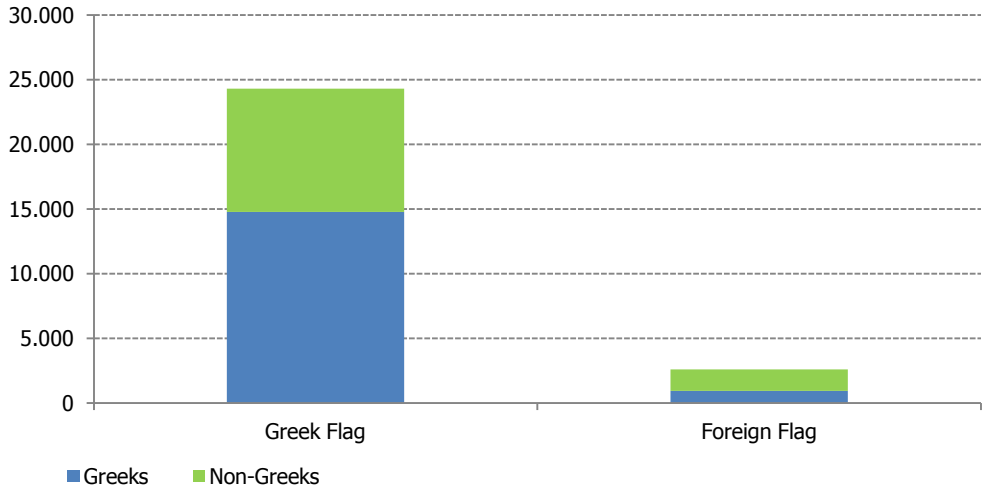
The most recently published official data on employment are used on the input-output model. However, for the better understanding of the sector and its

contribution to the Greek economy, we also developed a theoretical employment framework based on some rational assumptions and estimations that arose from discussions with industry experts.

The published data include employees in the industry, regardless of their country of origin, and also those employed in shipping management companies. With all the reservations that arise as a result of the difficulties in obtaining reliable data for the industry, we can say that in 2008 employment in all water transport exceeded 34,000 jobs (based on Eurostat data), placing the industry in 21st place among 59 sectors of economic activity in the country. However, the recession in the global shipping in 2009 reflected strongly with job losses of about 1.4% (year-on-year change compared to 2008), while in 2010 employment in the sector contracted further by 6.5%.

The majority of employees in the industry are active seafarers on vessels larger than 100 GRT. According to the most recent data of ELSTAT relating to the year 2008, those seafarers employed on Greek and foreign flagged vessels contracted with the Seamen's Pension Fund account to 26,893[4]. In addition, 35% of the recorded by ELSTAT seafarers are employed in coastal / passenger ships (see Table 3.1 in the Appendix), while the rest work in cargo vessels and tankers (31.3% and 31.7% respectively).

Figure 3.3: Greek/non Greeks breakdown by country of registry (flag)



Source: ELSTAT (only includes ships flying foreign flags that are contracted with the Greek Seamen's Pension Fund)

[4] During the survey data from the Seamen's Pension Fund (NAT) relating to the Greek sailors were requested, however, they were not available.

According to ELSTAT published data, the number of active seafarers (regardless of nationality) that are employed in Greek-owned vessels (regardless of flag) does not exceed 17,000. However, the methodology of ELSTAT displays significant limitations to the measurement of employment and does not include employment on ships that are not contracted with the Greek Seamen's Pension Fund. Thus, the Greek ship management under foreign flag seems to employ the minority of seafarers (11% of total), although as mentioned in the previous chapter, these ships constitute the majority of the fleet (see Figure 3.3).

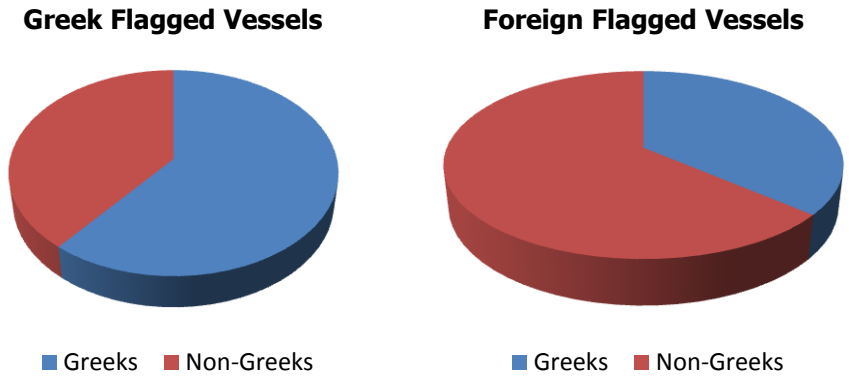
Given the ratio of Greek-owned ships under Greek and foreign flags (52.5% of the fleet was registered under the Greek flag in 2010) we can conclude that Greek-owned foreign flagged vessels employed 35,600 people, the majority of whom are of foreign nationality. Assuming that Greek seafarers on these vessels do not exceed 10% of total employment, the number of Greek seamen employed there at a given time during the year is estimated at 3,560. On an annual basis (based on the fact that the typical contract for dry cargo ships is seven months per year) the number of Greek seamen is nearly doubled, exceeding 6,103 people.

Adding the registered (by the Hellenic Statistical Authority- ELSTAT) active seafarers with Greek citizenship (14,779) and the percentage of those who were not on duty during the period of investigation because of the five-month rest (10,556), we can conclude that the number of the Greek seamen on Greek-owned ships must exceed 31,438 people.

Assuming that every ocean going foreign flagged vessel employs an average of 20 people, the majority of whom (18 people) are seafarers of foreign nationality the total employment in Greek-owned ships exceeds 60,000 jobs. The challenge, however, remains to track which part of this employment represents activity carried out by domestic shipping firms and based on ESA 95 should have been recorded as part of the domestic workforce.

In any case, the officially recorded contribution of the sector to the Greek employment underestimates the capability of Greek-owned shipping to contribute to the restoration of the Greek economy through shifting more of their activities to offices located in Greece.

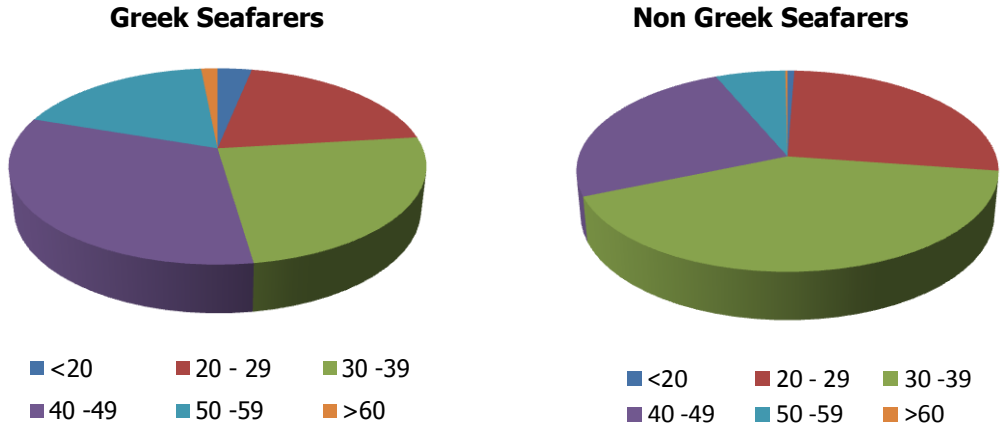
Figure 3.4: Greek/Non Greek Seafarers employed in Greek-owned vessels



Source: ELSTAT (only includes ships flying foreign flags that are contracted with the Greek Seamen's Pension Fund)

Despite the problems with the data, the analysis of employment by country of origin is quite revealing. In 2008, 15,721 Greek seamen (of all specialties) and 11,172 foreign seafarers were employed in ships under Greek management (regardless of brand). When combining employment with the registration flag of the fleet, we can observe that Greek seafarers are more than 61% in Greek flagged ships (Figure 3.3 and Figure 3.4).

Figure 3.5: Distribution of Greek/non Greek seafarers in Greek-owned vessels



Source: ELSTAT, (only includes ships flying foreign flags that are contracted with the Greek Seamen's Pension Fund)

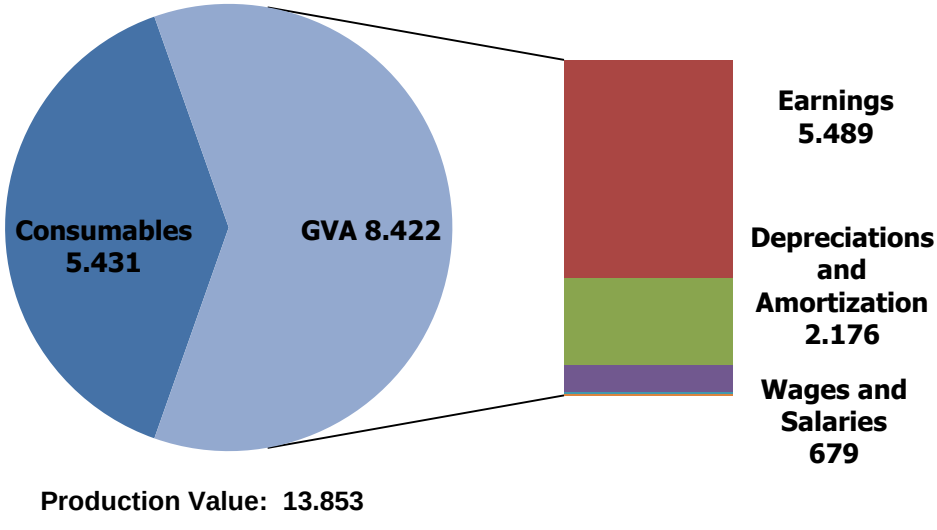
In contrast, 64% of the crew employed in the foreign flagged ships comprised mainly of non-Greek seafarers. However, Greek shipowners still trust specialized Greek seafarers in high-ranking positions. Specifically, 98% of the captains employed on Greek-owned ships that are contracted with the Seamen's Pension Fund, (as recorded in the official records of ELSTAT) are Greek. This trend is reversed when examining the lower ratings.

Studying the age distribution of seamen is also of great interest. Few young Greeks (specialized or not) start a career in shipping (Figure 3.5). Most of the Greek workers are between 40 and 60 years, while only 45% are in the age of 20-39. On the other hand, nearly two-thirds of foreign seamen under Greek ship management are aged between 20-39 years. The relatively low participation of young people in employment in the shipping industry is a serious structural problem, which may significantly limit the availability of qualified officers and staff in the future. This may create a serious risk in the maintenance of the leading position of Greek shipping globally.

3.2.2 Value added and other economic aggregates

The recorded direct contribution of water transport in terms of added value is significant. The production value of the shipping industry, which is defined (ESA 1995) as "*the receivable amounts for transporting goods and passengers*" accounted to €13.9 billion in 2009, according to data from the input-output tables published by Eurostat. Almost €5.4 billion of this amount was spent on goods and services in other sectors of the Greek economy (Figure 3.6). Hence, water transport produces €8.4 billion of added value, from which €5.5 billion represent corporate earnings, €2.2 billion correspond to depreciation of capital, €679 million to salaries, €53 million to social security contributions and €25 million to taxes on production.

Figure 3.6: Water transport's GVA in 2009 (in thousand €)



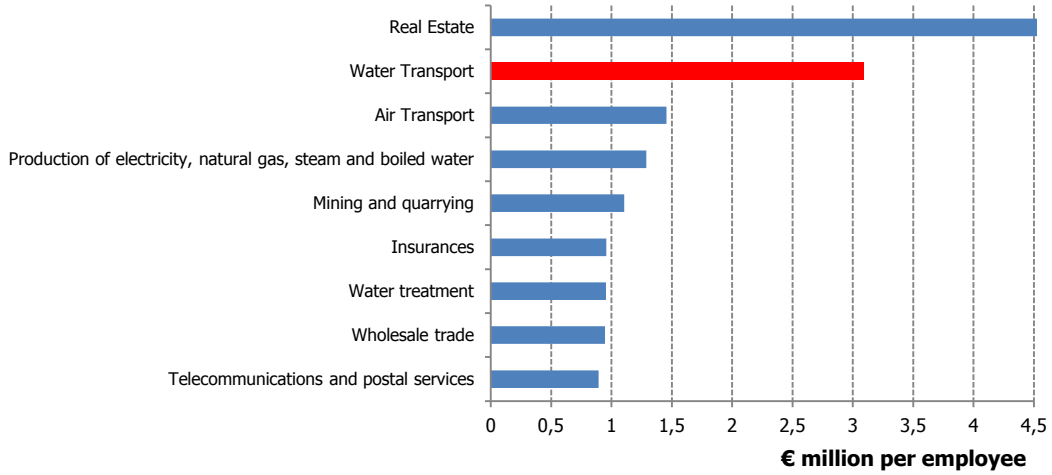
Source: ESA tables, Eurostat

Water transport is ranked 9th on the basis of value added across all sectors of economic activity in Greece. Traditionally, the highest added value is produced in

activities related to real estate (net income from rents, including imputed rents of home-owners), followed by wholesale trade, public administration and defense (wider public sector) and at fourth place, hotels and restaurants.

Regarding the ratio of value added per employee, the shipping industry ranks second (behind the real estate services) with more than €3 million per employee, according to data from the input-output tables from Eurostat and employment data from the Hellenic Statistical Authority (Figure 3.7). Essentially, this means that among the productive sectors (excluding real estate, where a significant fraction of the revenue derives from imputed rents), maritime transport has the highest value added per worker. The productivity of the sector is more than twice that of air transport and the production of electricity and natural gas (3rd and 4th place respectively), while it is much higher than the corresponding European average. However, we should note that the possible underestimation of employees in Greek-owned shipping registered under foreign flag (managed from offices within the Greek territory) implies overestimation of the value added per employee indicator.

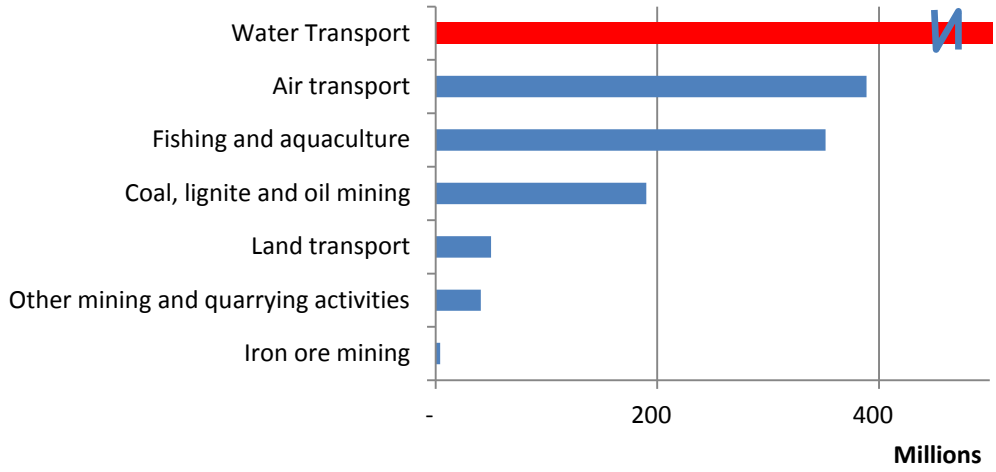
Figure 3.7: Sectors' productivity, 2009



Source: Eurostat **Data Process**: IOBE

The recorded contribution of the industry in terms of net exports is also very significant. Indeed, according to the data of Eurostat's input-output tables, water transport's net exports are in first place with €12,7 billion, followed by air transport and aquaculture (Figure 3.8). We should mention that the tourism industry is not included in the list, as the tourist spending seems not to be decoupled from the domestic household consumption in the input-output tables.

Figure 3.8: Sectors with positive net exports



Source: Supply and use tables, Eurostat 2009

The considerable contribution of oceangoing shipping to the Greek economy is also reflected in the most recent data from the Bank of Greece on the services surplus (Table 3.1). The net inflows of transport services (95% of which are attributable to ocean-going shipping) represent more than 48% of the services surplus in the last three years. Gross receipts (2000-2008) from transport services cover 23% of the trade deficit of the country (goods and services).

Table 3.1: **Balance of Services 2009-2011**

€ in mil.	January- December		
	2009	2010	2011
Balance of Services	**12,640**	**13,249**	**14,639**
Revenue	**26,983**	**28,478**	**28,624**
Traveling	10,400	9,611	10,520
Transport	13,552	15,418	14,097
Other services	3,031	3,448	4,008
Payments	**14,343**	**15,229**	**13,985**
Traveling	2,425	2,156	2,274
Transport	7,073	8,155	7,233
Other services	4,845	4,918	4,479
Transport Contribution to Balance Services	**51.3%**	**54.8%**	**46.9%**

Source: Bank of Greece, January 2011

3.3 The indirect contribution of maritime transport

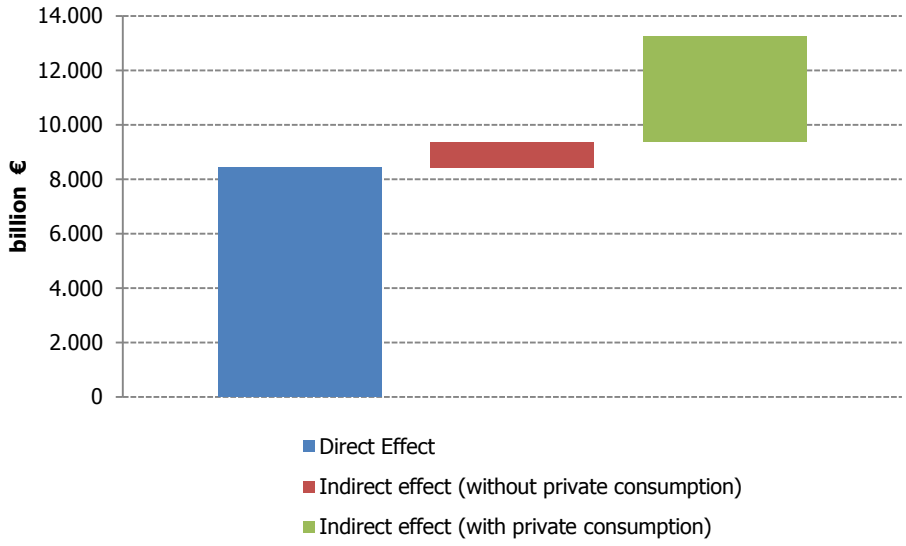
The Water transport contribution to the Greek economy is not only limited to the employment or the added value of the sector. If water transport services had not been developed in Greece, and the demand for those services was served by offices operating abroad, the demand for auxiliary services to the water transport services, for oil products and for the rest of the goods and services along the sector's supply

chain would have been considerably lower. This would have had a negative impact on the added value and the employment in the rest of the sectors of the economy. Moreover, the demand (and the financial results of all sectors of the Greek economy) would appear reduced because of the loss in disposable income of those employed along the value chain (namely, those sectors that are directly/indirectly related to water transport). The reduced income of the water transport would then lead to a decline of the demand for both sectors connected with shipping and the rest of the economy (where households' income is spent). By using the input-output model we can determine this indirect effect of shipping on various economic aggregates of Greece, such as employment, value added, tax contribution etc.

3.3.1 Value added

The total value added generated directly and indirectly by the sector exceeds €13,2 billion, 29.3% of which (€3,9 billion) is attributed to induced effects. The indirect impact (without private consumption) does not exceed 7.2% (€950 million) and is attributed to the high added value of the sector and consequently to a low consumption of products from the domestic market (Figure 3.9).

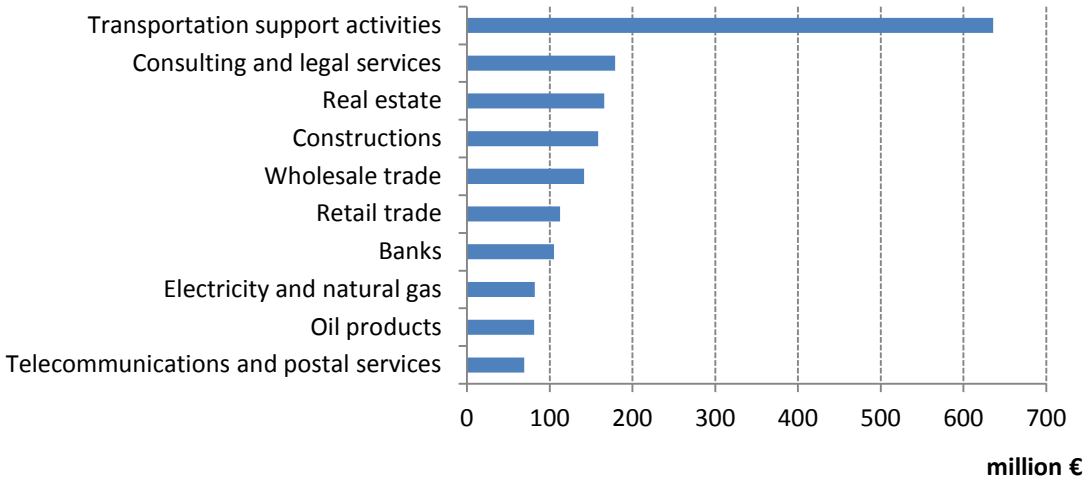
Figure 3.9: Water transport's total GVA



Source: I/O model, IOBE

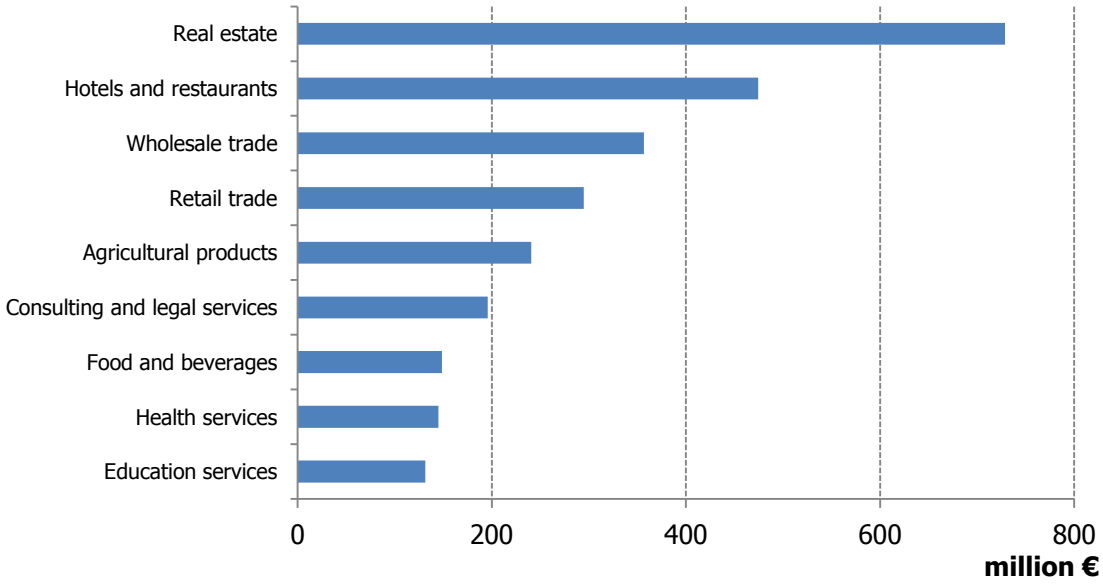
If we count in the model the effects of private consumption (-*the induced effect*- salaries and wages), we conclude that the sectors most favored by shipping's operations are those related to commodities and services purchased by households, such as activities related to real estate (buying and renting houses), hotels and restaurants, retail and others (Figure 3.11).

Figure 3.10: Ten sectors with the highest indirect effect in Water transport's GVA



Source: I/O model, IOBE

Figure 3.11: Ten sectors with the highest induced effect in Water transport's GVA

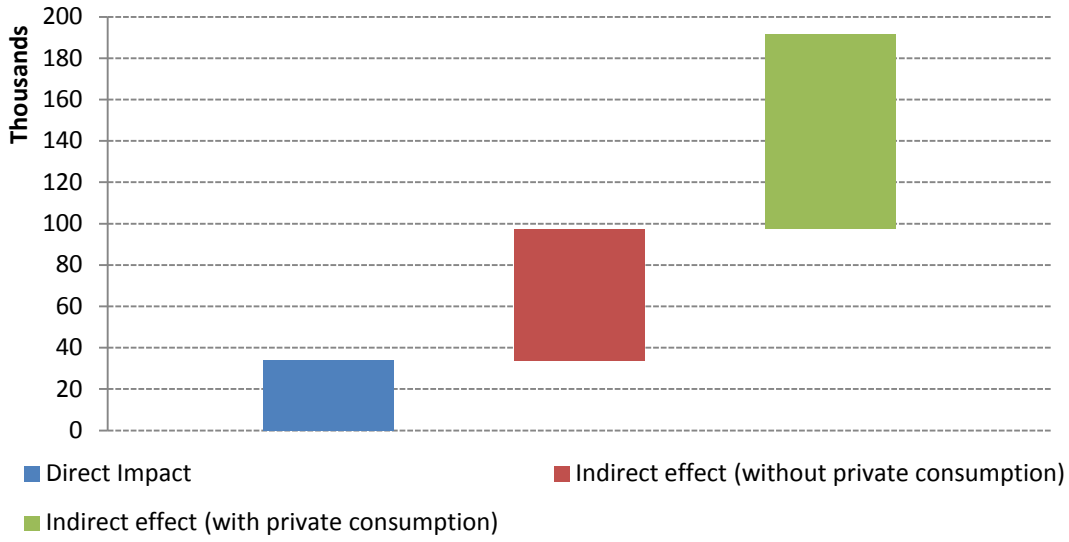


Source: I/O model, IOBE

3.3.2 Employment and compensation of employees

As mentioned in previously, there may be a serious underestimation of the published employment data in Greek shipping. Even so, according to the officially recorded data, the total impact of the industry on employment exceeds 190,000 jobs (Figure 3.12).

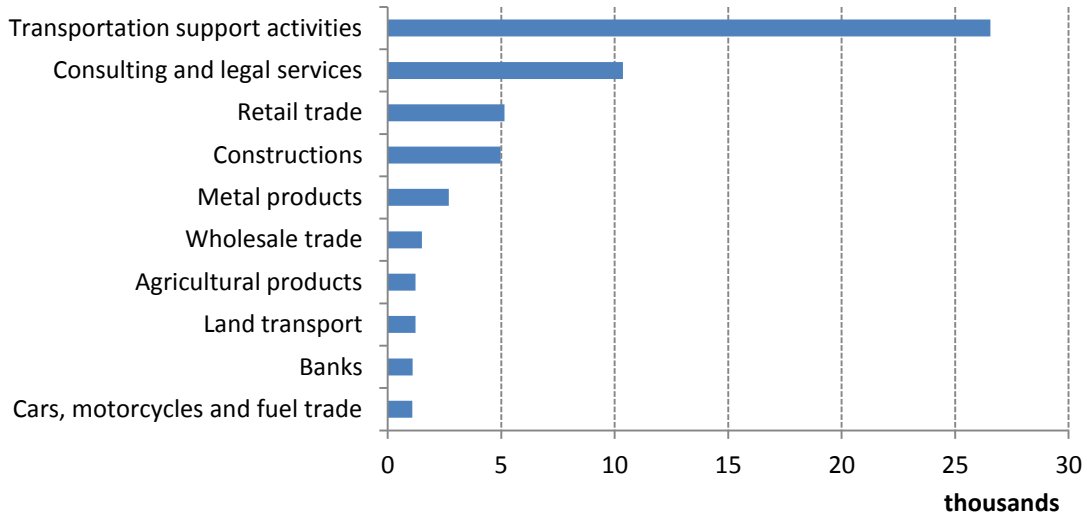
Figure 3.12: Water transport's total effect in employment



Source: I/O model, IOBE

The sectors whose employment is affected indirectly (without private consumption) are those which meet the demand of shipping (suppliers and other parties involved along the sector's supply chain). The effect of shipping is quite important in the employment of industries such as auxiliary services to transport activities (26.6 thousand jobs), advisory and legal services (10.4 thousand jobs), retail trade (5.0 thousand), agricultural products (1.2 thousand), banks (1.1 thousand), vehicles and fuel (1.1 thousand – Figure 3.13).

Figure 3.13: The indirect effect of Water transport in employment, first ten sectors



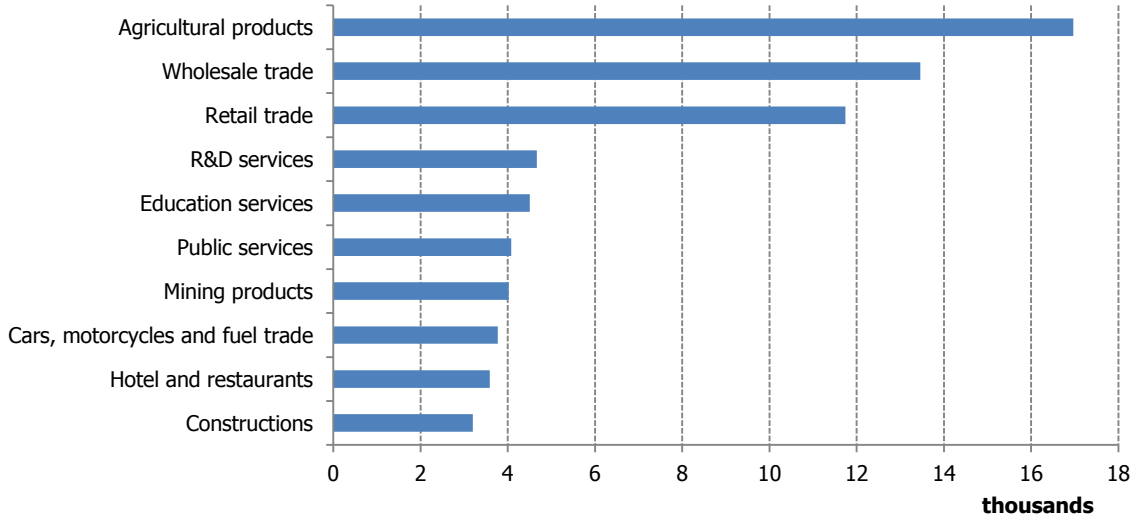
Πηγή: I/O model, IOBE

Indirect effect on employment appears larger compared to the value added. This can be attributed to the fact that the productivity in industries serving the shipping sector

is considerably lower. In other words, the generation of €1 of value added in the supportive industries requires more people compared to shipping.

When we take into account the effects of households' income generated when serving shipping's demand, then the contribution of shipping to employment appears even greater. The indirect impact of shipping on agriculture is estimated at 17 thousand jobs, followed by wholesale (13.5 mm) and retail trade (11.7 thousand jobs – see Figure 3.14).

Figure 3.14: The induced effect of Water transport in employment, first ten sectors



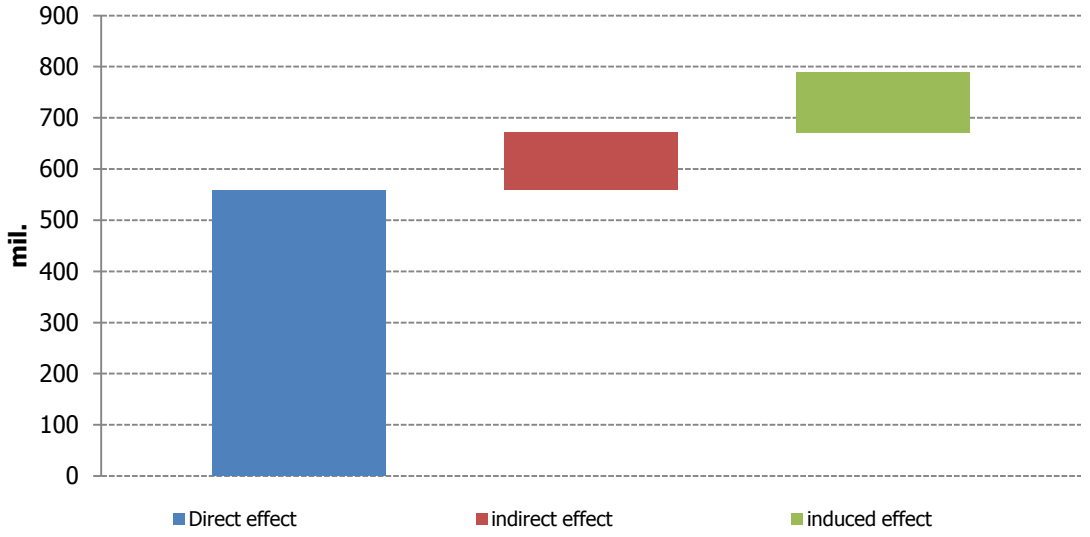
Source: I/O model, IOBE

Consequently it is estimated that shipping significantly boosts private income as well. The total impact on the income of all employed is estimated at €2,7 billion, 45.6% of which is attributed to induced effects.

3.3.3 Contribution to tax revenues

Based on the data from the input-output tables, total taxes on consumed products by Water Transport amounted to €546 million, in addition to €14 million coming from the tonnage tax of the Greek-owned ships managed in Greece. Overall, the direct contribution of maritime transport in tax revenues is estimated at €560 million. The indirect effect of shipping on tax revenue is estimated at €231 million, while the contribution is increased by another €121 million when we take into account private consumption effects as well. Hence, the contribution to the state tax revenues is estimated at around €790 million (Figure 3.15).

Figure 3.15: Water transport's contribution to tax revenues



Source: I/O model, IOBE

The study of shipping taxation, both in Greece and in other European countries is of particular interest. The main scheme of taxation, found in all European countries with a strong maritime presence, imposes a tax on the capacity of each vessel, also known as the tonnage tax. There are two forms of tonnage tax: the Greek and the Dutch.

Specifically, in the Greek tonnage tax scheme, the vessel is taxed based on its capacity and its age. In contrast, in the Dutch tonnage tax system, an imputed profit from the operation of the ship per day and per year is estimated and then a corporate tax is applied.

Greece, along with Malta and Cyprus, introduced the tonnage tax in 1951[5]. In the Greek taxation model, the capacity of the ship and its age, are taken into account. According to data on the state budget of the year 2010 by the Ministry of Finance, revenues from the taxation of vessels amounted to €14.7 million.

Income earned from commercial activities of the Greek offices or foreign companies that are engaged exclusively in the management, operation, freight, insurance and brokerage of vessels under Greek or foreign flags (over 500GRT), are exempt from all taxes, obligations and contributions imposed by either the Greek government or by third parties.

[5] Law 1880/1951, modified with the Emergency Law 465/1968.

At the same time, shareholders of Greek or foreign shipping companies established in Greece are not subject to taxation for dividends and capital gains, deriving from their participation in these businesses.

Similarly, income derived by companies managing ships registered under Greek or foreign flag (provided that they are registered in the Seamen's Pension Fund) are exempt from all taxes, withholdings and any other obligation to the Greek state. Foreign companies that have vessels registered under foreign flag, whose management is entrusted to a Greek company or company office, are also excluded from any kind of profit taxation. Dividends distributed by these companies are exempt from income tax at the shareholder level. The same situation exists also in other countries within and outside the EU.

Text box: The example of tax calculation under tonnage tax in Europe

Consider as an example the case of taxation (both in the Greek and Dutch system) of an oceangoing ship 20.000 dwt, 5 years old, which operates the year round. The coefficients for the Greek tonnage tax listed in the following tables are derived from the tax return declaration for 2012 (Tax Ships), while the corresponding coefficients of the Dutch system are derived from European Commission document.

Greek tonnage tax

The following coefficients of capacity and age are used.

Scale of gross tonnage in metric tons	Coefficients	Age of the ship	USD per metric ton of gross tonnage
100-10,000	1.2	0-4	**0.382**
10,001-20,000	1.1	5-9	**0.684**
20,001-40,000	1	10-19	**0.670**
40,001-80,000	0.45	20-29	**0.634**
80,001 plus	0.2	30 plus	**0.490**

The taxable capacity of these ships are calculated using the following expression: 10.000 x 1.2 + 10.000 x 1.1 = 23.000.

Then, the total tax is calculated in the basis of the age: 23.000 x $ 0.684 = $ 15.732 or approximately € 12.000.

Dutch tonnage tax

The imputed profit that the same vessel would have under the Dutch tonnage tax system is calculated using the following table of coefficients:

Gross tonnage in metric tons	Coefficient
1-1,000	**€0.91**
1,001-10,000	**€0.67**
10,001-25,000	**€0.46**
25,001-40,000	**€0.23**
40,001-50,000	**€0.23**
50,001 plus	**€0.05**

Consequently, the imputed taxable profit is calculated as follows: 1 x € 9.10 + 9 x € 6.70 +10 x € 4.60 = € 115.4, for each day of operation of the ship, i.e. € 42.121 per year. A general corporate tax of 30% is levied on this amount, resulting in a tonnage tax payment of € 12.636, a level quite similar to that under the Greek tonnage tax system.

3.4 Summary

The contribution of shipping is quite significant as its absence would reduce notably the turnover of other sectors. The total recorded contribution of shipping to the Greek economy, based on the official data of the Hellenic Statistical Authority (ELSTAT) and once we take into account the multiplier effects as well, is estimated at €13 billion value added and 192,000 jobs (see Table 3.2).

Table 3.2: The total contribution of shipping to the Greek economy, 2009

€ in million	Direct Impact	Indirect Impact	Total Impact
Domestic Value Added	8,422	4,847	13,269
Labor income	732	1,949	2,681
Taxes	559	231	790
Employment (in thousands)	34	158	192

Source: ELSTAT, Eurostat, I/O model

Given the fact that only a part of the employment in the Greek-owned foreign flagged fleet is accounted to the country's economic aggregates, the contribution of shipping based on the official data is a subset of the potential (or possibly real) contribution of Greek shipping to the national economy.

3.5 Annex

Table 3.4: Number of seamen per vessel categories and nationality, 2008

Nationality of seamen	Cargo	Tankers	Tourist-Passenger	Other	Total
Total	**8,577**	**8,441**	**9,451**	**424**	**26,893**
Greek flag	***7,714***	***7,700***	***8,483***	***402***	**24,299**
Greek	3,488	3,494	7,395	402	**14,779**
Egyptian	32	0	105	0	**137**
Philippine	3,449	3,413	357	0	**7,219**
Pakistan	13	86	0	0	**99**
India	49	17	96	0	**162**
Sri Lanka	2	9	11	0	**22**
Chilean	10	0	0	0	**10**
Portugal	1	0	0	0	**1**
Honduran	35	96	5	0	**136**
Syrian	5	77	0	0	**82**
Cyprus	11	18	28	0	**57**
Ghanaian	10	0	1	0	**11**
Indonesia	91	0	84	0	**175**
Myanmar	36	0	45	0	**81**
Ukrainian	170	107	152	0	**429**
Other	312	383	204	0	**899**
Foreign flag	***863***	***741***	***968***	***22***	**2,594**
Greek	331	214	387	10	**942**
Egyptian	6	3	5	0	**14**
Philippine	427	458	138	11	**1,034**
Pakistan	12	0	0	0	**12**
India	0	0	133	0	**133**
Sri Lanka	0	0	0	0	**0**
Chilean	0	0	1	0	**1**
Portugal	0	0	3	0	**3**
Honduran	0	0	33	0	**33**
Syrian	0	1	0	0	**1**
Cyprus	0	0	2	0	**2**
Ghanaian	2	0	2	0	**4**
Myanmar	0	0	12	0	**12**
Ukrainian	22	28	61	1	**112**
Indonesia	0	0	62	0	**62**
Other	63	37	129	0	**229**

Source: ELSTAT

4. The potential contribution of Shipping to the Greek Economy

- ***We estimated the potential contribution of oceangoing shipping in the hypothetical scenario of attracting additional shipping activity of expatriate Greek and foreign shipping companies to Greece.***
- ***Our key assumptions:***
  - ***The offices located on Greek territory attract new activity to a level that is equal to the activity of Greek firms abroad.***
  - ***The domestic auxiliary sectors are able to meet the increased demand for goods and services.***
  - ***The productivity indices and input requirements of the Greek commercial shipping companies are equal to that of a sample of other European shipping economies.***
- ***The potential benefits for the Greek economy are very large:***
  - ***The total domestic added value of oceangoing shipping is expected to exceed €26 billion.***
  - ***More than half a million jobs in terms of total contribution to employment.***

4.1 Introduction

The estimation of the contribution of Greek-owned shipping, using the officially published data, highlighted the importance of the sector for the economy. However, some data characteristics and especially the unreasonably low employment on ships of foreign flag, suggest that the analysis based on the official data underestimates the real contribution of the sector to the extent that vessels not contracted with the Seamen's Pension Fund are being operated by shipping offices located in Greece.

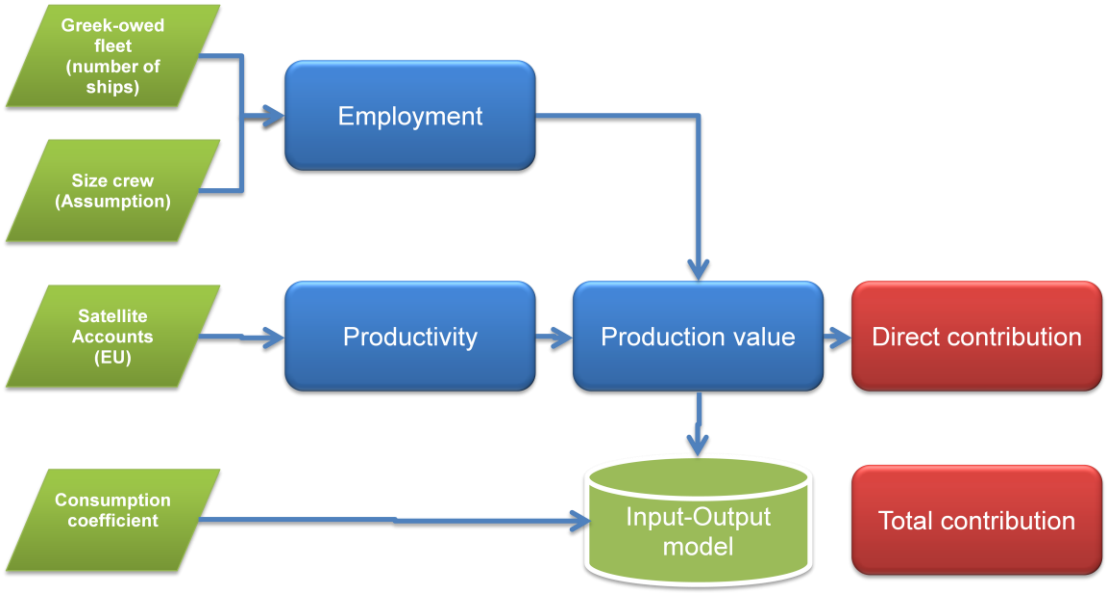
Moreover, part of the Greek fleet is managed by Greek-owned agencies located outside Greece. Under the appropriate conditions some of this activity could be undertaken from the offices located in Greece. The potential attraction of foreign shipping companies and offices to Greece (under conditions presented extensively in the last chapter of the present report) would further lead into an increase in the recorded exports of transport services, improve the balance of payments and increase the domestic activity of shipping firms in terms of domestic value added, employment and tax revenues.

4.2 Methodology / calculation estimates

Using the methodology described in the previous chapter, we assessed the contribution of the Water transport sector to the Greek economy and not the contribution of shipping per se. In the present chapter we isolate shipping from other activities that belong to the "maritime cluster" (such as coastal shipping). In order to do so, we use data on Greek-owned oceangoing shipping alone. As mentioned above, the publication of more detailed data would greatly assist in the more accurate determination of the contribution of oceangoing shipping to the Greek economy.

Given the limited data availability and the need to assess the potential contribution of the sector to the recovery of the Greek economy, we made a series of reasonable assumptions, in order to calculate the direct potential contribution of shipping. These data were fed into the input-output model (Figure 4.1) to determine the overall potential impact of the sector to the Greek economy.

Figure 4.1: Process of calculating the potential contribution of the oceangoing shipping in Greece



Source: IOBE

4.2.1 Determination of direct contribution

To assess the potential contribution of oceangoing shipping, we assumed that Greece will be able to attract activity of shipping offices located abroad, following an improvement of the current institutional framework and the setting up of modern infrastructure. The activity of the Greek-owned shipping offices located abroad is, in our view, a feasible level of expansion. Under this scenario, the total capacity of the fleet operated by offices on Greek territory would be equal to the overall Greek-owned fleet (all registries) managed both in Greece and internationally.

We then estimated the sector's production value based on the size of the potential fleet, with some specific assumptions for the crew size and for the average productivity. For the latter we used an average productivity index from a sample of European shipping economies. As seen in the third chapter, in 2010, only 52.5% of the Greek-owned fleet (approximately 1,974 oceangoing ships) were recorded by the Statistical Office to determine the employment in the sector. The total Greek-owned seagoing fleet (regardless of flag or management location) amounts to 3,760 vessels.[6] Assuming that 20 people man on average every oceangoing vessel, the direct employment exceeds 75,200 jobs, corresponding to 6.1% (3) of the total

[6] Clarkson Research Services, World Fleet Monitor, Vol. 3, No. 3, March 2012.

employment in the shipping sector worldwide. This estimation can be considered conservative, as it does not include the jobs in the management offices ashore.

Table 4.1: Production value and employment in maritime transports in a sample of 15 countries, 2009

	Production value (€ in mil.)	Employment (people)
Belgium	823	238
Germany	16,251	26,803
Spain	807	2,839
Italy	5,178	11,870
Latvia	43	455
Lithuania	148	1,602
Hungary	3	60
Netherlands	4,651	9,908
Portugal	354	694
Romany	70	807
Slovenia	49	195
Finland	1,401	3,793
Sweden	2,340	6,719
Norway	11,470	15,349
Croatia	249	753
Total	**43,837**	**82,085**

Source: Eurostat

To determine the production value of oceangoing shipping, based on the number of employees (ashore and at sea), we estimated the average productivity ratio of employees in the shipping sector using a sample of 15 countries that exhibited reliable data (Table 4.1). Specifically, we calculated a benchmark productivity index by dividing the total output of the reference countries (sum of production value of shipping of each country) with their total employment (sum of employment in shipping of each country).

The production value of shipping in our sample of countries, exceeds €43,8 billion through the employment of 82,085 people, resulting in an average productivity of around €534 thousand per person. Here, it should be noted that countries with significant production value (i.e. Greece, Denmark, United Kingdom, France, etc.) are missing from our sample due to lack of data solely for shipping. The potential production value of oceangoing shipping that would be managed by shipping offices in Greece was estimated by multiplying the employment calculated previously with the benchmark productivity index. In this way, the potential production value was calculated at €40,2 billion (€534 thousand per person by 75,200 employees).

Assuming a constant proportion to the production value, we then calculated value added and other key figures (direct contribution to the economy), while the external shock from the increase of the final demand, needed to estimate the indirect contribution to the economy was also estimated.

4.2.2 Determining indirect contribution

In the input-output tables published for Greece, the data refer to water transport, not to the oceangoing shipping per se. By inserting the additional production value (resulting from the potential additional attraction of shipping activity from abroad in Greece) in the existing input-output tables we risk creating a distortion, since some sectors that offer services mainly to coastal shipping would receive an unjustified boost (i.e. travel agencies).

To determine the inputs that are needed to meet the newly introduced demand, we used the production coefficients of Germany provided by Eurostat, since Germany holds a considerable fleet of oceangoing shipping while the participation of coastal shipping into the local maritime cluster is limited. Attracting more maritime activities in Greece is expected in the short run to enhance the existing shipping cluster as the additional demand will boost further the maritime entrepreneurship. Still, it is not reasonable to assume that the Greek economy will be able to serve the entire demand of oceangoing shipping inputs, thus we took into account the import content of each sector's supply.

4.3 Potential contribution of oceangoing shipping

Using the above mentioned estimates and the input-output model (the methodology of which is described thoroughly in Chapter 3) we calculated the potential effect of the oceangoing shipping industry on the Greek economy, in terms of employment, value added, taxes and more.

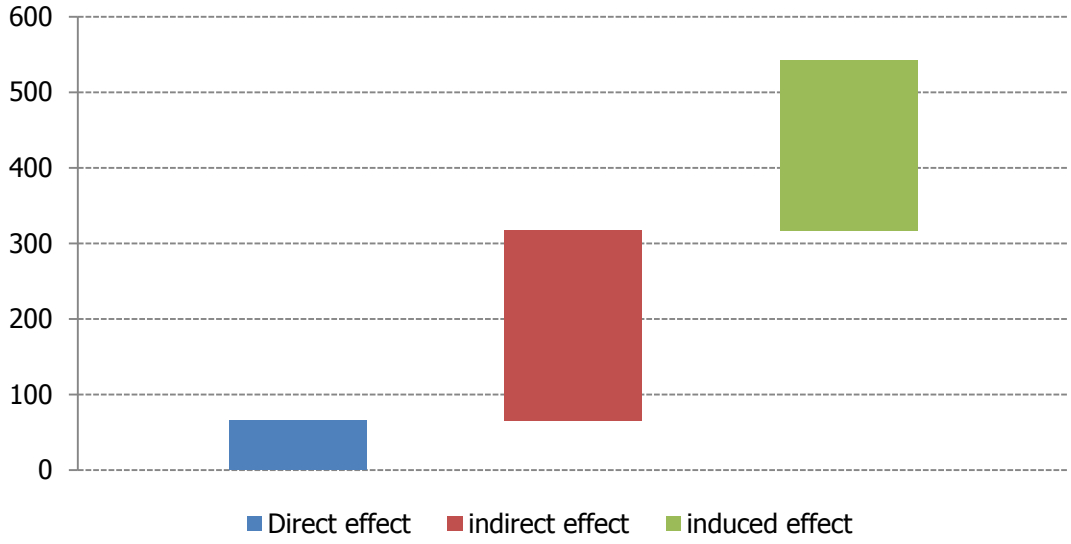
4.4 Employment

As already mentioned, the potential employment in shipping is estimated at around 75,200 people. It should be noted, however, that, as in the case of the officially recorded employment data, the above mentioned figure includes Greek and foreign seafarers.

Indirect employment refers to the number of people who serve the potential demand for inputs to the oceangoing shipping activity. The input-output model provides an estimate of the indirect employment in the sector to the amount of 251 thousand

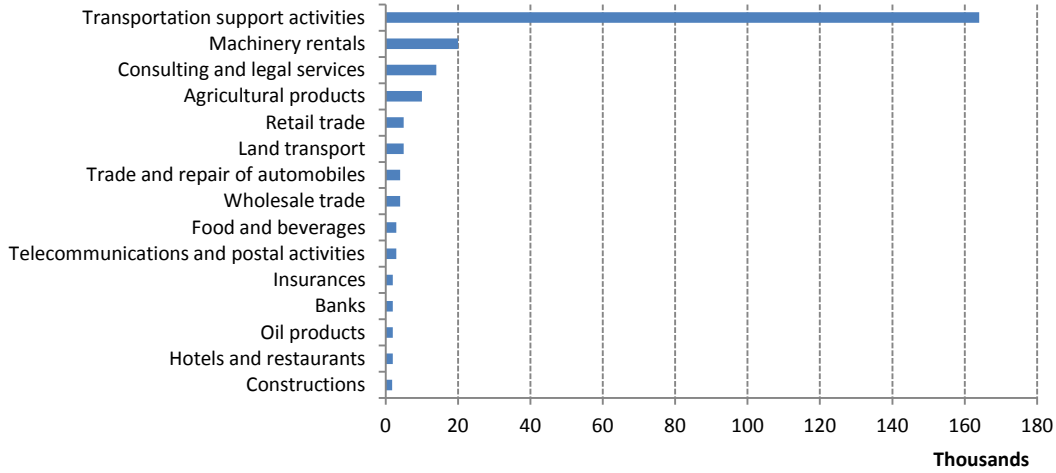
people, while the induced impact (from higher labor income along the supply chain) is estimated at 225 thousand additional jobs (Figure 4.2). In total, employment in both the 'augmented' oceangoing shipping, the enhanced maritime cluster and the sectors involved though consumption demand would exceed 552 thousand jobs.

Figure 4.2: The potential contribution of oceangoing shipping to employment



Source: I/O model, IOBE

Figure 4.3: Indirect effect to employment by oceangoing shipping

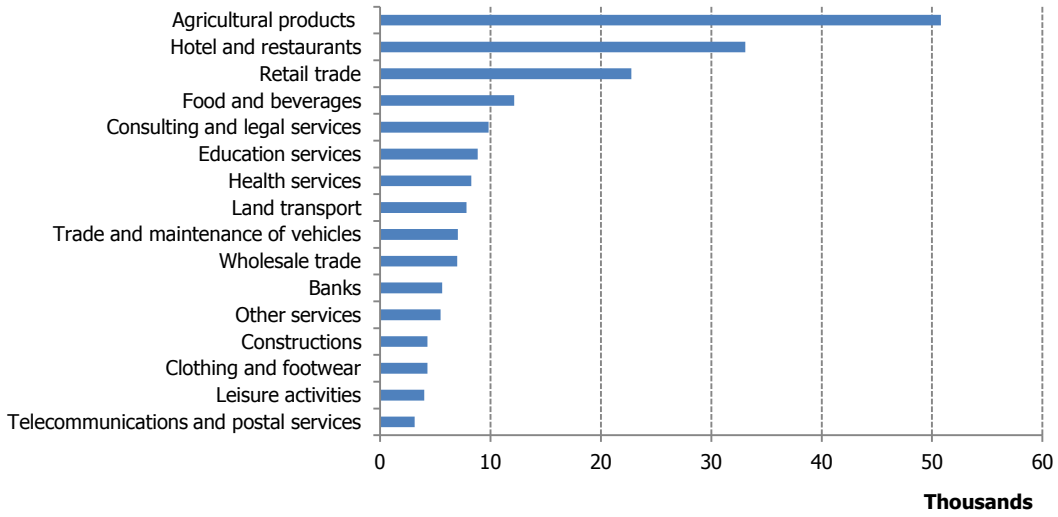


Source: I/O model, IOBE

As expected, the sectors directly related to the operation of oceangoing shipping experience the largest boost of indirect employment (Figure 4.3). The auxiliary to transport activities experience a significant boost of 164 thousand jobs, the benefit for the rental and leasing activities exceeds 20 thousand jobs, while consulting and legal services enjoy a benefit of 14 thousand jobs. The sector of petroleum products, although directly related to the operation of shipping ranks significantly lower (2.3

thousand jobs). Similarly in the banking sector, the potential level of oceangoing shipping is expected to affect indirect employment to a smaller extent (2.3 thousand jobs). This estimate can be even smaller, considering the fact that funding (newbuilding orders, maintenance etc.) is covered mostly by foreign banks.

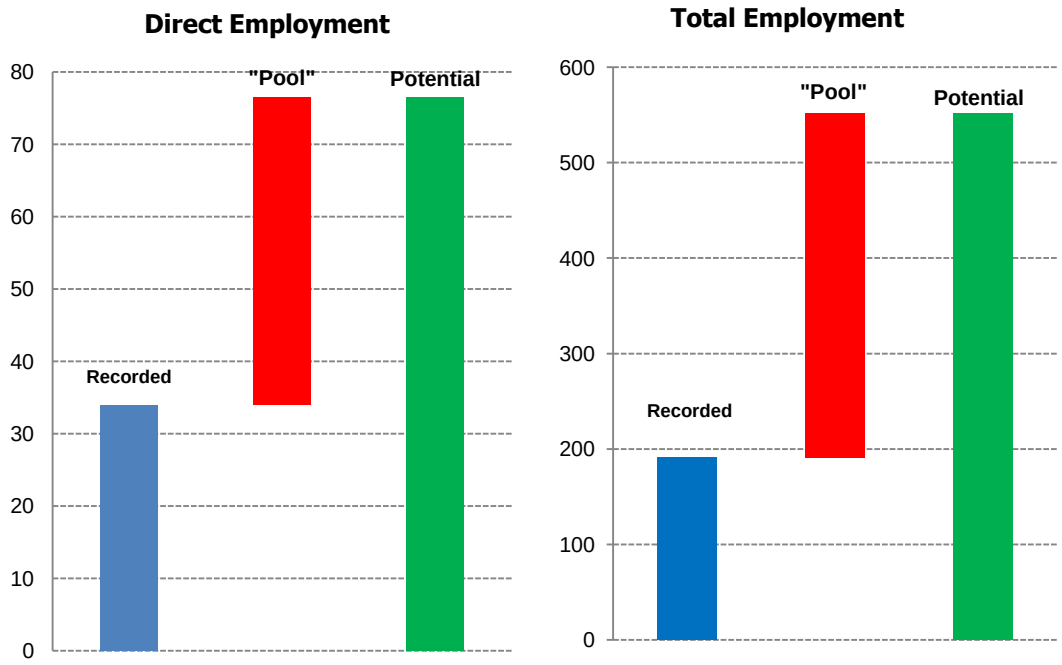
Figure 4.4: Induced effect to employment by oceangoing shipping



Source: I/O model, IOBE

The direct and indirect jobs mentioned above generate more income to spend on commodities (see Figure 4.4). The sectors that are not directly related to the demand of shipping but relate mostly to sectors that serve the needs of everyday life (e.g. agricultural products, food products, clothing etc) are thus mostly affected by the induced effects. Indeed, the sector of agricultural products ranks first with 51 thousand jobs while the sectors that follow are those of hotels and restaurants (33.1 thousand), retail trade (23 thousand) and food and beverages (12.1 thousand).

Figure 4.5: Comparison of recorded and potential contribution to employment



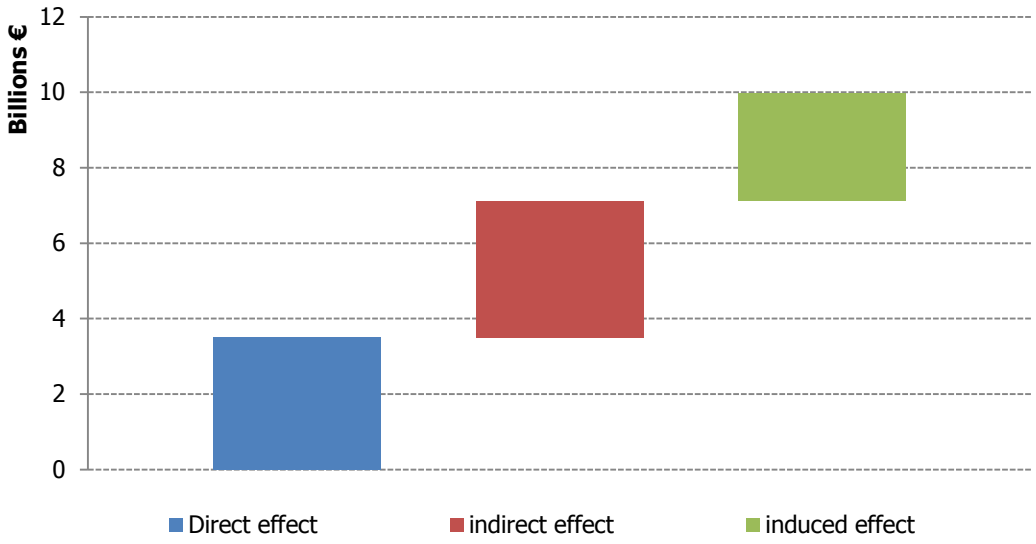
Source: I/O model, IOBE

Comparing the potential with the recorded contribution, the direct employment in the transport sector is increased by 41,200 jobs, while the "pool" of available jobs in the whole economy is approximately 360,000 people (Figure 4.5). Since more than 1,025,877 people were unemployed during the fourth quarter of 2011 and assuming that the above job positions are covered by people who are counted in the domestic employment data, the expansion of maritime activity in Greece may reduce unemployment by almost 36.1% of total unemployment. Considering the need for new employees in oceangoing shipping, without necessarily having higher education, the additional positions in the sector can contribute in improving significantly the employment prospects of young people less than 29 years old, an age segment where unemployment exceeded 39.5% during the fourth quarter of 2011.

4.4.1 Income from employment

The impact on income from employment is of great importance because of the higher final demand that the shipping is expected to generate. Indeed, the potential total income from employment in the sector exceeds €9,9 billion, 35.1% of which is attributed to salaries in the maritime sector. The remainder refers to indirect and induced effects (Figure 4.6).

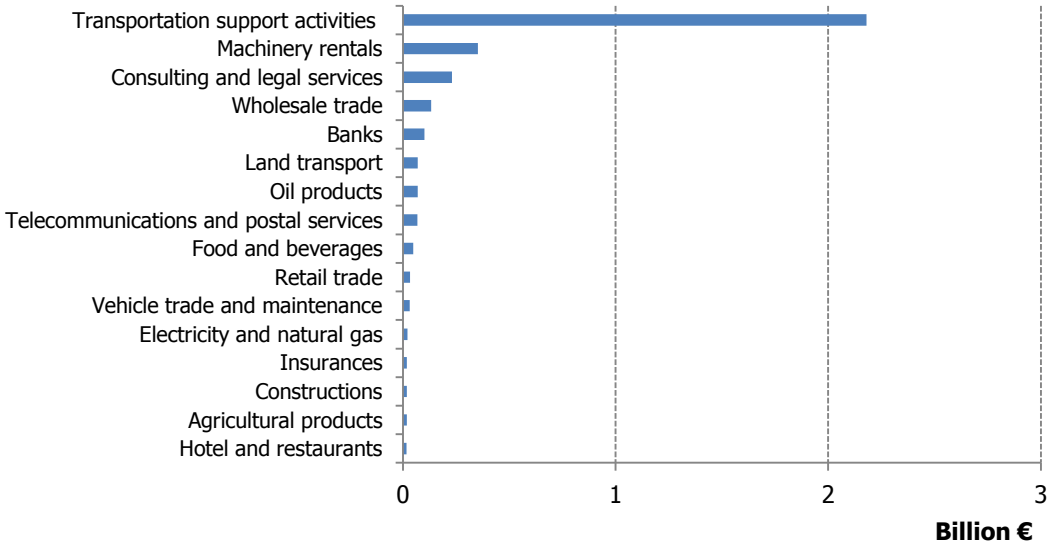
Figure 4.6: Oceangoing shipping's contribution to disposable income



Source: I/O model, IOBE

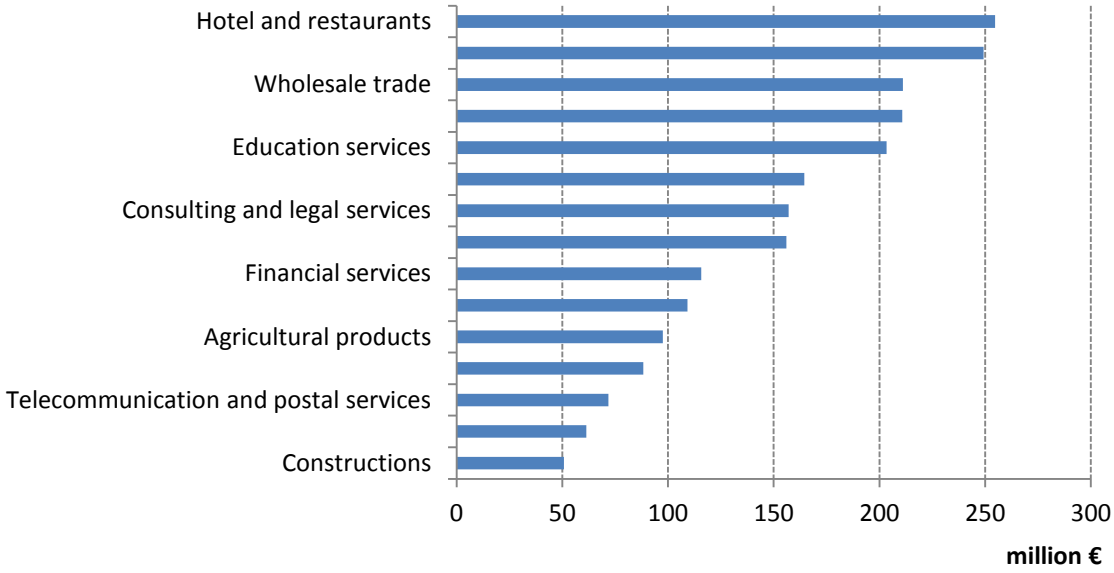
The sectors whose income is indirectly affected are those that serve the shipping demand (auxiliary to transport activities, wholesale trade, banks and other-seeFigure 4.7), while the sectors associated with the overall service of the Greek society are presented in the analysis of induced effects (see Figure 4.8).

Figure 4.7: The potential indirect effect of oceangoing shipping to the disposable income



Source: I/O model, IOBE

Figure 4.8: The potential effect of oceangoing shipping in the generation of income



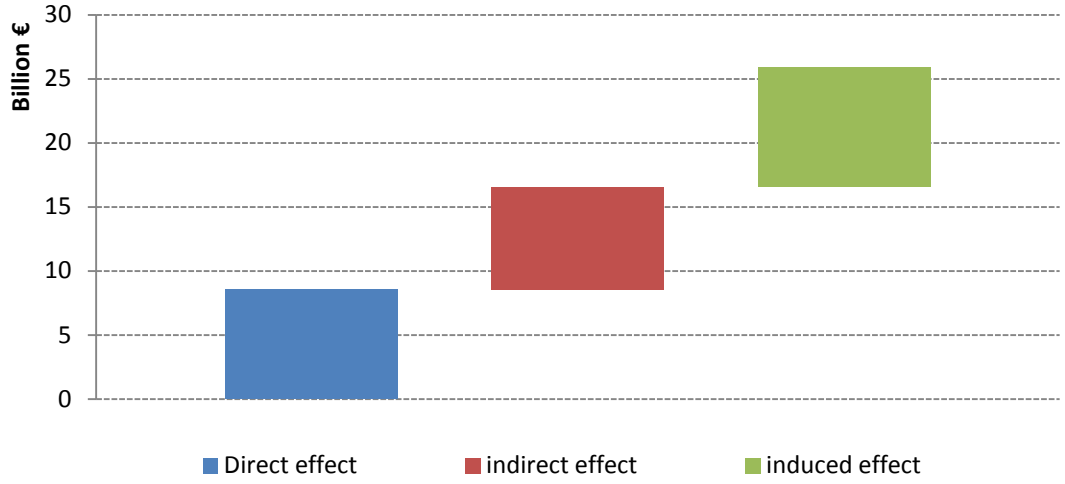
Source: I/O model, IOBE

4.4.2 Value added

The estimated inputs for covering the demand of the extended services of oceangoing shipping are estimated at €29 billion, 43.3% of which are covered domestically. Taking under consideration the tax of 8.9%[7] on the above products, the intermediate consumption of the sector is estimated at around €31.6 billion. Excluding the intermediate consumption from the production value (€40.1 billion), the potential direct value added is estimated at €8.6 billion and represents 3.9% of the total GDP[8] of the country in 2011.

[7] This tax rate appears to sector consumptions in Greek input-output tables
[8] ELSTAT data

Figure 4.9: The potential effect of oceangoing shipping in GVA

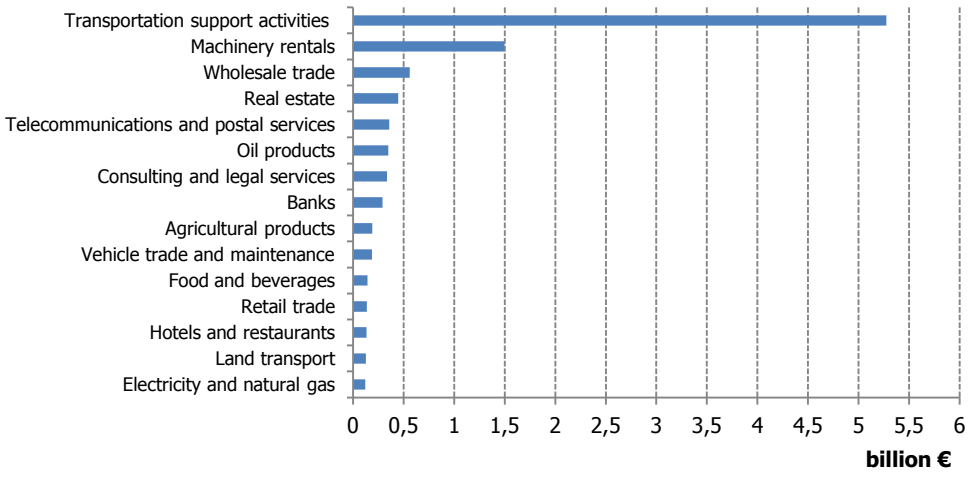


Source: I/O model, IOBE

Taking into account the interactions of the sectors of the Greek economy by using the input-output model, the total added value created by the industry exceeds €25,9 billion, 30.9% of which results from the indirect effect, while 36.0% is accredited to induced effects (Figure 4.9).

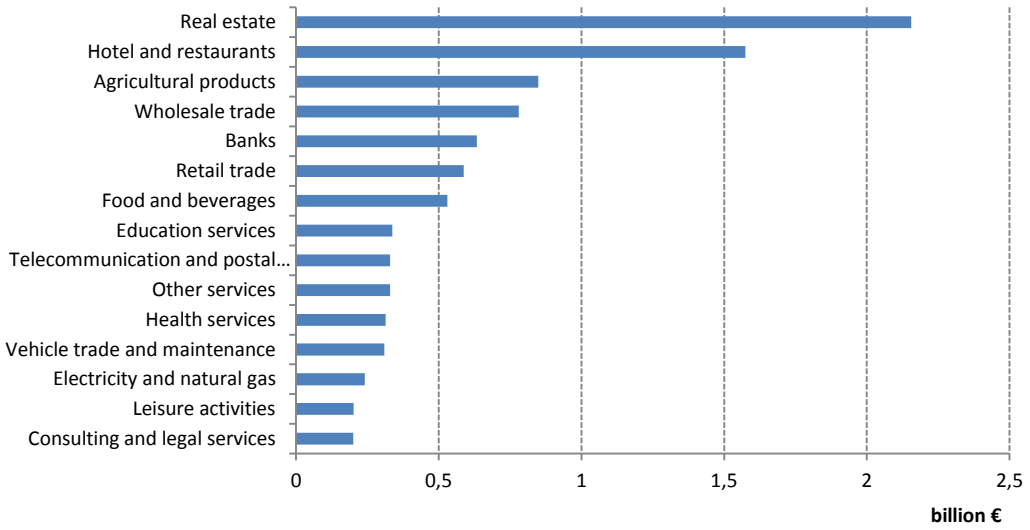
As in the case of employment, the sectors affected indirectly are those that primarily serve shipping's demand. The value added of the auxiliary services to transport services (€3.9 billion) and the renting of machinery is boosted very strongly as a result of the increased shipping demand. On the other hand, the real estate sector exhibits a relatively modest development (€332 million -Figure 4.10).

Figure 4.10: The potential effect of oceangoing shipping to GVA of the Greek economy (indirect effect)



Source: I/O model, IOBE

Figure 4.11: The potential effect of oceangoing shipping to GVA of the Greek economy (induced effect)

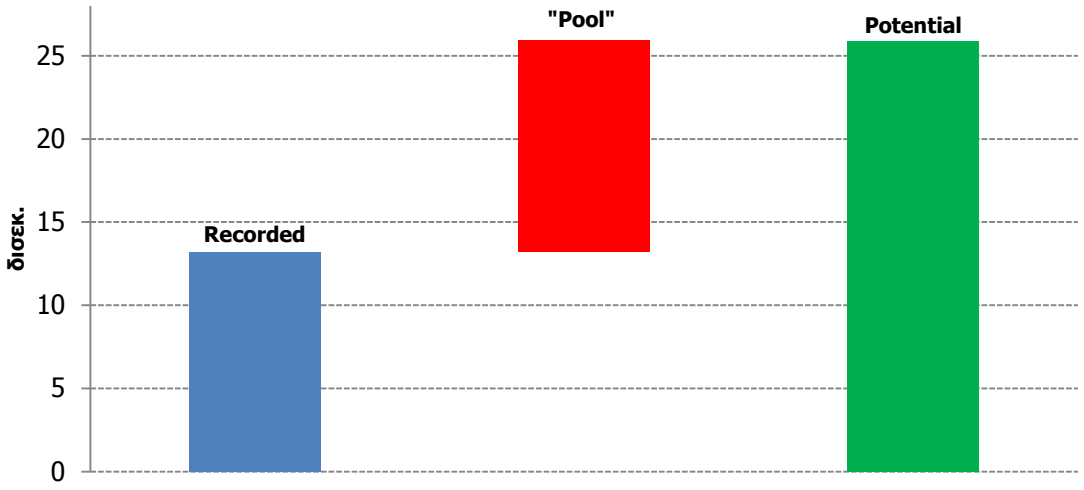


Source: I/O model, IOBE

The link between oceangoing shipping and durable goods markets is more evident in the induced impact. In particular, the real estate sector ranks first in terms of value added (€1,9 billion) and is followed by hotels and restaurants (€1,3 billion), agriculture (€720 million) and banks (€537 million). On the other hand, a weaker boost is experienced in sectors such as foods and beverages (€450 million), educational services (€286 million), sport and leisure activities (€172 million) and finally consulting services (€170 million). It is evident that these estimates largely reflect the Greek consumption patterns (Figure 4.11).

Comparing the recorded to the potential value added, we observe a rather insignificant difference (€140,9 million). In contrast, there is a notable difference between the recorded indirect and induced value added and the corresponding potential. Here, the incremental value added to the Greek economy by attracting more shipping offices and companies in Greece and the generic enhancement of the maritime cluster, extends to €12,7 billion, which represents an additional GDP of 5.8% per annum (Figure 4.12).

Figure 4.12: Comparison of recorded/potential contribution to GVA



Source: I/O model, IOBE

4.4.3 Contribution to taxes

The estimation of the potential contribution of the sector to state taxes is of great interest. According to the input-output model estimations and by assuming an average tax rate on production value of around 3% (a number that results from the officially published ESA tables), the direct potential contribution of the oceangoing shipping to the state taxes is estimated at around €1.2 billion, while the total contribution (direct, indirect and induced) exceeds €1.9 billion.

4.5 Summary

The input-output model demonstrates the significant potential impact of expanding the oceangoing shipping on all sectors of the Greek economy. The overall results of the model are summarized in the following table.

million €	Direct	Indirect	Total
GVA	8.563	17.314	25.877
Labour income	3.506	6.472	9.978
Contribution in taxes	1.205	723	1.928
Employment (in thousands)	75	477	552

4.6 Annex

Table 4.2: Potential Inputs of Ocean-Going Shipping

Consumption in € mil.	Total	Imports	Domestic Production
Travel agencies and alternative transport	21,184	14,834	6,350
Rental equipment	2,261	312	1,949
Petroleum products	2,223	545	1,678
Maritime transport	1,501	283	1,218
Wholesale trade	483	-	483
Food, beverages	312	59	253
Machinery and equipment	308	265	43
Banks	143	9	135
Agriculture	79	9	70
Other business services	66	4	62
Precision devices (optical, medical)	61	50	11
Post and telecommunication	58	3	55
Insurance	56	11	45
Retail trade	41	-	41
Metal products	36	6	31
Chemical products	35	27	8
Public administration services	30	-	30
Other transport equipment	25	14	10
IT Services	20	2	18
Prints	18	2	17
Real estate	18	0	18
Educational Services	16	-	16
Electrical energy	10	0	10
Constructions	10	0	10
Fabrics	7	4	3
Papers	7	4	3
Fishing	3	0	3
Clothing	2	1	1
Electrical appliances	2	1	1
Collection, processing and distribution of water	2	0	2
Hotels and restaurants	2	0	1
Waste management services	2	0	2
Member services	2	0	2
Other services	2	0	2
Total	**29,022**	**16,443**	**12,579**

Source: IOBE estimates

5. Policy proposals

- ***The potential benefits and the maintenance of the current contribution of the oceangoing shipping require immediate state actions.***
- ***Suggestions for a boost of the satisfaction of the oceangoing shipping's demand for inputs from domestic sources:***
  - ***Remove barriers for entrepreneurship***
  - ***Block all special sector protections / barriers (e.g. shipyards)***
  - ***Improve competitiveness of the connected sectors***
  - ***Improve infrastructure***
- ***Invest in the establishment of a large "pool" of educated Greek seafarers:***
  - ***Provide a solid linkage of the schools with the business environment***
  - ***Enhance the image of the sector in order to attract new seafarers***
  - ***Update the study curriculum of shipping universities***
  - ***Track the best available practices in economies with enhanced maritime training (e.g. Denmark, UK).***
  - ***Exploit the opportunity of the current crisis to attract young people to the shipping sector.***
- ***Creating incentives to attract shipping activity from abroad:***
  - ***Create a Shipping Centre***
  - ***Insulate the country's maritime policy from the political cycle***
  - ***Create a strategic plan for maritime entrepreneurship***
  - ***Consider the best available policies applied in other maritime economies***
- ***In order to transform Greece into an attraction pole of foreign capital, it is vital to achieve a more sustainable economic and business environment.***

5.1 Summary of findings

The Greek-owned oceangoing shipping remains highly competitive even during the period of global recession, since Greek shipowners control more than 15% of the world fleet. The sector demonstrates its ability to adapt to constantly changing and demanding conditions, something which is reflected also in the investment for newbuildings, which exceeded $13 billion in 2011. However, even according to the most optimistic analysts a strong recovery of the shipping sector is not expected to occur for three more years, at least.

The benefits for the Greek economy from the oceangoing shipping sector are several. The recorded total contribution of oceangoing shipping to the economy is substantial, as according to official data, it amounts to €13 billion in value added and to 192,000 jobs.

The potential benefits for the Greek economy, in the hypothetical scenario of attracting more shipping management activities (even foreign owned) domestically, are even bigger. The total potential added value that the sector can generate exceeds €25.9 billion, while the potential employment in the oceangoing shipping and in the sectors that are indirectly involved with shipping's demand is estimated at around 550 thousand jobs.

5.2 Policy recommendations

Evidently, the main goal is to attract as many shipping companies and offices in Greece as possible, so as to foster as much as possible the Greek economy not only at the time of the deepening crisis, but also over the long term. For the latter to be accomplished, the creation of a specific strategic policy framework in Greece is required, according to which the shipping sector will operate competitively in the international business environment without further obstacles.

5.2.1 Create incentives for attracting shipowners

Attracting more shipowners in the Greek market demands (like any other capital investment) political and economic stability. Additionally, it is necessary to amend the shipping policy, so as to ensure its independency from the political cycle of changes in government.

Through more detailed studies the best available international practices can be adopted to the unique Greek environment, in order to create a broader strategic plan boosting the maritime entrepreneurship and overall the oceangoing shipping sector in the country.

Attracting funds from abroad through the relocation of shipping agencies (and shipping activities in general) in the country is expected to have enormous beneficial prospects. As the lookout for a model of sustainable and fair development of the Greek economy is one of the greatest challenges of today, opportunities such as those offered by the further development of the domestic shipping activity should be of high priority.

5.2.2 Meeting the demand for shipping's inputs domestically

Maximization of the contribution of the sector to the Greek economy can be achieved by meeting the shipping demand from domestic sources by strengthening the domestic ecosystem that supports shipping. In this way, the outflow of funds generated by shipping will be reduced significantly. Consequently, innovative systems and processes are required. These could provide competitive products and services, free from any protections and obstacles that currently prevail in the model of the Greek economy. One indicative example, could be the modernization of the shipbuilding/repairing services that will lead (among others) to the generation of a significant number of employment positions in the Greek economy as a result of the increased demand by Greek and foreign shipping companies.

5.2.3 Invest in the establishment of a significant "pool" of educated Greek seafarers

The existence of a significant pool of young educated Greek seafarers is a vital precondition for attracting more shipping companies in Greece. According to the ELSTAT data, presented in the second chapter of the report, the entry of young educated Greek seamen to the sector has fallen significantly over the past decades. The candidates that are admitted in the maritime faculties annually do not exceed 1,350 people (on average), while there are no data regarding success rates and graduation.

Text Box: The impact of the reduced entry of young seafarers in the shipping sector

The lack of adequate skilled workforce for the merchant fleet is expected to create many problems in the future. First of all, the decrease in recruitment of seafarers leads to a reduction of the Seamen's Pension Fund's revenues from contributions, thus, it is unable to cover its costs (e.g. pensions, hospitalization expenses, etc.).

The shipping offices are expected to face significant problems that will arise because of their inability to meet their vacancies with experienced seafarers (for the management, chartering and technical departments). As a result, they will be forced to relocate in countries where the supply of skilled labor is increased. This will have as a result further losses for the Greek economy.

Numerous problems in the available logistical infrastructure of the faculties, shortages in teaching staff (the majority of the faculties operate with temporary staff) and the lack of interconnection between the schools and the market make the option of maritime education less attractive. Thus, the shipping companies turn to foreigners, even for the positions that require special expertise, in order to meet the demand for ships.

Countries with much lower contribution to global shipping have invested significant funds in education, creating a solid foundation for the future development of the industry. Particularly, the implementation of a strategic education plan in the United Kingdom doubled the young candidates who chose the maritime faculties between 2000-2012.

In Denmark, captains and engineers with at least ten years of experience have the opportunity to register in Danish universities for free, following relevant studies.

It is generally accepted that in order to provide the young candidates with a maritime frame of mind as they enter a relevant faculty, the creation of a specific action framework by the State and the Greek shipping sector, is essential. (8):

- Enhance the image of shipping–and develop its social importance through actions that improve the social profile of the industry.

- Promote the principles and objectives of the Greek-owned oceangoing shipping, while emphasizing respect towards the human capital and the seafarers onboard.
- Develop further synergies between the schools and the various shipping companies, with the intention of placing the trainees in active ships for internships. By doing so, the trainees will come in contact with the real demands of the profession, but also potentially with their future employers.
- Promote life-long learning so as to achieve maximum productivity and a safe / smooth transition of seafarers to the offices.
- Adopt modern techniques for the human resource management in order to understand the requirements and the needs of the seafarers.
- Create a more favorable system of income taxation of the seafarers.

5.2.4 Development and promotion of the Attica marine center

The above mentioned proposals require strong steps towards a new competitive shipping policy. The creation of an international shipping center developed in Attica could contribute significantly in the above direction. The concentration of all services in the wider area of Piraeus, for example, would turn the region into a center of shipping entrepreneurship with many benefits not only for the Greek economy, but also for the sector itself. These benefits have been presented extensively in the fourth chapter.

The important prerequisites for the further development of the area as a shipping center were already mentioned and concern both the training of seafarers (marine academy) and the development of new staff in the industry. The graduates of these (and other) institutions will also benefit, since the growth in maritime entrepreneurship will greatly boost their absorption into the labor market.

Moreover, attracting shipping services in Piraeus and the wider Attica region is expected to enhance the wider maritime cluster, as it will increase the demand for services related to the shipping sector. The establishment of more shipping companies in the region will significantly improve the turnover of the construction sector and the real estate industry in general (through transactions, rents, etc.).

The advantages of developing a shipping center have already been reflected in developed shipping nations such as Singapore. The port state authority of Singapore

was founded in 1996 in order to transform the port into an international shipping center through a "maritime services ecosystem ". In order to attract companies and shipowners in the country, the state itself, provides clear and friendly business institutional framework, access to an efficient justice system and commitments relating to good governance policy. Furthermore an attractive tax regime fosters further the business environment. The higher maritime training institutes provide an adequate number of trained seafarers and managers, available both to the fleet and to the offices on land. Furthermore, there is a significant number of programs that aim to provide consulting services to small and medium sized enterprises, while finally there are significant financial incentives to enhance maritime innovation at every level (education, businesses).

5.2.5 Indicative timetable

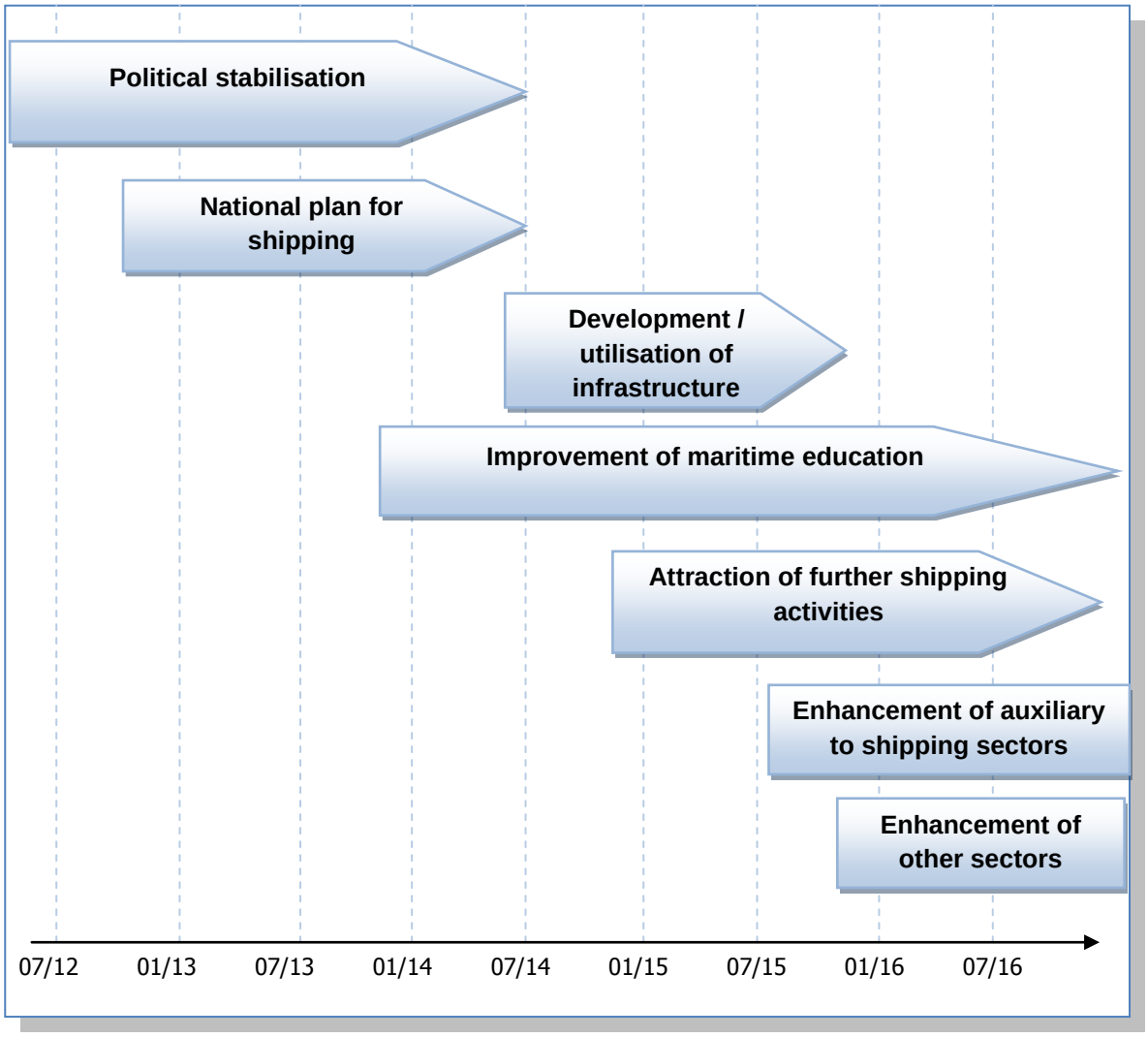
The potential benefits from bringing shipping activity to the Greek territory are very important, but the success depends on many factors and policy measures, as recorded above. This raises the obvious question of when can we expect the materialization of this benefit. Obviously, if the political and socioeconomic situation in the country remains unstable, we cannot expect to attract funds, Greek or not, to the domestic economy. Similarly, a negative change in the available tax regime will not contribute in attracting international shipping – on the contrary it may lead to migration in the opposite direction with Greek management emigrating abroad.

However, in a more favorable development, the benefits from attracting further shipping funds may be visualized even within a time horizon of three years (Figure 5.1). This requires stabilization of the political situation over the next two years. Meanwhile, the adoption of a strategic development plan for oceangoing shipping in Greece is required. The stability of a favorable institutional framework will push the development of the infrastructure needed so as to transform Attica into one of the strongest shipping centers worldwide. At the same time procedures to strengthen the maritime training are essential.

Under these conditions, favorable conditions for attracting additional shipping activities may occur even towards the end of 2014. Given the time required for the rest of the economy to adapt, the first tangible results in terms of value added and employment could occur from mid 2015, increasing gradually overtime.

The reinforcement of a healthy entrepreneurship through a strategic policy framework, such as described above, will create considerable prospects for the development of the overall maritime cluster. Consequently, the competitiveness of the sectors (operation, maintenance, shipbuilding and so on) in the global market will be enhanced, thus, attracting shipping companies of foreign interests, with huge potential benefits for the Greek economy.

Figure 5.1: Indicative timetable for the development of shipping policies



References

1. **OECD.** *Transport Outlook-Meeting the Needs of 9 Billion People.* s.l. : OECD/ITF, 2011.

2. **Drewry Maritime Research.** *Dry Bulk Insight.* London : s.n., 2012. 96.

3. **Clarkson Research Services Limited.** *World Fleet Monitor.* 2012. ISSN 2042-0633.

4. **Petrofin Research.** *2011 Greek Fleet Statistics.* s.l. : Petrofin Research .

5. **Moore Stephens.** *Shipping Confidence Survey.* Μάρτιος 2012.

6. **Nijdam, Michiel and Van Der Horst, Martijn.** *The Economic Effects of Shipping Policy.* s.l. : Erasmus University Rotterdam, 2006.

7. **Institute of Shipping Economics and Logistics (ISL).** *Shipping Statistics and Market Review.* Bremen : Institute of Shipping Economics and Logistics (ISL), 2010.

8. *Challenge to the industry, Securing skilled crews in today's marketplace.* s.l. : Deloitte, 2011.

9. **Weber, Tina and Nevala, Anne-Marie.** *Employment trends in all sectors related to the sea or using sea resources.* Birmingham : DG Fisheries and Maritime Affairs, European Commission, 2006.

10. *Shipping in the future.* **George, Cambanis.** Athens : World Shipping Congress, 2012.

11. **Center, Maritime Knowledge.** *International Shipping Facts and Figures - Information Resources on Trade, Safety, Security and the Environment.* s.l. : International Maritime Organization, 2011.

12. Express. 8/12/11, Piraeus: s.n., 2011.

13. *Review of Maritime Transport 2010.* New York and Geneva : United Nations , 2010.

14. **Price Waterhouse Coopers.** *Choosing a profitable course around the globe, corporate taxation of the global shipping industry.*