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SOCIO-ECONOMIC CHANGES IN ADVANCED SOCIETIES

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3 (2016)

Published by

Laboratory of Land Use Mobility and Environment
DICEA - Department of Civil, Architectural and Environmental Engineering
University of Naples "Federico II"

TeMA is realized by CAB - Center for Libraries at "Federico II" University of Naples using Open Journal System

Editor-in-chief: Rocco Papa
print ISSN 1970-9889 | on line ISSN 1970-9870
Licence: Cancelleria del Tribunale di Napoli, n° 6 of 29/01/2008

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Cover Image: The High Line, New York.

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TeMA

Journal of
Land Use, Mobility and Environment

TeMA 3 (2016) 269-286
print ISSN 1970-9889, e- ISSN 1970-9870
doi: 10.6092/1970-9870/3945

review paper received 14 June 2016, accepted 01 December 2016
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www.tema.unina.it

How to cite item in APA format:

Stamos, I., Mitsakis, E., Tsekeris, T. (2016). Harnessing the opportunities of austerity: a detailed mapping of the Greek transportation sector. *Tema. Journal of Land Use, Mobility and Environment*, 9 (3), 269-286. doi: <http://dx.doi.org/10.6092/1970-9870/3945>



HARNESSING THE OPPORTUNITIES OF AUSTERITY:

A DETAILED MAPPING OF THE
GREEK TRANSPORTATION SECTOR

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ABSTRACT

Since 2009, shortly after the global economic crisis of 2008, Greece has entered into a deep recession phase. The multifaceted presence of austerity is experienced in an increasing number of sectors of the country. The Greek transportation sector is not immune to this state of affairs. The ongoing crisis has had a significant impact on its economic (investment, employment, exports-imports turnover) as well as its operational (transportation intensity, throughput, performance) aspects and capabilities. In this paper, a detailed mapping of these impacts is presented, correlating transport-related characteristics, trends and estimations with the respective economic ones. The paper presents analyses of the Greek passenger and freight transportation sectors, following a data-driven approach. Findings show a substantial decrease of activities overall. Paradoxically, however, austerity can also be said to offer opportunities, such as the development of innovative, cost-effective and outward-looking business schemes, for handling transportation-related issues. In the face of these opportunities, authorities and stakeholders have recently turned their attention to ways of harnessing them as they may arise. The paper conducts a detailed analysis of these efforts to discover prospects for development in the midst of austerity, and highlights the steps currently being taken in this direction.

KEYWORDS:

Austerity, economic crisis, Greek economy, transportation sector

TeMA

有关土地使用、交通和环境的杂志

TeMA 3 (2016) 269-286
print ISSN 1970-9889, e- ISSN 1970-9870
doi: 10.6092/1970-9870/3945

review paper received 14 June 2016, accepted 01 December 2016
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www.tema.unina.it

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利用紧缩机会： 希腊运输部门详细映射

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摘要

2008年全球经济危机发生后不久，2009年起，希腊就进入了深度衰退阶段。其国内越来越多部门经历着这一多面向的紧缩。希腊运输部门也未能免受其扰。这一持续发酵的危机对其经济（投资、就业、进出口成交量）及其社会运转（运输强度、生产量、绩效等）方面以及国家实力有着重大影响。本文将一一列举这些影响的具体表现，将运输相关特征、趋势和评估与各自经济方面特征、趋势和评估进行关联。本文在多个方面运用数据驱动的方法，然后具体分析希腊客货运输。结果表明，活动整体大幅度下滑。而矛盾在于，经济紧缩也可以说为解决运输相关问题提供了机会，如创新、成本高效和外向型商业体系。面临这些机遇，当局和利益相关者近来将注意转向如何在发展的同时有效控制它们。本文详细分析这些为在经济紧缩状态下寻求发展前景所做的尝试，强调近来在此方向采取的措施。

关键词：

紧缩，经济危机，希腊经济，运输部门

1 INTRODUCTION

Mediterranean economies, and consequently their societies too, are growingly experiencing the impacts of the ongoing economic recession. Greece, a protagonist of this global crisis, is only now starting to crawl back into development. Having only signed its first International Monetary Fund (IMF), European Commission (EC) and European Central Bank (ECB) Memorandum in the dawn of the current decade, and unlike other European member states, which are either exiting or nearing an exit from such commitments, Greece is still trying to achieve an economic recovery.

This multifaceted presence of austerity has not left the transportation sector uninfluenced. Various economic aspects of the sector have been lately stagnating due to the lack of influx of resources, while others owing to the chain-effect often experience such conditions: as transportation (and in this sense, mobility too) is more of a means to an end, rather than an end in itself, it is unavoidably subject to recession-related impacts originating from other economic fields.

Motivated by a series of recent scientific publications (Schneider et al., 2010; Tsekeris, 2013; Ferreira and Couto, 2015), the objective of this paper is to explicitly map the impacts of the currently ongoing austerity on transportation-related activities in Greece, by correlating transportation and mobility characteristics, trends and estimations, with the respective economic ones. Furthermore, it aims to identify the aspects of the economic crisis that have positively affected mobility in Greece, both at the urban and regional level, and the economic opportunities that have arisen via the transportation sector during the recession period. The paper initially presents the results of a detailed literature review, in order to form a consolidated knowledge base on how the economic recession has overall affected Greece, by analyzing key indicators, such as un/employment rates, GDP fluctuations and tourist sector activities. With this in mind, the paper attempts to frame the austerity picture in the Greek transportation sector by laying out an in-depth analysis of qualitative and quantitative related indexes, which it then discusses. From this analysis, the paper draws a number of conclusions on the crisis' overall impact on the field of transportation.

The remainder of the paper is organized as follows: Section 2 presents the Greek economic crisis in numbers, followed by Section 3 that reviews pertinent sources on transportation-related characteristics influenced by the economic recession. Section 4 discusses potential positive prospects following from these conditions and Section 5 concludes on the conducted research and proposes future research directions.

2 DATA ON THE GREEK ECONOMIC CRISIS

The Greek economic system has experienced a series of fluctuations in the last decade, yet the country has reached the brink of bankruptcy on numerous occasions. The effects of the economic recession are strongly reflected in all related figures and indicators published by national public sources, as well as private organizations and respective working groups. Indicatively, data regarding the Greek Gross Domestic Product (GDP) and the national debt and deficit evolution since 1963, depicted in Figure 1, map the situation as it currently stands. The GDP shows a declining tendency from 2009 onwards, while public debt (as a percentage of GDP), after 2011, shows a significant reduction. However, according to financial data of 2014 (Trading Economics, 2014), this reduction does not last long, as there is an upward trend until today. Concerning the trend analysis of the deficit (as a percentage of GDP), there was a negligible deficit for Greece until the late 1980s, which has since been primarily tending upwards (World Bank, 2014; ELSTAT, 2014; EUROSTAT, 2014; Masourakis, 2011; Chalikias, 2013). It is interesting to highlight that the significant increase of the debt started

right after the Athens 2004 Summer Olympic Games, while the effect on the GPD appeared after 2008. The largest deficit of the modern era appeared in 2009, but in 2013 this value was already positive.

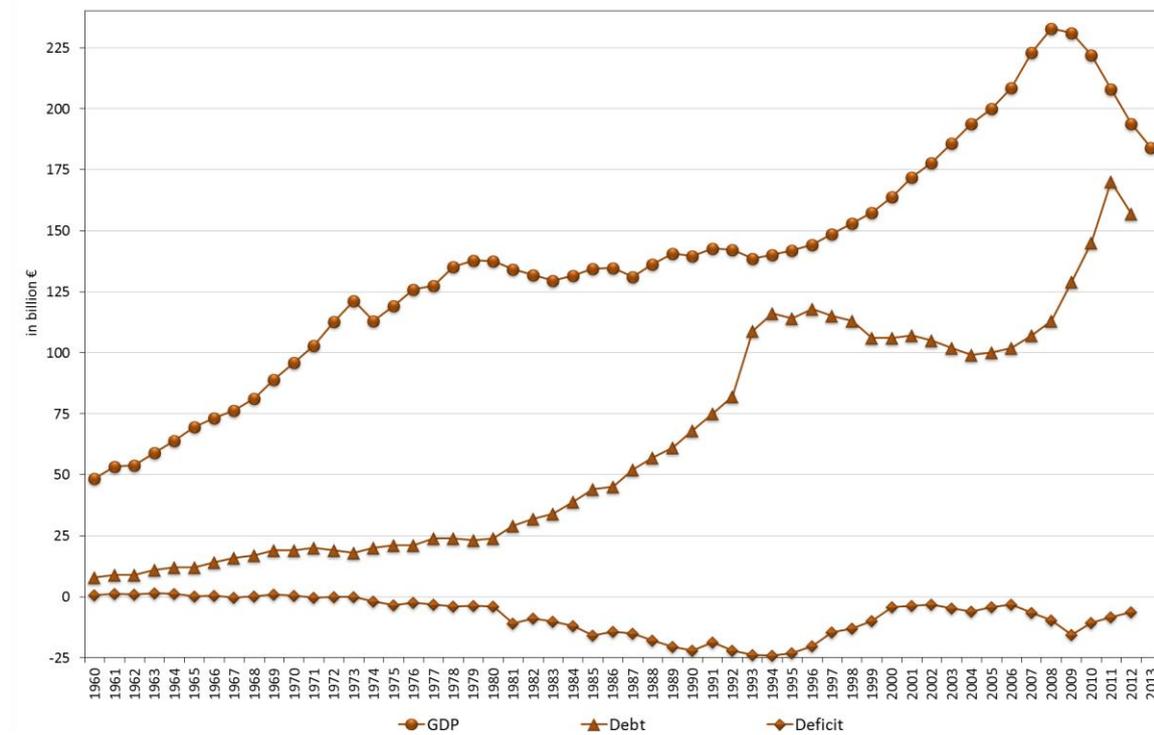


Fig. 1 GDP, debt and deficit in Greece

Concerning the national exports and imports, there is a direct correlation with the domestic economic crisis, due to the contribution of the latter to the trade balance.

Trade balance of goods has traditionally been negative in Greece, because of the excessive amount of imports, which has always been a cause of worry for the economy (Bank of Greece, 2014). Positive results appeared only in recent years, mostly due to the increase of shipping and tourism activities (Gibson et al., 2012). Numerical data on trade of goods is presented in Figure 2.

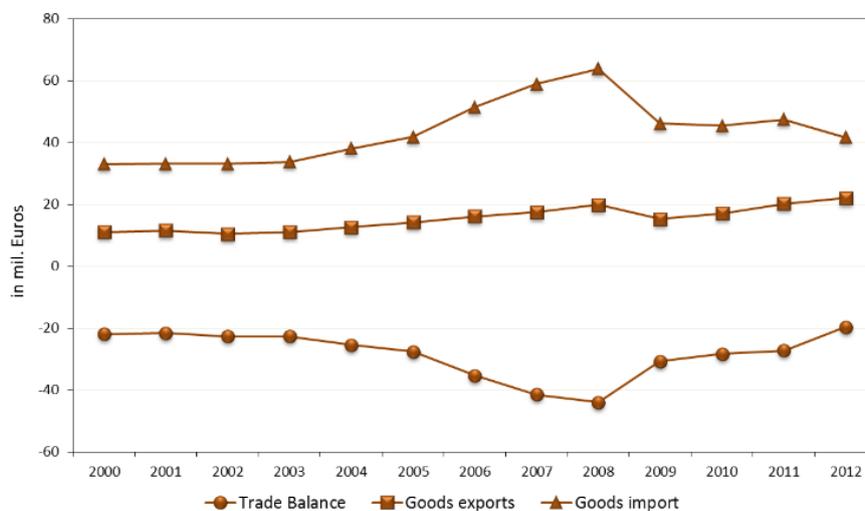


Fig. 2 Trade balance of goods in Greece

As expected under such conditions, the employment of citizens has been strongly hit in the last years, resulting in an overall reduction of financially productive activities in various sectors. Figure 3 presents the employment – unemployment ratio and Figure 4 shows the evolution of the unemployment rate since 2009. As observed, unemployment has constantly increased since 2009, from approximately 500000 unemployed citizens to approximately 1.5 million, while, as expected, employment has been gradually falling (Trading Economics, ELSTAT, 2014; Cholezas, 2013). The negative development of the Greek economy in both GDP and unemployment during the years 2008 and 2013 resembles a depression.

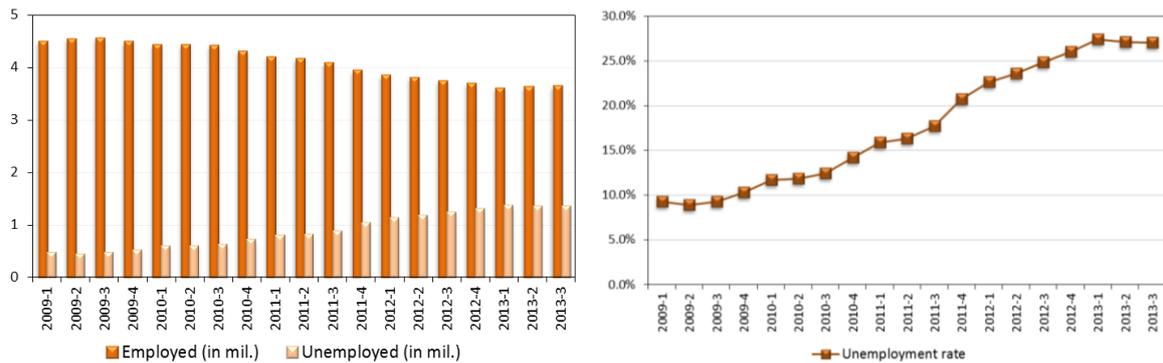


Fig. 3-4 Employed – unemployed in Greece (on the left) and Unemployment rate in Greece (on the right)

Tourism is undoubtedly one of the most important sectors of the Greek economy. It contributes significantly to the country’s GDP and employs (directly and indirectly) approximately 35% of the national workforce (Rerres et al., 2013). The next figures show data related to the evolution of the country’s tourism. Clearly, the ongoing economic turmoil could not leave touristic activities intact in Greece. As depicted in Figure 5, the contribution of travel and tourism to the national GDP presents a peak just after 2004 (due to the international attention the country garnered in response to the 2004 Olympic Games hosted in Athens), while the decreasing trend from 2006 onwards is also observed in the four EU countries (Figure 6) ranked as top tourist destinations. This decreasing trend picks up again in 2011, showing that Greece has regained the attention of international travelers (Association of Greek Tourism Enterprises (SETE), 2014; Masourakis, 2011; Gulbahar, 2011).

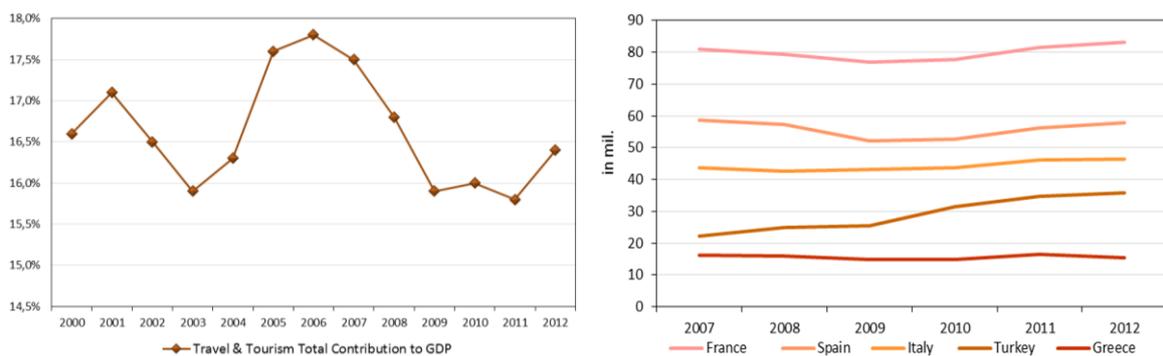


Fig. 5-6 Travel and tourism contribution to GDP (on the left) and International tourist arrivals (on the right)

3 IMPACTS OF ECONOMIC CRISIS ON THE TRANSPORTATION SECTOR

The financial crisis has had significant impacts on many sectors of the country's economy. Passenger and freight transportation have both been strongly affected. This section summarizes the main repercussions of the economic crisis in Greek transportation following a data-driven approach.

3.1 TRANSPORT MARKET INDICATORS

First and foremost, the economic recession has greatly reduced the transport expenditures, due to the decrease of the average income over the past years. Figure 7 shows the household expenditure on transport compared to the average per capita income for the years 2000 to 2011. As shown, a reduction in income leads to a decrease in total household expenditure on transport. Thus, in the case of Greece, the drop of average annual income from € 21000 to € 12500 simultaneously causes a drop in transport expenditure from € 830 to € 300 per year (Chita and Zervas, 2013).

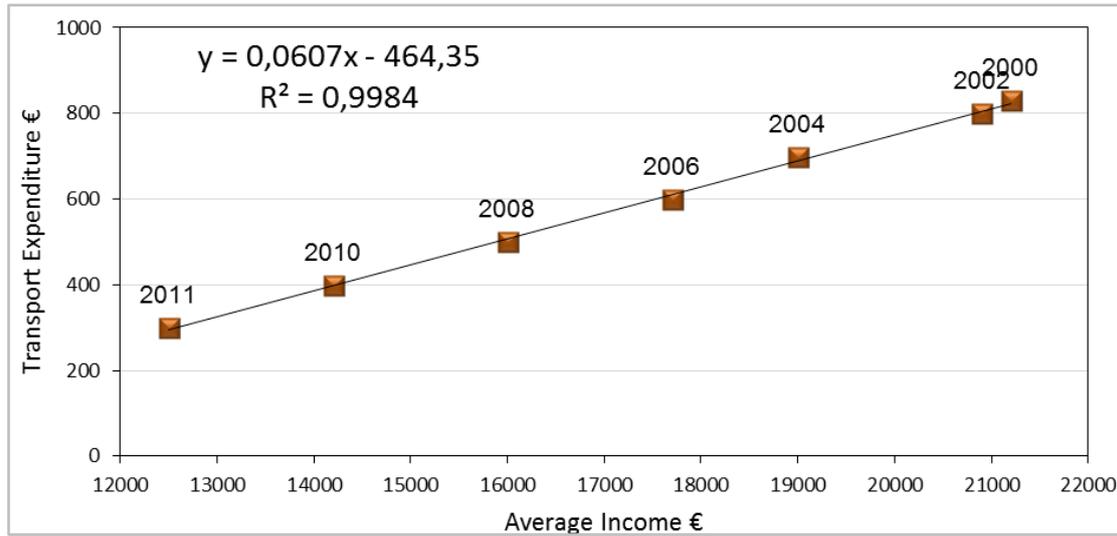


Fig. 7 Relation between annual expenditure on transport and the average per capita income

Additionally, expenditures in transport directly relate to energy consumption and fuel price, two indicators also affected by the economic recession. According to EUROSTAT, fuel prices remained in high levels throughout the years of austerity and this resulted in an overall decrease of energy consumption (EUROSTAT, 2014). Figure 8 depicts energy fuel consumption in the transport sector between 2000 and 2011, using as a unit of measurement one million tons of oil equivalents. It appears that there is an uptrend in energy fuel consumption until 2009. This 28% increase, exceeding 9 million tons of oil equivalents, is attributed to population growth and the general economic growth of the country until then. After 2009, the indicator plummets by 17% due to the economic recession, reaching just over 7.5 million tons.

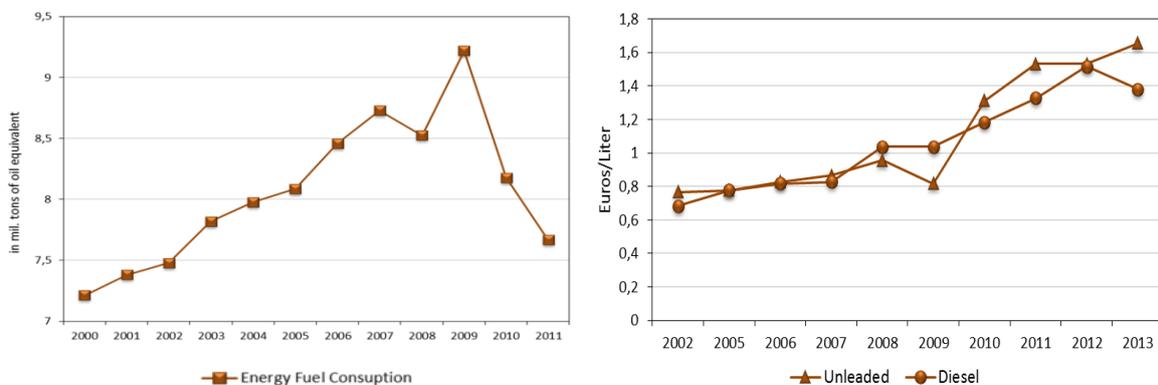


Fig. 8-9 Energy fuel consumption in the transport sector in Greece (on the left) and Fuel price in Greece (on the right)

Figure 9 illustrates the course of fuel price from 2002 until 2013. During these years, both diesel and unleaded have increased in terms of price, while the economic crisis led to a decrease in the extensive use of cars, and consumers turned to the purchase of diesel vehicles (HITE, 2014). As observed, diesel price in 2012 was reduced, while unleaded continues its ascendant course from 2009. This is largely attributed to the owners of fuel service stations, whose union opted for an increase in the price of unleaded following decreased demand, while, at the same time, the appearance of new types of vehicles, such as autogas and hybrid vehicles, led to a decrease in diesel price (Ministry of Development, 2014; EUROSTAT, 2014).

Greece's transportation turnovers present competitiveness up to the crisis period, when a decrease is noted in all modes of transport. Figure 10 concerns the turnover of several activities, with the year 2005 serving as base index year. The turnover of all modes of transport and related activities consistently decreased since the beginning of the economic crisis, with air transport being the least impacted thanks to its flexibility, fast travel options and the increase of air transport passengers carried into Greece (Trading Economics, 2014; Ministry of Development, 2014).

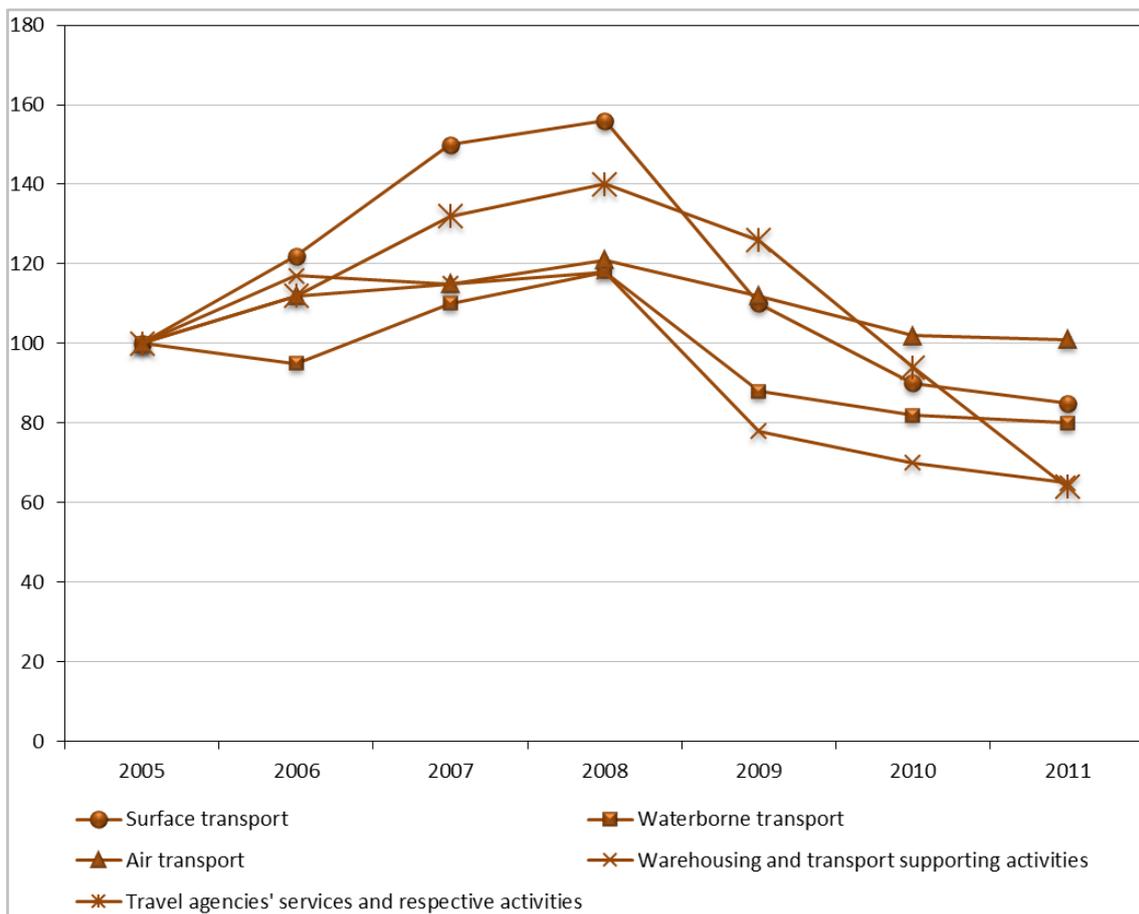


Fig. 10 Transportation activities turnover Index in Greece

3.2 PASSENGER TRANSPORT

Greece is a tourism center; therefore regular transport services for passenger mobility are required, in order to cover a high level of demand. The following diagrams showcase the low number of kilometers travelled by passengers and the reduction of traffic flow, especially private car traffic. Combined with high fuel costs and the increase in alternative means of transport, these diagrams illustrate users' reduced travel due to the ongoing economic crisis. Figure 11 presents the passenger kilometers travelled per citizen by road and rail

transport for four countries, including Greece, for the time period 2001-2010. As shown, Denmark, the Netherlands and Belgium far exceed Greece. The passenger kilometers per citizen in these countries are within a range of 10000 to 14000, while Greece is found stable at 4000. Figure 12 shows the average traffic flow in the region of Attica, where Athens, the capital of Greece, is situated, on a quarterly basis between 2006 and 2013. Within this time period, a 30% reduction of urban traffic volumes is observed (ELSTAT, 2014; EUROSTAT, 2014; HIT Portal, 2014).

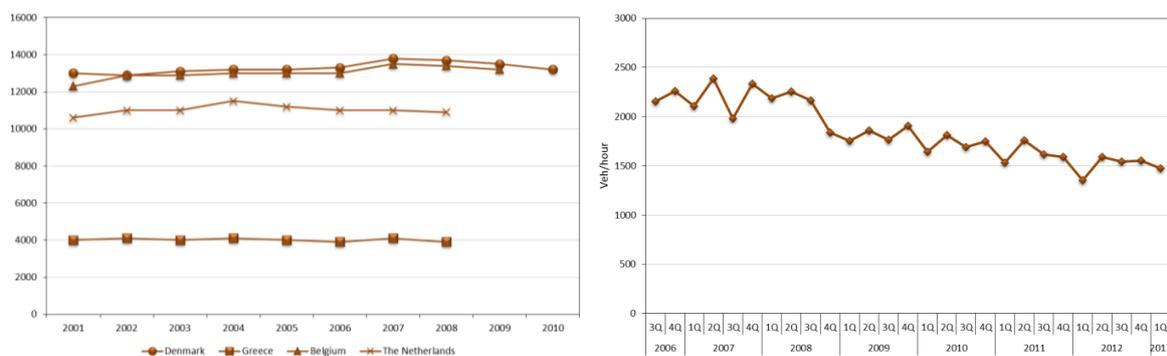


Fig. 11-12 Passenger kilometers travelled by road and rail transport per citizen (on the left) and Average traffic volume in Attica Q1 (on the right)

Public transport is another sector that is strongly experiencing the consequences of the economic crisis. According to Thessaloniki's Integrated Transport Authority, the crisis has brought an increase of public transport operating costs mostly due to the 50% increase of fuel price, as well as the increase of direct taxes and value added taxes, while the state has concurrently reduced its subsidies because passenger mobility has overall decreased (Papaioannou and Konstantinidou, 2011).

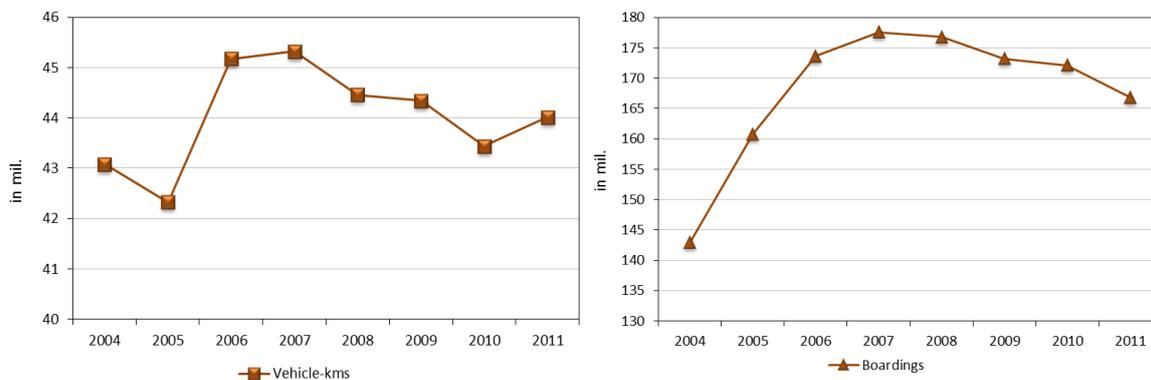


Fig. 13-14 Vehicle-kilometers in Thessaloniki (on the left) and Public transport boardings in Thessaloniki (on the right)

Figure 13 shows the vehicle kilometers traveled in Thessaloniki, the second largest city of the country, and Figure 14 shows the total annual boardings for the years 2004 to 2011. There is an observed downward trend since 2006 in vehicle-kilometers travelled, as a result of the crisis, since overall reduced economic activities and reduced demand for travel resulted to less trips, thus vehicle-kilometers. From 2010 onwards, however, a significant uptrend is noted, reaching 44 million in 2011. In addition, a continuous increase of boardings is observed between 2004 and 2007 (approximately 35 million), while, due to the economic crisis, a reduction of about 10 million is observed between 2009 and 2011 (Thessaloniki's Integrated Transport Authority - THEPTA, 2012; OASA, 2014).

Furthermore, the high unemployment rates, combined with a reduction of income, have led to a decrease in the number of registrations of new cars (Chita and Zervas, 2013; Association of Motor Vehicle Importers Representatives, 2014). Figure 15 concerns the authorizations for the circulation of cars in the period 2000-2013 at monthly intervals. As seen, until 2008, there was a consistent influx of registered vehicles, with an average of approximately 22500 authorizations. However, from 2009 onwards, a reduction of 73% is observed, due to private vehicle owners choosing to return their registration plates to the state owing to their inability to cope with the maintenance and registration expenses. Since 2012, the number of car registrations is stably below 5000. Figure 16 shows the new registrations of private cars compared to the average per capita income from 1995 until 2008. Initially, there was an increase in per capita income by the year 1999, resulting in a large number of new passenger cars registered. Between 1999 and 2008, new car sales remained stable at around 270000 per year, suggesting a saturation of the private vehicle market. After 2008, the country's economic crisis led to a sharp drop in income. The consequence was a great reduction in the number of new registrations of private cars, which totaled only 58000 in 2008, representing a decrease of approximately 80% (Chita and Zervas, 2013; Athanassiou and Tsouma, 2013; Association of Motor Vehicle Importers Representatives, 2014).

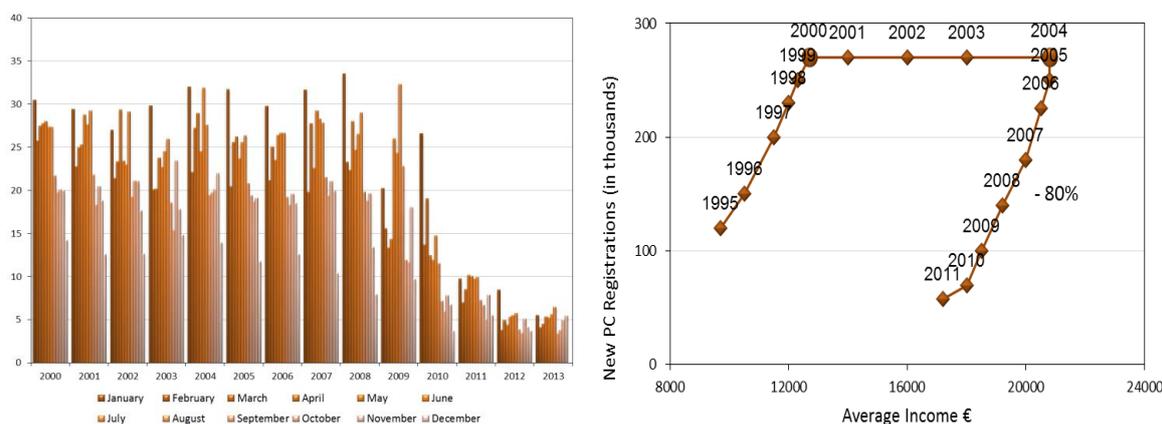


Fig. 15-16 Car Registrations in thousands (on the left) and Association between new registrations of private cars and average per capita income (on the right)

3.3 FREIGHT AND LOGISTICS TRANSPORTATION

The country's economic recession has significantly reduced the activities in logistics and freight transportation as well. Between the years 1998 and 2008, the transport logistics sector in Greece had increased by 20% on average (in terms of personnel occupied, vehicle fleet and operations), while in 2008-2009 and 2009-2010 it decreased by 6 and 7%, respectively (ICAP 2013). In 2009-2010, 39% of the logistics companies reported financial losses in their annual turnover, while 25% had a significantly lower profit than the previous year (Hellenic Statistical Authority, 2011). Table 1 summarizes the turnover reduction of each transport sector in Greece between 2008 and 2010.

	2008 - 2009	2009 - 2010
Land transport	-31.5%	-18.1%
Waterway transport	-22.8%	-8.5%
Air transport	-12.6%	-3.3%
Warehousing activities and transportation support activities	-33.3%	-10.9%

Tab. 1 Turnover of each transport sector in Greece

The economic crisis raised many issues in this sector, including the drop in import and export trading, lack of freight centers, illegal truck traffic from other countries that reduces domestic carryings, low standard infrastructures and high cost of equipment, which prevents the freight companies from investing. However, in the last years, the situation appears to be improving, due to investments in freight transport, such as the new international highways connecting the country with Europe and the privatization of Piraeus port container terminal, both of which contribute to strengthened freight flows in Greece, as observed in the following figures (Imerisia, 2011).

Figure 17 shows the gross weight of foreign cargo, loaded and unloaded, in the Greek seaports between 2005 and 2012 (cargo loaded: from 50.8 to 55.6 million tons - cargo unloaded: from 25.6 to 37.6 million tons). Before the beginning of the economic crisis, a decrease appears on both counts (ELSTAT, 2014; EUROSTAT, 2014). However, from 2011, an uptrend is observed, which is attributed to the collaboration of the Greek government with major private companies in the field (Liz Alderman, 2012). This trend is mainly due to the fact that the 50% share of the Piraeus port, the most important port in the country, has been leased to COSCO, which multiplied by three the cargo volume in only two years.

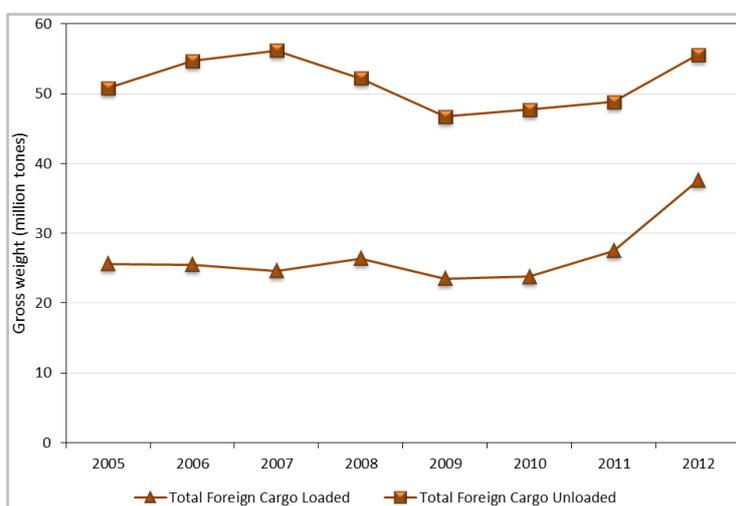


Fig. 17 Gross Weight of Foreign cargo at Greek seaports

Figures 18 and 19 present data about the total number and gross weight of containerized foreign cargo (loaded and unloaded) at Greek seaports in the period 2005-2012. These figures show that the economic crisis has had a significant impact on reducing the amounts of cargo between 2008 and 2010, whereas in 2011 and 2012 the number of containers is increasing.

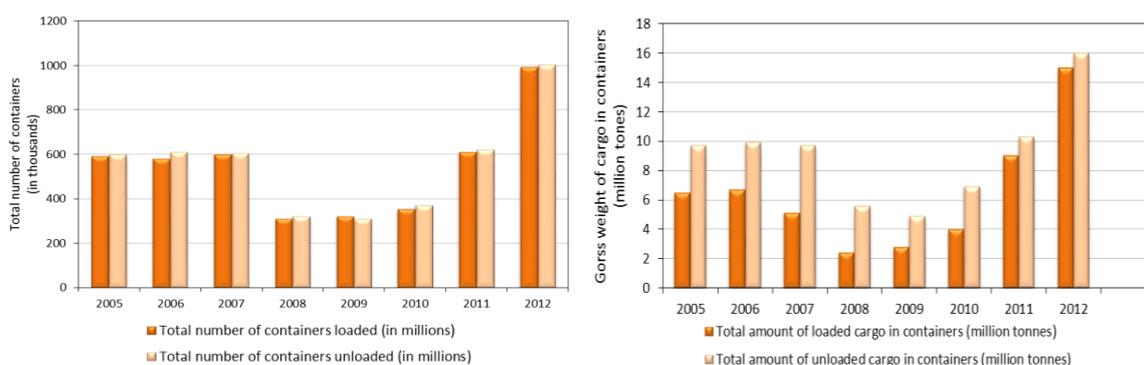


Fig. 18-19 Total number of containerized foreign cargo at Greek seaports (on the left) and Gross weight of containerized foreign cargo at Greek seaports (on the right)

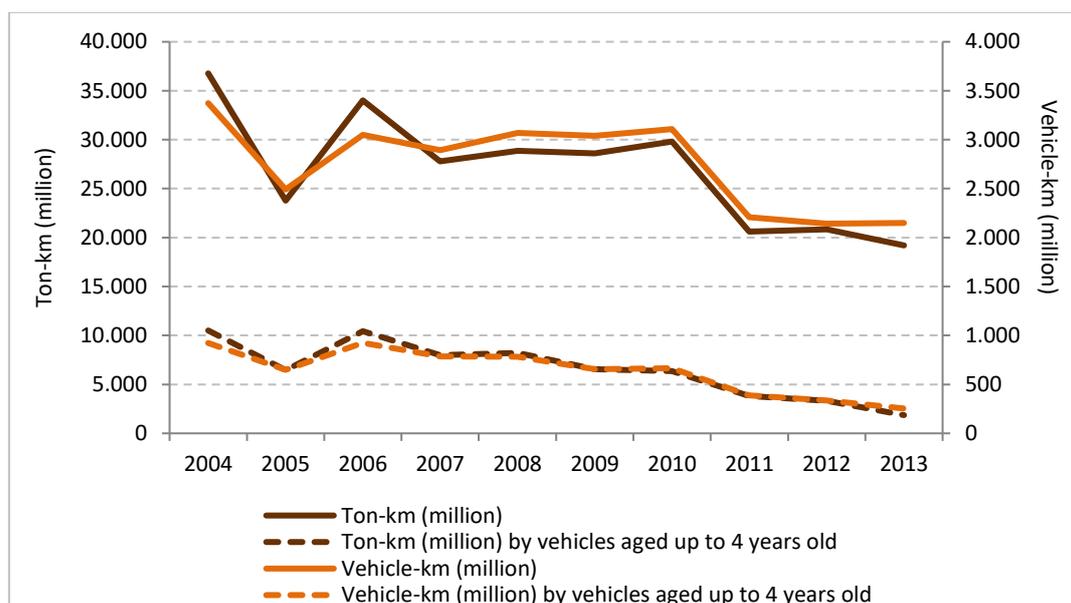


Fig. 20 Total road freight transport output by all vehicles and by vehicles aged up to 4 years

Significant reduction is also observed in the total (national and international) road freight transport, in relation to the measures of ton-km and vehicle-km (Figure 20). Between 2004-2013, the overall decrease in ton-km amounted to -47.8% (from 37 billion to 19 billion) and in vehicle-km to -36.2% (from 3.4 billion to 2.2 billion), respectively. These reductions amounted to -35.6% in ton-km and -30.8% in veh-km during 2010-2013, with relative stabilization trends after 2011. The declining road traffic for both passengers and freight is associated with less toll revenues for highway operators, which, in conjunction with the severe national budget constraints and the fluidity problems of the Greek economy, led to halting the process of completion of the national highway system.

Even larger was the reduction in both ton-km and vehicle-km travelled by vehicles aged up to 4 years-old during 2004-2013 (-82.3% and -72.5%, respectively). These results demonstrate the gradual aging of the domestic commercial vehicle fleet as well as the weakness of its renewal, exacerbating the negative road transport externalities to the environment, energy consumption, safety and pavement conditions. The negative impact of economic crisis is also evident on the relative reduction (by -10.4% in ton-km and -2.3% in vehicle-km) of the share of national road freight transport to the total (national and international) road freight transport during 2004-2013 (Figure 21). This trend reflects a (small) turn of businesses towards sales in foreign markets, particularly due to the declining domestic demand.

At the same time, a significant increase of the share of national road freight transport by private-use vehicles is observed during 2004-2013, which amounts to 86% in transported tons, 126.3% in ton-km and 92.7% in vehicle-km, although the temporary reduction of this share between 2010-2012 (Figure 22). Namely, the economic crisis has not yet led to an actual adjustment of firms' behavior toward public-use road haulage and 3PLs, in order to find more cost-effective ways to lower their operational (delivery and storage) costs. These findings show that the crisis has not allowed the public road haulage to benefit from the (as of 2010) liberalization act aimed to treat existing inefficiencies and enhance competition in the specific sector. It is indicatively noted that, in 2013, the average share of national road freight transport by private-use vehicles in

EU-27 was 33.5%, in terms of the transported tons, 17.6%, in terms of the ton-km, and 25.5%, in terms of the veh-km, compared to the corresponding much larger shares of 82.9%, 49.9% and 64% in Greece.

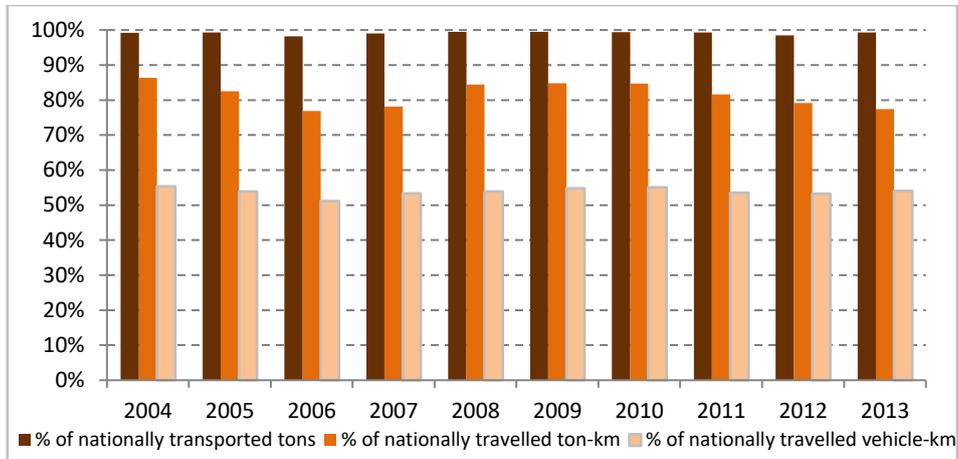


Fig. 21 Evolution of the Greek national road freight transport as a share of the total Greek (national and international) road freight transport

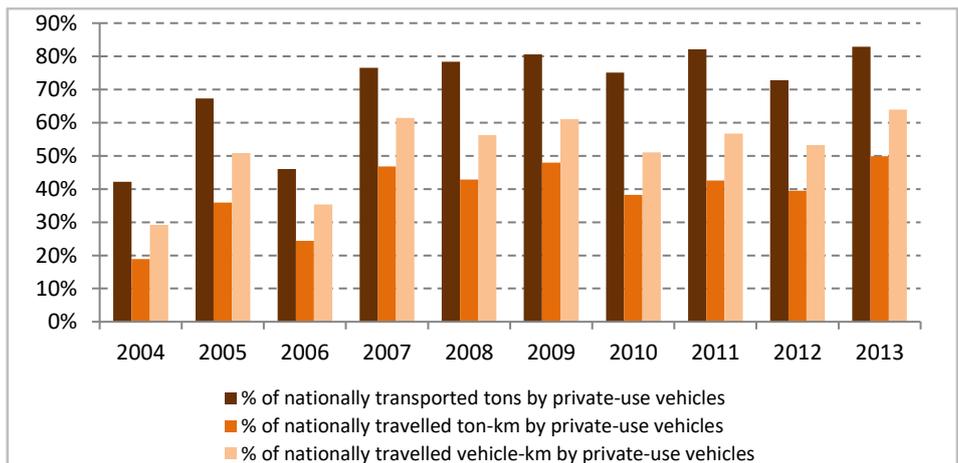


Fig. 22 Evolution of the Greek national road freight transport by private-use vehicles as a share of the corresponding transport by all vehicles

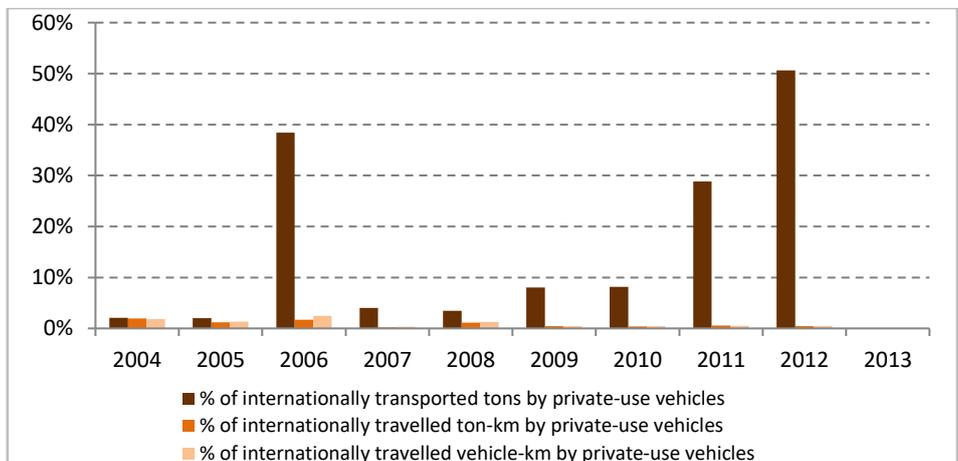


Fig. 23 Evolution of the Greek international road freight transport by private-use vehicles as a share of the corresponding transport by all vehicles

In addition, it is stressed that the number of public-use commercial truck vehicles has substantially remained the same after the public road haulage liberalization in 2010. This fact, in conjunction with the small reduction of the private-use commercial truck vehicle fleet size (since 2012), has resulted in the aging of the total commercial truck vehicle fleet, as illustrated in Figure 20. The significant cost of public-use truck vehicle purchase and license holding, which should correspond to emissions category Euro V, in combination with the high operating costs and taxation, have discouraged the renewal or development of new fleets and the access of new firms in the domestic market.

Regarding the international road freight transport, the cargo transported by private-use truck vehicles rapidly increased (by 528.7%) during 2009-2012 (Figure 23). However, the other two transport output measures (ton-km and vehicle-km) present different trends, as the corresponding shares were reduced below 1% after 2009 and remained almost unchanged thereafter. These trends possibly reveal the firms' preferences toward private-use truck vehicles for servicing relatively closer (neighboring or less distant) foreign markets, to which freight demand (mostly for heavy goods) has increased, compared to more distant foreign markets, which are largely served by public-use truck vehicles. Moreover, there is a remarkable increase of the combined (road-maritime) transport of freight moved from the Greek ports (mostly, those of Patras and Igoumenitsa) towards Western Europe during the crisis period. According to Tsekeris (2016a), within the period 2009-2012, the share of the amount of cargo exported by combined road-sea transport operations, in relation to the total amount of cargo exported by road, was increased from 61.5% to 65.3%, while the corresponding share of the inland distance travelled was increased from 51.9% to 56.4%.

4 OPPORTUNITIES

In Chinese, the word crisis consists of two sino-characters; the first refers to threat (or danger), while the second represents opportunity. When a system collapses, there is an opportunity to renovate oneself, finding new solutions, products and markets. This situation has been observed in several countries in the context of austerity and sustainability, for instance, through the introduction of Demand Responsive Transportation (DRT) systems (Gomes et al., 2015) and free-floating car-sharing systems (Seign et al., 2015). This is also the case for the transportation sector in Greece. The innovation of the Greek market is a fundamental asset and one of the most significant opportunities of the country. This effort can be quantified in terms of European Research Council (ERC) grants, one of the most competitive funding schemes of Europe, whose number in comparison to the population in Greece is similar to economies like France or Germany. The only negative aspect is that half of those grants are awarded to Greek researchers from abroad, which means that, if Greece is able to keep its researchers, these figures will significantly increase. As a result of the economic crisis in the private sector, which was evidently shown in the analysis of impacts on passenger transport in subsection 3.2, new and promising business concepts have been developed and applied in Greece, such as car-sharing platforms and mobile applications supporting passenger transport, which have flourished rapidly during the recession times of the last years. As an indicative example, the travel demand decrease in the taxi sector has paved the way for smarter business models, such as the taxi booking applications based on smart devices, which largely replaced conventional dispatching companies by more innovative and traveler-oriented solutions. The positive aspect is that these small and innovative companies have remained in Greece instead of going abroad.

Not all austerity-related consequences are necessarily of a negative nature. There had been a lot of efforts to reduce traffic congestion in Greece before the crisis - from policy measures, such as no-driving days based on vehicle's license plate numbers, to technological efforts, such as the operation of modern Traffic Management

Centers in large metropolitan areas. Remarkably, however, the crisis has addressed congestion in a far better way, albeit at the expense of citizens' wellbeing. Private vehicle circulation reduction has become a reality for the wrong reasons (less disposable income and more unemployment), but it has nevertheless contributed to the development of more livable urban environments, with less traffic also resulting in less pollution, as observed in other cases (Schneider et al., 2010). As a result of austerity, the mobility needs of a large portion of the Greek population have been reduced to the basics. Ideally, what begun as a consequence of a ruinous financial situation may set in motion a positive transport behavioral change; that of a shift from use of private cars to public transport.

Lack of financial resources has also led transportation research and innovation efforts to develop innovative, cheaper and more sustainable ways for improved and more efficient mobility planning and management, utilizing new technologies. Expensive conventional traffic measurement equipment is being gradually replaced by more flexible and low-cost traffic data sensors, such as Bluetooth detectors and Floating Car Data systems, which allow larger area coverage at a much lower cost, through the participation of the users themselves. Another promising effort is related to the use of open data for applications in the transport domain (CERTH-HIT Open Data Hub, 2015; Open Geospatial Portal, 2015), a movement the importance of which is also recognized and supported through relevant policies and actions in other countries (Las Casas et al 2014). As a consequence of such efforts, not only did end users become active participants of mobility services, but all implicated stakeholders have increased their collaboration, in order to provide better mobility services by combining their data sources and systems. The positive results of such collaborations can be demonstrated in the example of city of Thessaloniki, where the Regional Authority, the Thessaloniki Integrated Transport Authority and the Municipality have been collaborating during the last 6 years in various mobility-related projects for providing innovative services to travelers, such as environmentally friendly or least cost routing (Mitsakis et al., 2013; Morfoulaki et al., 2015). These efforts put Thessaloniki in the list of European smart cities regarding the transport domain. At a national level, associations driven by similar motives and goals have been established, in an effort to make use of their full potential (Tsekeris et al., 2013).

Finally, one of the most significant prospects for the transportation sector arising from the financial crisis is the development of new transport investment roadmaps of actions that need to be taken, depending on a pre-defined timeplan. These actions aim to achieve specific targets regarding the enhancement of the transportation business sector, the increase of goods exported to foreign countries and the modal shift to more efficient and environmentally friendly modes. An immediate policy measure has been the liberalization of various sectors, most of them related to the transport sector (e.g., rail freight services, public road haulage, taxi and van services, cruising), which improved or is expected to promote significantly their efficiency and productivity, despite that, in some cases, such as the public road haulage, the deep crisis has not hitherto unleashed the potential benefits (subsection 3.3). Another important plan refers to the design and operation of a country-wide logistics hub network to help develop the role of Greece as an emerging international trade hub between South-East Asia and Central Europe. The location of freight distribution centres and logistics facilities is currently unplanned and highly scattered across the country, a fact which intensifies the impact of crisis on freight transport and logistics sector (subsection 3.3). A network including a few large logistics parks of national scope (in Athens and Thessaloniki) and several others of regional or local scope would exploit economies of scale and density, reduce transport costs and facilitate both domestic and international trade (Tsekeris, 2016b). In the same context, the ongoing process of the concession of key transport and logistics facilities and services (e.g., the port of Thessaloniki, the National Railway Organization etc.) to private-sector

strategic operators would considerably favor new investments, technology transfer and the country's connectivity in the regional and global supply chain networks.

5 CONCLUSIONS

This paper presented a detailed investigation of the impacts of austerity until 2013 in the Greek transportation sector. Economic and mobility indicators have been correlated in an effort to quantify the extent to which the economic crisis has affected transportation-related activities, covering both the passenger and freight and logistics areas. The data analysis has revealed a clear decreasing tendency in the turnover of the transport sector and of related activities, such as warehousing or acquisition of new vehicles. The reduction accounted on average for 40-50% in only three years, while operating cost (fuel price) increased continuously during these years. A strong relation between the average income and the transport expenditure has also been observed, which indicates the importance of the transport sector activities in the daily life and activities of the population. Most transportation-related indicators analyzed herein remained stable after the significant fall they experienced in 2008-2009.

However, a series of indicators present increasing tendencies during the last years, which demonstrate that the worst effects of the economic crisis and regulations have ended and that the transport sector in Greece has started to recover slowly. This fact is not a passive result due to time passing by; on the contrary, it has been strongly supported by reformations in the transport sector, as seen from the political, organizational and technical points of view. A few examples are the more efficient use of resources with control according to output measurements/end results and the introduction of more competition from the private sector. The active participation of all the stakeholders involved in the transport sector made it possible to take advantage of the opportunities that appeared during the crisis for creating new policy documents, roadmaps and passenger/freight master plans as well as reducing deficiencies, increasing the performance of the current transport systems or creating new, high value added and efficient ones, such as combined transport operations, urban/green logistics and innovative transport technologies.

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IMAGE SOURCES

Fig. 1, 7, 11, 12: Elstat, Eurostat

Fig. 2, 3, 4: Elstat

Fig. 5, 6: Sete

Fig. 8, 9: Eurostat

Fig. 10: Ministry of Development

Fig. 13, 14: Thepta

Fig. 15: Ministry of Transport, Infrastructure and Networks

Fig. 16: elaborated by the authors

Fig. 17, 18, 19: elaborated by the authors from Elstat and Eurostat data

Fig. 20: elaborated by the authors from Elstat data

Fig. 21, 22, 23: elaborated by the authors from Eurostat data

Table 1: Icap, Elstat

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