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GREEK ECONOMIC OUTLOOK

- Macroeconomic analysis and projections
- Public finance
- Human resources and social policies
- Development policies and sectors
- Special topics



GREEK *Economic Outlook*

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Contents

Editorial	3
1. Macroeconomic analysis and projections	4
1.1. Recent developments and prospects in the main demand components, <i>Ersi Athanassiou</i>	4
1.2. The evolution of the Consumer Price Index (CPI) in Greece and in the Eurozone, Yannis Panagopoulos	11
1.3. Factor model forecasts for the short-term prospects in GDP, Factor Model Economic Forecasting Unit	
Ersi Athanassiou, Theodore Tsekeris, Ekaterini Tsouma	14
2. Public finance	16
2.1. State Budget execution, January-August 2018, Elisavet I. Nitsi	16
2.2. The evolution and structure of public debt, Christos Triantopoulos	18
3. Human resources and social policies	21
3.1. Recent developments in key labour market variables, <i>Ioannis Cholezas</i>	21
3.2. The evolution of the anatomy of material deprivation, <i>Nikolaos C. Kanellopoulos</i>	30
4. Development policies and sectors	37
4.1. Analysis of the industrial sector based on industrial production and turnover indices, Georgia Skintzi	37

4.2. Digitisation patterns of the Greek economy and society, Alexandra Kontolaimou, Georgia Skintzi	41
4.3. The sharing economy in Greece: Developments in short-term real estate rentals, <i>Ersi Athanassiou, Agapi Kotsi</i>	49
Special topics	55
Productivity developments of the Greek economy at the macro and sectoral levels, Theodore Tsekeris	55
Relative output performance of public hospitals in Greece, Roxani Karagiannis	67
Private education in Greece, Ioannis Cholezas	80

Editorial

Greece concluded its third and final rescue programme on August 20, 2018, marking a tremendous milestone in its recent history and the end of a most difficult period for the country and for the eurozone. However, significant challenges to Greece's economic and political stability still remain. In order to facilitate Greece's return to economic and financial autonomy, on June 21 the Eurogroup agreed to a set of measures that would ensure a smoother transition to the markets. The deal included a disbursement of the fifth and final tranche of the ESM programme, amounting to €15 billion: of this amount, €3.3 billion is to be used for repayments to the International Monetary Fund and the European Central Bank. Moreover, €9.5 billion will be disbursed to an account especially set up to create cash buffers and which will be used for debt service if the need arises. Overall, Greece will be leaving the programme with a sizeable cash buffer of €24.1 billion, covering the sovereign financial needs for around 22 months following the end of the programme in August 2018. As part of the measures to ensure debt sustainability and to give more breathing space to the fragile Greek economy, the Eurogroup postponed a large part of the payments until 2033 and prolonged the maturities by a decade.

According to the agreement, Greece will have to maintain a primary budget surplus target of 3.5 percent of its GDP until 2022, after which it will have to sustain a budget surplus of 2.2 percent until 2060. The agreement also hinges on this and subsequent Greek governments implementing and continuing specific reforms, including introducing certain pre-legislated pension cuts and tax hikes over the next two years. Other actions include reforms in public financial management, banking, labour markets, human resource management in the public sector and the modernisation of the health-care sector. As it exits the eightyear bailout programme, Athens will still remain under close surveillance by officials from the EU and the International Monetary Fund: the 'enhanced surveillance framework' is meant to ensure and support the implementation of agreed reforms and to closely monitor Greece's fiscal policy going forward.

In the international arena, the bilateral relations between Greece and the Former Yugoslav Republic of Macedonia as well as the future of the Agreement of Prespes remain the most crucial issues. Although the "ves" vote prevailed in the referendum on the ratification of the Agreement on September 30, the extremely low participation rate (34%) raised the issue of the legitimacy of the whole process. Prime Minister Zoran Zavev declared that despite the very low participation. he considered the final result to be in favour of the "yes" vote, and that he would bring the agreement to the Parliament for a ratification vote. If the Parliamentary process fails, the most likely outcome will be a call for early elections. If the Prespes Agreement is not ratified, FYROM will not join NATO, its European prospects will be stalled, and the country will probably return to the vicious circle of internal instability, economic stagnation and ethnic friction. However, even if the Agreement is ratified in FYROM, there are still strong negative reactions to its ratification from within various Greek social and political strata.

The 37th issue of KEPE's Greek Economic Outlook is presented in two parts. Part One examines recent developments and prospects for the main components of demand, the Consumer Price Index in Greece and the Eurozone, as well as the factor model forecasts for the short-term prospects of GDP. Public finance is examined through an analysis of the State Budget execution (January-August 2018) as well as the evolution and structure of public debt. Recent developments in key variables of the Greek labour market are discussed, as well as the nature and structure of material deprivation. As far as sectoral policies are concerned, the articles present analyses of the industrial sector (based on industrial production and turnover indices), digitisation patterns of the Greek economy and society, as well as developments in short-term real estate rentals. The articles presented in Part Two provide a deeper and more specialised analysis of important contemporary topics. The first article examines "Productivity developments of the Greek economy at the macro and sectoral levels" while the second article analyses "Relative output performance of public hospitals in Greece". Finally, the third article examines crucial aspects of "Private education in Greece".

> RITSA PANAGIOTOU Editor

1. Macroeconomic analysis and projections

KEPE, Greek Economic Outlook, issue 37, 2018, pp. 4-10

1.1. Recent developments and prospects in the main demand components

Ersi Athanassiou

According to the latest seasonally adjusted data of the quarterly *National Accounts* for the first half of 2018 (ELSTAT, provisional data, September 2018), the GDP of the Greek economy seems to be on a stable path of recovery, having recorded an increase of 2.5% in

the first quarter and 1.8% in the second quarter of the year, as compared to the corresponding quarters of 2017 (Table 1.1.1). The main driver of these positive developments was the significant improvement of the balance of goods and services, which overcompensated for the instability still characterizing changes in the main components of domestic demand.

As evident on the basis of data in Table 1.1.1, domestic demand declined in the first quarter of 2018 and recorded a marginal increase in the second quarter of the year. The latter development resulted mainly from the mild recovery of private consumption in the second quarter of 2018, which represented a marked improvement over the weak performance observed in

TABLE 1.1.1 Main macroeconomic aggregates

% rates of change compared to the corresponding period of the previous year (seasonally adjusted data at constant prices)

									6 m per Jan	onth iod June
	2016Q3	2016Q4	2017Q1	2017Q2	2017Q3	2017Q4	2018Q1	2018Q2	2018	2017
Private consumption	3.7	0.4	0.8	0.6	-0.1	-0.6	0.0	1.0	0.5	0.7
Public consumption	0.8	-4.5	-3.5	-2.1	-1.1	2.1	0.1	-2.0	-0.9	-2.8
Gross fixed capital formation	13.6	-7.4	17.0	1.1	-8.3	29.0	-10.3	-5.4	-7.9	8.7
Domestic demand*	3.4	-1.4	2.2	0.4	-1.8	3.2	-1.3	0.1	1.3	-1.3
Exports of goods and services	9.2	5.0	5.4	9.3	7.6	5.5	8.0	9.4	8.7	7.3
Exports of goods	8.3	-0.1	3.0	8.7	2.9	7.3	10.8	7.2	9.0	5.9
Exports of services	9.9	12.3	9.0	11.2	11.8	3.1	4.6	12.2	8.4	10.0
Imports of goods and services	14.0	4.9	11.3	4.8	9.2	5.0	-3.1	4.3	0.5	8.0
Imports of goods	10.4	3.6	11.8	2.8	9.0	3.9	-6.2	1.7	-2.3	7.2
Imports of services	35.1	10.1	11.6	15.2	6.9	9.9	11.8	16.2	14.0	13.4
Balance of goods & services (% of GDP)	-354.5	3.4	74.0	-26.4	62.8	-0.8	-74.5	-48.7	13.6	55.4
GDP	1.2	-0.8	0.3	1.5	1.5	2.0	2.5	1.8	2.2	0.9

Source: National Accounts, ELSTAT (September 2018), own calculations.

* Excluding inventories.

the preceding three quarters. With respect to developments in the remaining components of domestic demand, negative rates of change were recorded in the case of gross fixed capital formation both in the first and the second quarter of 2018, mainly as a consequence of the major correction in transport equipment investment. In parallel, a significant decrease was observed in the second quarter of the year in the case of public consumption, as a result of the continuing fiscal adjustment process. Overall, the contribution of domestic demand –excluding inventories– to the rate of change of the GDP amounted to -1.3 percentage points in the first quarter of 2018 and 0.1 points in the second quarter of the year, from 2.2 and 0.4 points in the corresponding quarters of 2017 (Figure 1.1.1). With respect to the external sector, the rapid increase in exports of goods and services continued in the first two quarters of 2018. In parallel, in the first quarter of the year, the positive stimulus on the balance of goods and services was strengthened by a temporary decline in imports of goods and services. On the whole, the contribution of the external sector to the rate of change of the GDP reached 3.6 percentage points in the first quarter of 2018 and 1.5 points in the second quarter, from -2.1 and 1.1 points in the corresponding quarters of 2017.

Focusing on the available indications with respect to the course of economic activity during the latest period, the economic sentiment indicator showed improved levels in the course of the second quarter of 2018, thereafter exhibiting a significant increase in July and

FIGURE 1.1.1

Contributions to the rate of change of the real GDP





Source: National Accounts, ELSTAT, own calculations.



FIGURE 1.1.2

Individual components of domestic demand



relative stability in August (Figure 1.1.2 above). These developments are related to the general environment of recovery of the Greek economy, in combination with the new conditions and prospects arising from the completion of the financial assistance programmes.

Regarding the main factors shaping the recent developments in the GDP and its main components, next follows a more detailed analysis of their evolution and prospects, on the basis of *National Accounts* data and selected short-term indicators.

1.1.1. Private consumption

According to National Accounts data, the mild downward trend followed by private consumption in the second half of 2017 was progressively reversed in the course of the first half of 2018, with the relevant rate of change amounting to 0.0% in the first quarter and 1.0% in the second quarter of the year. Additional indications on the recent course of private consumption are provided by the relevant trends with respect to the monthly volume index in retail trade. The index moved mostly upwards from January until June of 2018, thus recording in the first half of 2018¹ an average rate of change of about 1.6% against the corresponding period of 2017. Positive contributions to the development of the general index came from the side of two out of the three main retail sector categories, and more particularly from the food sector and the non-food sector (average rates of change amounting to 2.0% and 2.4%, respectively) (Figure 1.1.3). In contrast, a marginal decline was recorded in the case of the index referring to the *automotive fuel* sector (-0.1%) (Figure 1.1.3).

Regarding the course of the volume indices in the individual store sub-categories, in five out of the eight cases the first half of 2018 was characterized by overall positive developments. In particular, the indices referring to the supermarkets, pharmaceuticals-cosmetics, furniture-electrical equipment-household, department stores and clothing-footwear sub-categories recorded on average positive percentage changes (amounting to 4.1%, 3.0%, 7.6%, 2.7% and 0.9%, respectively) as compared to the corresponding half-year period in 2017. On the contrary, aside from the *automotive fuel* category, a marginal decrease over the same period was observed in the case of the volume index referring to books-stationery-other books (-0.2%), while a significant decrease was recorded in the case of the volume index for food-beverages-tobacco stores (-6.7%).

Given the above data and indicators, it appears that private consumption is returning to an upward trend, with significant dynamics in certain individual store categories but also continuing pressures in the case of basic goods such as automotive fuel and food-beveragestobacco sold in smaller stores. These developments appear to reflect on the one hand the positive impact on consumption from the improvement of the economic environment and the main labour market figures, and on the other hand the adverse effects still exerted as a result of remaining uncertainty and the pressures on household disposable income from the implementation of fiscal adjustment measures.

FIGURE 1.1.3



Percentage changes in the general volume index and the main sector indices in retail trade on a year-on-year basis

^{1.} All the following references to the six-month period include provisional data for the month of June.

FIGURE 1.1.4 General volume index in retail trade and confidence indicators



Regarding the future developments in private consumption, the aforementioned trends with respect to the recent path of consumer spending converge to an assessment for a continuation of the recovery in private consumption over the short-term. This assessment is in line with the significant improvement in the expectations of consumers with respect to the course of their consumption expenditure, as reflected in the rising trend of the consumer confidence indicator particularly during the period from July to August 2018 (Figure 1.1.4). Furthermore, a positive outlook is also reflected in the assessments of retailers, with the retail confidence indicator amounting in August 2018 to a level considerably higher compared to the beginning of the year. However, it should be noted that a certain degree of ambiguity concerning the prospects of consumption still exists, in anticipation of policy decisions which will influence the impact of the continuing fiscal adjustment process on household disposable income.

1.1.2. Investment

Gross fixed capital formation declined by -10.3% in the first quarter of 2018 and -5.4% in the second quarter, as compared to the corresponding quarters of 2017 (Table 1.1.2). As a result, the contribution of investment to the rate of change of the GDP amounted to -1.3 percentage points in the first quarter of 2018 and -0.6 points in the second quarter.

More particularly, with regard to investment other than construction, developments in the course of the first half of 2018 were positive, with the important exception of expenditure in transport equipment which recorded a major decrease both in the first and in the second quarter of the year (-56.2% and -48.8%, respectively). Investment in machinery and equipment presented a significant increase in both quarters (19.0% and 19.3%, respectively), while a similar positive development was also observed in the case of investment in Information and Communication Technology equipment (21.9% in the first quarter and 15.4% in the second quarter). Investment in other products remained stagnant in the first quarter of 2018, subsequently recording a marginal increase in the second quarter of the year (0.6%).

With respect to investment in construction, expenditure in other constructions increased both in the first and in the second quarter of 2018 (by 4.8% and 6.9%, respectively). In parallel, investment in dwellings also exhibited an increase in both quarters, a development which assumes particular importance as it represents the first clear sign of recovery of this particular investment category after ten years of almost continuous decline.

Additional information on developments in the construction sector as a whole is derived from the available statistical data on the course of the general production index in construction in the first and second quarter of 2018.² As it is observed, the index presented a slight decline of 0.7% in the first quarter and a further decrease of -4.2% in the second quarter, as

^{2.} Note that the reference concerns the indicator adjusted for the number of working days while data for the second quarter of 2018 are provisional.

TABLE 1.1.2 Main investment aggregates

% rates of change compared to the corresponding period of the previous year (seasonally adjusted data, constant prices)

	Quarters									
	2016Q3	2016Q4	2017Q1	2017Q2	2017Q3	2017Q4	2018Q1	2018Q2		
Cultivated assets	32.3	36.6	1.7	-2.3	-0.5	3.4	4.6	5.1		
Other machinery and equipment and weapon systems	7.7	-19.7	-2.3	2.3	-1.7	23.3	19.0	19.3		
Transport equipment and weapon systems	2.6	-30.7	204.2	16.4	8.1	120.2	-56.2	-48.8		
Information Communication Technology (ICT) equipment	-29.5	-24.4	-16.0	-9.2	-0.9	12.3	21.9	15.4		
Dwellings	-2.8	-2.7	-11.1	-5.4	-7.2	-11.1	10.9	5.1		
Other construction	42.3	2.5	-1.6	-2.7	-15.4	7.8	4.8	6.9		
Other products	2.8	-0.6	0.4	-0.4	-0.8	-0.2	0.0	0.6		
Gross fixed capital formation	13.6	-7.4	17.0	1.1	-8.3	29.0	-10.3	-5.4		
Source: National Accounts, ELSTAT (September 2018), own calculations.										

compared to the corresponding guarters of 2017. This development, which comes in contrast to the positive picture of investment in construction over the same period, seems to be due to the evolution of the individual sub-index of production of civil engineering (e.g. highways, bridges, tunnels, pipelines, networks, port development), which declined by -24.3% in the first guarter and -20.2% in the second guarter of 2018, as compared to the corresponding quarters of 2017. On the other hand, the sub-index referring to the production of building construction (e.g. dwellings, industrial and commercial buildings, other buildings) increased significantly during the same period, with the relevant percentage changes reaching 34.8% and 15.9% in the first and second guarters of 2018, respectively.

More particular information with regard to the recent developments in residential investment is derived from the residential buildings indicator with respect to square meters of useful floor area, based on building permits. Both the individual monthly observations of the residential buildings indicator and the estimated private building activity³ exhibited significant improvement during the most recent reference period, in accordance with the aforementioned *National Accounts* data on investment expenditure in dwellings. More specifically, from January until May 2018, the monthly percentage changes of the residential buildings indicator on a year-on-year basis were highly positive, ranging between 28.6% (May) and 51.7% (April). In parallel the rates of change of the estimated private building activity stabilized at levels above 20.0% throughout the course of the period under consideration (Figure 1.1.5).

On the basis of the above data, investment activity seems to have shown positive dynamics over the most recent period of reference, with the exception of transport equipment expenditure which went through a correction of the major increase recorded in the previous year. Despite the fact that the decline in transport equipment investment was large enough to push downwards total gross fixed capital formation in the first half of 2018, investment categories relating closely to the enhancement of the country's productive capacity and infrastructure were characterized by positive trends, while some first indications of a certain revival of housing investment also came about. The

^{3.} A twelve-month moving average and the related percentage point changes are calculated.

FIGURE 1.1.5 Estimated residential building activity based on permits







latter development may possibly reflect a tendency for recovery of the housing market, which was severely hit by the crisis.

Overall, the increase of investment expenditure in most major categories during the first half of 2018 in combination with the general course of recovery of the economy, point to a positive outlook for investment. On the other hand, developments in transport equipment investment, which present a high degree of volatility, are not easy to predict and are likely to exert a significant impact on total investment over the short-term. In parallel, the instability still characterizing the construction confidence indicator (Figure 1.1.6) suggests that a certain degree of uncertainty regarding the prospects of investment is still present. Therefore, the need for the facilitation and encouragement of investment remains pressing, underlining the importance of the further stabilization of the economic environment, the implementation of major investment projects that are either in waiting or in progress, and the improvement of financing and liquidity conditions in the market through a further stabilization of the domestic banking system. Progress with respect to these crucial areas will determine to a significant extent developments in gross fixed capital investment over the short term.

1.1.3. External balance of goods and services

The further stabilization of the Greek economy, in combination with a series of favourable exogenous factors among which is the preservation of high rates of growth of world trade, contributed to the continuation of the improvement of the country's external sector performance during the first half of 2018.

More specifically, with respect to exports, their contribution to the rate of change of the GDP was highly positive, reaching 2.5 percentage points in the first guarter of 2018 and 3.0 points in the second guarter, compared to the corresponding quarters of the previous year (see Figure 1.1.7). More particularly, in the field of services exports a major increase was recorded, amounting to 4.6% in the first guarter of the year and 12.2% in the second quarter. A strong upward trend was also observed in the field of goods exports, with the relevant rates of change reaching 10.8% in the first quarter and 7.2% in the second quarter of the year. The rise in goods exports is related to positive developments in foreign demand, while also being likely to reflect a further improvement in competitiveness, indications of which can be found in the recent path of the country's real effective exchange rate. The favourable developments of services exports are due to the large increase in tourism receipts (by 18.9% as a whole in the first half of the year, according to Bank of Greece data) and the boost in receipts in the transportation services category (by 11.7%). In the case of the latter, considerable positive effects were exerted both by the favourable developments in world trade and by the related higher

FIGURE 1.1.7



Contributions to the rate of change of the GDP Individual components of external demand levels of ocean shipping freights rates as compared to the corresponding period of the previous year.

With respect to imports, their contribution to the rate of change of the GDP fluctuated in the course of the first half of 2018, amounting to 1.2 percentage points in the first quarter of 2018 and subsiding to -1.4 points in the second quarter. More particularly, the field of goods imports recorded a decline by -6.2% in the first quarter of 2018 and a small increase of 1.7% in the second quarter, with these developments being most likely related to the course of consumption and the decline in transport equipment investment over the same period. In the field of services, imports presented a significant increase in the area of 11.8% in the first quarter and 16.2% in the second quarter of the year, as a result of an increase in payments for tourism, transportation and other services.

Concerning future developments in the external sector, the indications thus far available with respect to the country's exports performance, as well as trends in word trade, point to a prospect for a further strengthening of exports. On the other hand, imports are expected to increase, due to the foreseen recovery of domestic demand and the expected higher oil prices as compared to the previous year. Overall, the contribution of the external sector to GDP growth is expected to remain positive in the short term, with the further strengthening of the country's export performance being related directly to the implementation of the new investment necessary for the expansion of the country's productive capacity.

1.1.4. Conclusions

From the above analysis it appears that the Greek economy is on a stable path of recovery, with some volatility as to the contribution of certain individual demand components to the rate of change of the GDP. An important positive feature of the recent developments is the continuing rapid growth of exports of goods and services, while indications of recovery are also identified in the case of private consumption. Regarding investment in fixed capital, the observed volatility in the transport equipment category destabilized total investment over the most recent period of reference, with the dynamics of investment expenditure remaining, nevertheless, positive in individual categories relating closely to the enhancement of the country's productive capacity and infrastructure. This picture points to a positive outlook for GDP growth in Greece in the upcoming guarters, in line also with the forecasts derived on the basis of the KEPE dynamic factor model (see Section 1.3).

1.2. The evolution of the Consumer **Price Index (CPI) in Greece** and in the Furozone

Yannis Panagopoulos

Greece

The Greek headline Consumer Price Index (CPI), from May 2018 onwards, presents a diversified trend with respect to its core¹ (see Table 1.2.1 and Diagram 1.2.1). Actually, from the beginning of 2018 until April, the two indices moved following more or less the same change pattern (negative or positive). However, from May onwards this parallel behavior stopped and thus the headline CPI recorded a change close to 1% (see July and August 2018) while its core exhibited a negative change on a monthly basis (-0.5%, July 2018).

A similar trend was recorded by the Greek harmonized CPI (HCPI). The only difference is that the diversification between the HCPI and its core appeared with a month lag (from June 2018 onwards). More analytically, while the HCPI moved steadily with positive changes between 0.8%-0.9%, its core recently passed into negative changes on a monthly basis (-0.1%, July 2018). This negative percentage of the core change leaves no room for optimism concerning to the ability of the Greek HCPI to follow the Eurozone's corresponding changes.²

Additionally, according to the Hellenic Statistical Authority (ELSTAT), the aforementioned headline inflation rate (1.0%, y-o-y, in August 2018) can be mainly attributed to subsequent price increases in nine (9) main sub-categories, namely:

- the "Food and non-alcoholic beverages" category (a) (by 1.0%), due to price increases mainly in beef, poultry, fresh fish, milk, eggs, fresh fruits, potatoes, coffee and juices. Part of this increase was offset by decreases in the prices of olive oil, vegetables and cold cuts.
- (b) the "Alcoholic, drinks and tobacco" category (by 0.7%) basically due to price increases in tobacco,
- (c) the "Clothing and Footwear" category (by 0.5%) due to price increases of these products,

	Headline Inflation (Greece)	Core Inflation (Greece)	Harmonized Inflation (Greece)	Core Harmonized Inflation (Greece)	Harmonized Inflation (EU19)	Core Harmonized Inflation (EU19)
2018M1	-0.2	-0.4	0.2	0.6	1.3	1.2
2018M2	0.1	0.1	0.4	0.8	1.1	1.2
2018M3	-0.2	-0.4	0.2	0.6	1.3	1.3
2018M4	0.0	0.1	0.5	0.8	1.3	1.1
2018M5	0.6	0.0	0.8	0.5	1.9	1.3
2018M6	1.0	0.0	1.0	0.3	2.0	1.2
2018M7	0.9	-0.5	0.8	-0.1	2.1	1.3
2018M8	1.0	NA	0.9	NA	NA	NA
Source: ELSTAT, E	UROSTAT.					

TABLE 1.2.1 Inflation in Greece and in the Eurozone

Note: NA: Data not available.

^{1.} The core does not contain the prices of electricity, natural gas, and automobile petrol.

^{2.} On this issue see the econometric relationship between HCPI and its core in Greece as it was estimated in the Greek Economic Outlook, Vol. 31 (2016).

DIAGRAM 1.2.1 CPI, % change relative to the respective month of the previous years



DIAGRAM 1.2.2

Harmonized indices of consumer prices, % change relative to the respective month of the previous years



- (d) the "Housing" category (by 0.3%) due to increases for residential heating, natural gas and solid fuels. Part of this increase was offset by the decreases in the prices of rents and electricity bills,
- (e) the "Health" category (by 1.3%) especially due to price increases in pharmaceutical products, hospitals and clinics,
- (f) the "Transportation" category (by 3.1%) mainly due to increases in the price of automobile fuels as well as heating petrol. Part of this increase was offset by the decreases in the price of passenger airplane tickets and in the maintenance and repair of personal transportation equipment
- (g) the "Communication" category (by 4.3%) mainly due to increased fees for telephone services,
- (h) the "Education" category (by 0.2%) mainly due to increases in the fees for secondary schools,
- (i) the "Restaurants-Hotels-Cafés" category (by 1.4%) mainly due to increases in their prices.

Part of the aforementioned inflation rate was offset by the decrease in the prices mainly of three (3) subcategories, namely:

 (a) the "Household equipments" category (by 1.5%) mainly due to decreases in prices for furniture and decoration, household textile products and household consumption items,

- (b) the "Recreation and culture" category (by 1.2%) mainly due to decreases in the prices of audio and visual equipments for PCs as well as other durable recreation goods and services,
- (c) the "Miscellaneous goods and services" category (by 0.8%) basically due to reductions of the prices of personal care products and vehicle insurance.

Eurozone

As regards to the harmonized CPI of the euro area (HCPI-EU19), we can report that in April of 2018 it managed to reach the target/objective of the European Central Bank³ (ECB) for the first time after the beginning of 2017. At the same time, the core of the HCPI-EU19 continues to move steadily with positive changes of around 1.2%-1.3%. Regarding now the issue of convergence between the rate of change of the HCPI in the Eurozone and in Greece, we observe –at least from the beginning of the year– a difference is more widened in the case of the corresponding core indicators and ranges between 0.3%-1.5%.

References

Panagopoulos, Y. (2016), "The relationship between harmonized inflation and its core during the economic crisis: an econometric approach", *Greek Economic Outlook*, Vol. 31.

^{3.} The target of the ECB for the HCPI-EU 19 is a percentage change of 2.0%.

1.3. Factor model forecasts for the short-term prospects in GDP

Factor Model Economic Forecasting Unit Ersi Athanassiou, Theodore Tsekeris, Ekaterini Tsouma

The current section presents the updated short-term forecasts of KEPE concerning the evolution of the rate of change of real GDP in Greece for 2018.1 The forecasts are produced by implementing a dynamic structural factor model, a detailed description of which can be found in Issue 15 (June 2011) of the Greek Economic Outlook. The underlying time series database used to estimate the model and produce the forecasts includes 126 variables, covering the main aspects of economic activity in the country on a quarterly basis, spanning the time period from January 2000 up to June 2018. Specifically, the database incorporates both real economy variables (such as the main components of GDP from the expenditure side, general and individual indices concerning industrial production, retail sales, travel receipts and the labor market) and nominal variables (such as the general and individual consumer price indices, monetary variables, bond yields, interest rates, exchange rates and housing price indices). In addition, the data sample includes a considerable number of variables reflecting expectations and assessments of economic agents (such as economic sentiment and business expectations indicators). It is noted that the seasonal adjustment of all time series is carried out by use of the Demetra+ software, which is freely available from Eurostat.²

According to the econometric estimates presented in Table 1.3.1, and having incorporated published (provisional) seasonally adjusted GDP data for the first and second quarter of 2018 (2.5% and 1.8%, respectively),³ the mean annual rate of change of real GDP for 2018 is predicted at 2.2% and the mean rate of change for the second half of 2018 at 2.3%. The respective projection reflects an improvement in economic conditions in 2018, as compared to 2017, for which the (revised)

official rate of change of real GDP lies at 1.3%. Moreover, it incorporates in both cases (year and second half period) a marginal upward revision of the previous factor model forecast (2.1% and 2.2%, respectively). In addition, the current projection continues to signal a tendency for an enhanced growth rate towards the end of the year, with the corresponding estimated rates of change for the third and fourth quarter of 2018 amounting to 2.1% and 2.4%, respectively.

The above presented estimates of the rate of change of real GDP for 2018 mirror the basic dimensions of the most recent short-term developments in the Greek economy and are consistent with both the course indicated by the included statistical data for the first half of 2018 and the preceding factor model forecast. In more detail, the GDP growth rate in the Greek economy was significantly reinforced during the first quarter of 2018 (2.5%), as compared to the marginal growth rate recorded during the first quarter of 2017 (0.3%), while a downward correction occurred in the second quarter of 2018 (1.8%), when also taking into account the GDP growth rate in the second quarter of 2017 (1.5%). Consequently, and according to the indications provided,

TABLE 1.3.1 Real GDP rate of change(%, y-o-y)

	2018				
Quarters	2018Q3	2018Q4			
Quarterly rate of change	2.11 [2.05 , 2.17]	2.42 [2.30 , 2.54]			
Mean rate of change, 2nd half of 2018	2.2 [2.17 ,	26 2.35]			
Mean annual rate of change	2.2 , 2.16]	1* 2.25]			

Note: Values in brackets indicate the lower and upper boundaries of the 95% confidence interval of the forecasts.

* The mean annual rate of change incorporates the officially available (provisional) data for the first two quarters of 2018, on a seasonally adjusted basis.

^{1.} The date of the forecast is September 18, 2018.

^{2.} The TRAMO/SEATS filter was used for the seasonal adjustment.

^{3.} According to the most recent publication by ELSTAT for the Quarterly National Accounts, dated September 3, 2018.

the Greek economy follows a gradual recovery and stabilization path, based on the positive developments in key macroeconomic components, which seem to result mainly from the rebalancing of major fiscal aggregates over time and the ongoing implementation of crucial structural reforms. The projected continuation of this favourable course in the second half of 2018 potentially incorporates the positive expectations related to the final completion of the fiscal adjustment programme in August. At the same time, there is still a lack of indications for stronger growth dynamics in the country. This situation is mostly associated with developments in domestic demand and is, to a significant degree, due to the overall financial burden weighing on households and enterprises.

The most recent upward course in a great number of economic variables, reflected in positive and, in many cases, even double-digit rates of change for the second quarter of 2018, on a non-seasonally adjusted basis, is in line with the above findings and assessments. More specifically, indicative are the favourable developments in: (a) goods and services' exports, (b) industry, based on both the general industrial production index and the individual index categories, as well as the general turnover index in industry, for the overall as well as for the internal and external market (with the exception of durable consumption goods), (c) retail trade, according to the general volume index and most of the individual index categories, (d) travel and transport receipts, (e) passenger cars and motorcycles trade, according to private passenger car licenses issued and the turnover index for motor trade, (f) building activity, in terms of volume, on the basis of permits issued, (g) wholesale trade, on the basis of the turnover index, (h) the Athens stock exchange, according to the General Index, and (i) spreads, which declined significantly. The major component of private consumption expenditure was also characterized by positive developments, but, in this case, the recorded rise was rather weak.

Favourable developments also characterized most of the indicators reflecting business expectations on a sectoral level, especially in construction, as well as some of the indicators incorporating the assessments for new and anticipated orders in industry, and also the economic sentiment indicator for Greece. Given the adverse situation still characterizing the domestic labour market, of great importance for the improvement of the economic conditions in the country is the continuation of the gradual reduction in unemployment on an aggregate level, as well as for the long-term and the newly unemployed, alongside with the preservation of the increasing trend in employment both on an aggregate level and in the three individual sectors, and especially in the primary sector.

On the negative side,⁴ the decrease in the key macroeconomic component of investment stands out, driven by the double-digit negative rate of change in transport equipment investment, which prevailed over positive rates of change in all the other investment categories. A falling trend characterized once again the production index in construction, with negative developments being mainly driven by the production index of civil engineering, while the production index of building construction recorded a positive path. Finally, there was no remarkable improvement in most of the considered competitiveness indicators and no significant increases with reference to export expectations.

The forecasted course of the real GDP in the country, as well as the overall domestic economic conditions, may evolve according to a more or less favourable than indicated by the above presented forecasts- scenario during 2018, depending on certain critical and decisive developments which concern a wide range of factors. These are associated, on the one hand, with the course of the major GDP components, which determine the degree of the medium-term enhancement of the growth dynamics and the number of jobs created in the country. More particularly, they refer to the strengthening of private consumption, the recovery in investment and the preservation -or even enhancement- of the general favourable sentiment with regard to exports. On the other hand, they relate to the potential positive effects on the domestic economy resulting from the completion of the economic adjustment programmes in August 2018 and the ability of the country to raise funding directly from financial markets thereafter. Finally, they are linked to any possible adverse effects arising from the implementation of economic measures, which incorporate significant additional financial burdens for households and enterprises and exert further pressure on their tax-paying and financial capacity.

^{4.} Here again, the ascertainments refer to the course of the variables on a non-seasonally adjusted basis.

2. Public finance

KEPE, Greek Economic Outlook, issue 37, 2018, pp. 16-17

2.1. State Budget execution, January-August 2018

Elisavet I. Nitsi

According to the most recent data retrieved from the General Accounting Office,¹ the execution of the State Budget in the period January-August 2018, on a modified base, has improved in comparison with the corresponding period of 2017, as well as the targets set, as they were reflected in the executive summary of the State Budget for the fiscal year 2018 and the Medium-Term Fiscal Strategy 2019-2022 (MTFS). More specifically, according to the data shown in Table 2.1.1, the State Budget balance had a deficit amounting to 1.24 billion euros against a deficit of 1.27 billion euros in the corresponding period of 2017 and a target of 2.15 billion euros from the State Budget, and 3.38 billion euros from the MTFS. Accordingly, the State Budget Primary Balance had a surplus of 3.14 billion euros, significantly higher than the target set at 1.48 billion euros both from the State Budget and the MTFS. It is, though, slightly lagging against the primary balance of 3.54 billion euros compared to the same period in 2017.

Moreover, State Revenues are moderately higher compared to the corresponding period of the previous year, amounting to 31.85 billion euros, increased by 419 million euros or 1.33%, as well as compared to the targets set for revenues by both the MTFS (set at 30.93 billion euros, which is a gain of 917 million euros or 2.97%) and the Budget (which amounted to 31.23 billion euros, increased by 617 billion euros or 1.98%). The increase in revenues can be attributed mainly to an increase in the Ordinary Budget revenues increase, amounting to 30.42 billion euros.² The State Budget also shows an increase in its expenditure, amounting to 33.10 billion euros, that is 386 million euros more or 1.18% compared to the first eight months of 2017, while the expenditures are clearly reduced compared to the target set by the MTFS, set at 34.32 billion euros, falling short by 1.23 billion euros or 3.58%, as well as the Budget, as it was spent 971 million euros less or 2.85%. This fall in expenditure is mainly owed to the decrease the Public Investment Program (PIP) by 38.5% compared to the targets set by the State Budget and the MTFS.

More specifically, the expenditure of the Ordinary Budget amounted to 31.61 billion euros, showing an increase of 491 million euros versus the same period of 2017 and a decrease of 48 million euros against the MTFS target and 304 million euros against the State Budget. The increase of the Ordinary Budget expenditure can be attributed to the increase in primary expenditure, which amounted to 27.24 billion euros, reduced compared to the same period in 2017 by 930 million euros or 3.54%. Against the targets set, primary expenditure is less by 380 million euros or 1.38% and 124 million euros or 0.45% compared to the target set by the MTFS and the State Budget, respectively. On the contrary, interest paid, amounting to 4.38 billion euros, is lower by 438 million euros or 9.10% compared to the corresponding period of 2017, but is slightly higher than the targets set by the MTFS and the Budget by 76 million euros or 1.77%.

From the State Budget Execution figures, it is shown that a significantly larger primary surplus was achieved in the first eight months of 2018 than the estimates made for this period in both the 2018 State Budget and the MTFS 2021-2022, which demonstrates its attainment. In addition, the Financial Facility Agreement expired in August and, consequently, so did the country's funding from the European Support Mechanism, leaving the Greek economy at a turning point. On the one hand, the slight increase in the growth rate as well as the pri-

^{1.} Based on preliminary data published in the State Budget Execution Monthly Bulletin, August 2018, General Accounting Office, September 2018.

^{2.} The exact distribution among the revenue categories of the Ordinary Budget will be made when the final State Budget Execution Monthly Bulletin is issued.

TABLE 2.1.1 State Budget execution, January-August 2018 (million €)

	JanAug. 2017		JanAug. 2018	
	Outcome ¹	Outcome	Targets MTFS ²	Budget Targets ³
State Budget				
Net Revenue	31,432	31,851	30,932	31,234
Expenditures	32,703	33,089	34,316	34,060
Ordinary Budget				
Net Revenue	30,242	30,417	29,332	30,011
Expenditures	31,121	31,612	31,916	31,660
- Primary expenditure	26,305	27,235	27,615	27,359
- Interest payments (on a cash basis)	4,815	4,377	4,301	4,301
Public Investment Program (PIP)				
Revenue	1,190	1,435	1,601	1,223
Expenditures	1,583	1,477	2,400	2,400
State Budget Primary Balance ⁴	3,544	3,139	917	1,475
State Budget Balance	-1,271	-1,238	-3,384	-2,826

Source: General Accounting Office, Greek Ministry of Finance.

Notes:

1. The total revenue and expenditure outcome is preliminary and will be finalized after the vote of the 2017 annual Budget report (for both revenue and expenditure).

2. Targets of the Medium-Term Fiscal Strategy 2019-2022, adjusted to the aggregate figures as reflected in the estimates of the MTFS Explanatory Report.

3. Targets as they were reflected in the Executive Summary of the State Budget for the fiscal year 2018.

4. + surplus, - deficit.

mary surplus, which is much greater than required by the agreements with Greece's debtors, give the Greek government autonomy to exercise social policy through the distribution of the surplus so as to help citizens in a difficult economic situation; about one third of the population lives below the poverty line. On the other hand, particular care should be given in the compliance with the agreements with the partners under the memorandum, and if they are to be overturned, it should be done in agreement with Greece's counter partners in the Eurozone, as their confidence, as well as that of the markets, in the Greek economy might be compromised and, consequently, the country's ability to borrow and meet its financing needs, may be compromised as well.

2.2. The evolution and structure of public debt

Christos Triantopoulos

Cash flow management, in the context of the need to create a "safety net" (in terms of liquidity) for the period following the fiscal adjustment program, affects the level of public debt in 2018 - in parallel, of course, with the outcome of the fiscal balance and the course of economic activity. Thus, according to the European Commission's report on Greece (July 2018), the General Government debt is estimated to increase to 188.6% of GDP in 2018, compared with the estimate of the State Budget 2018 that stands at 179.8% of GDP (or 332 billion euros). However, Preliminary Draft Budget 2019 estimates that the General Government debt will reach 183.0% of GDP (or 335 billion euros). Both estimates are the country's highest historical public debt in terms of Gross Domestic Product, as in 2017 it is estimated to have reached 178.6% of GDP (317.4 billion euros) from 180.8% of GDP (315 billion euros) in 2016. According to the European Commission, the public debt level of 2018 will -according to the (optimistic) baseline scenario- be followed by a course of de-escalation in 2019 and 2020, reaching 178.3% of GDP, and 169.9% of GDP, respectively (Figure 2.2.1). Probably, these projections will be

downward revised after the Preliminary Draft Budget 2019 scenario.

The picture, due to the intergovernmental debt (including short-term borrowing through repos agreements with General Government entities), is slightly different in the case of Central Government debt. According to the data of the General Government Monthly Bulletin, the Central Government debt in July 2018 stood at 342.9 billion euros, increased by 14.2 billion euros compared to the end of 2017 (Table 2.2.1). This increase derives from the funding received from the European Stability Mechanism until the end of the program and the large increase of short-term loans by 8.5 billion euros. Thus, the loans from the Financial Support Mechanism reached 238.6 billion euros, constituting 69.6% of the total Central Government debt. At the same time, the share of Central Government debt held in bonds in July 2018 stood at 15% of debt (51.6 billion euros) (Table 2.2.1). In addition, Central Government funding is maintained at the same levels as in the previous months through short-term securities and, in particular, Treasury bills, which remained stable at 14.7 billion euros (Figure 2.2.2).

It is worth noting that, contrary to the State Budget 2018 projections regarding the replacement –and thus decrease– of short-term loans in 2018, short-term borrowing through repos agreements with General Government entities has increased. In particular, according to the data of July 2018, intergovernmental loans through repos agreements increased to 23.5 billion euros compared to 14.9 billion euros at the end of 2017



TABLE 2.2.1 Structure of Central Government debt

	2011		2013	2013		7	July 2018	
	Million euros	% debt	Million euros	% debt	Million euros	% debt	Million euros	% debt
A. Bonds	259,774.18	70.6	76,296.25	23.7	50,457	15.4	51,577	15.0
Bonds issued domestically	240,940.37	65.5	73,415.28	22.8	48,681	14.8	49,813	14.5
Bonds issued abroad*	18,833.81	5.1	2,880.97	0.9	1,776	0.5	1,764	0.5
B. T-Bills	15,058.63	4.1	14,970.82	4.7	14,943	4.5	14,686	4.3
C. Loans	93,145.19	25.3	230,210.90	71.6	248,373	75.6	253,182	73.8
Bank of Greece	5,683.99	1.5	4,734.61	1.5	2,849	0.9	2,378	0.7
Other domestic loans	836.71	0.2	115.50	0.0	247	0.1	237	0.1
Financial Support Mechanism loans	73,210.36	19.9	213,152.48	66.3	232,959	70.9	238,592	69.6
Other external loans **	13,414.13	3.6	12,208.31	3.8	12,318	3.7	11,975	3.5
D. Short-term loans ***	0.00	0.0	0.00	0.0	14,931	4.5	23,479	6.8
Total (A+B+C+D)	367,978.00	100.0	321,477.97	100.0	328,704	100.0	342,925	100.0

Source: Public Debt Bulletin (December 2011, December 2013) and General Government Bulletin (July 2018).

Notes: * Including securitization issued abroad.

** Including special purpose and bilateral loans.

*** Including repos.

FIGURE 2.2.2 Central Government debt (July 2018), (million €; % debt)



Source: Ministry of Finance, General Government Bulletin (July 2018).

(Figure 2.2.3), thus this specific source of financing constituted 6.8% of the total Central Government debt (Figure 2.2.2). This is a particularly high level, which is far from the State Budget 2018 estimates projecting that financing through repos agreements would stand at no higher than 9 billion euros at the end of the year. However Preliminary Draft Budget 2019 estimates that at the end of 2018 the total financing through repos agreements will remain at 23 billion euros.

The short-term measures to strengthen the long-term sustainability of public debt have further affected the Central Government debt characteristics and, in particular, the stability of the interest rate. Thus, in June 2018, the share of the Central Government debt at fixed-rate debt stood at 80.1% of the debt, against 48.1% of the debt in December 2017 and 28.5% of the debt in December 2013 (Table 2.2.2). The result, therefore, is to strengthen the country's public debt against the risks linked to interest rate fluctuations and monetary policy changes. With regard to the other characteristics, there was no differentiation compared to the previous year; thus, the non-negotiable debt in December 2017 stood at 80.3% of the debt, while 97.6% of the debt was in euros.

Finally, as far as the establishment of a "safety net" (in terms of liquidity) is concerned, as part of the effort to

FIGURE 2.2.3 Central Government short-term loans (repos)



Source: Ministry of Finance, General Government Bulletin (various months).

Note: The July 2015 performance is widely diverted as it includes the short-term "bridge" loan of €7.16 billion from the European Financial Stability Facility that Greece received during the period between the second and third adjustment programs.

TABLE 2.2.2 Composition of Central Government debt

	December 2011	December 2012	December 2013	December 2017	December 2018
A. Rate					
Fixed rate ¹	62.0%	32.7%	28.5%	48.1%	80.1%
Floating rate ^{1.2}	38.0%	67.3%	71.5%	51.9%	19.9%
B. Trade					
Tradable	74.7%	34.3%	28.4%	19.9%	19.7%
Non-tradable	25.3%	65.7%	71.6%	80.1%	80.3%
C. Currency					
Euro	97.5%	96.7%	95.9%	97.4%	97.6%
Non-Euro area currencies	2.5%	3.3%	4.1%	2.6%	2.4%

Source: Public Debt Bulletin (December 2011, December 2012, December 2013, December 2016, December 2017, June 2018).

2. Index-linked bonds are classified as floating rate-bonds.

raise funding outside the fiscal adjustment program, it should be noted that according to the Public Debt Bulletin, in June 2018 the Greek Government's cash reserves stood at 13.1 billion euros, and the balance in the special public debt service account stood at 2.5 billion euros. In contrast, a year ago, in June 2017, the Greek Government's cash reserves amounted to only 1.4 billion euros, and the available balance in the special public debt service account was only 41 million euros.

Notes: 1. Fixed/floating participation is calculated including Interest Rate Swap transactions.

KEPE, Greek Economic Outlook, issue 37, 2018, pp. 21-29

3.1. Recent developments in key labour market variables

Ioannis Cholezas

3.1.1. Introduction

This issue of the *Greek Economic Outlook* discusses labour market developments during the first semester of 2018 and the weak recovery of employment observed. The increase in the number of the employed continued in the second quarter of 2018, although at a different pace across population groups. Moreover, specific industries proved more effective in creating jobs, while new jobs are unequally distributed across regions. The characteristics of the new jobs do not comply with the model of full-time open-ended job contracts, and that is disturbing. Unemployment, on the other hand, continued to decline, but the size of the improvement, once again, depends on personal attributes. Last but not least, there are several labour market institutional reforms introduced. Reforms are expected to continue, since the country exited the financial support programmes, and will probably have a positive impact on the wages of the employed, so long as they are implemented with caution. However, it is difficult to foresee their impact on unemployment. The discussion of the labour market relies on data from the Labour Force Survey by ELSTAT and from the reports of the information system ERGANI.

3.1.2. Employment

In the second quarter of 2018 approximately 137 thousand new jobs were created. Admittedly, a large share of those jobs are seasonal, e.g., due to the increase in tourism flows. Nevertheless, the increase is bigger than the one reported for 2017Q2, which suggests that labour market conditions are systematically improving. On the contrary, the y-o-y¹ increase, which is free of seasonal variation, but not of fluctuations due to the cyclicality of the business cycle, is smaller in 2018 compared to earlier years. For instance, the number of the employed increased by approximately 69 thousand in 2018Q2, 88.8 thousand in 2017Q2, 77.1 thousand in 2016Q2 and

GRAPH 3.1.1





1. A y-o-y change represents the change when compared to last year's same quarter.

86.4 thousand in 2015Q2. Although the number of the employed increased for the sixteenth consecutive quarter on a y-o-y basis, the slowdown of the process of new jobs creation should cause concern.

The discussion about employment leads to two interesting questions: a. what are the population groups that seem to benefit more from the slow recovery?, and b. what are the types of employment that increase faster than the rest? Answering these questions will shed light on the type of new jobs created and allow directing active labour market policies towards specific population groups. The discussion that follows will rely mostly on annual changes, in order to avoid the seasonal fluctuation of economic activity which may be coincidental.

New jobs by population groups, industry and region

Since the beginning of the recovery in 2014 (2014Q2-2018Q2), approximately 321 thousand jobs have been created. Of those, almost 57% have been occupied by men (Table 3.1.1). Over the past year men dominated new jobs even more. As a result, approximately 18% of the new jobs were occupied by women. Given the lower female employment rate (34.1% vs. 50.9% in 2018Q2), this gender hiring gap should be addressed by policymakers. Otherwise, it may deprive half the population from potential employment opportunities and in the long run make retirement more difficult.

TABLE 3.1.1 Changes in the number of the employed, 2014Q2-2018Q2

Decomposing age group movements is a more complicated task, because, first, there are more groups and, second, they are more heterogeneous. For instance, youth aged 15-24 constitute the smallest age group of the labour force for the simple reason that a large part of its members are still in school: 6.3% in 2014Q2 and 5.2% in 2018Q2. Therefore, the fact that 1.4% of new jobs are occupied by members of this age group comes as no surprise. Generally speaking, the drop in the labour force share of individuals up to 44 vears old and the rise in individuals over 45 is a discouraging phenomenon, although probably expected given the aging of the population. When comparing the shares of different age groups, it turns out that the share of those up to 44 years old has decreased; the share of those aged 45-64 has increased, by approximately 3 percentage points, while the share of those over 65 has marginally decreased. Therefore, it comes as no surprise that the majority of new jobs created during the past four years were mostly occupied by individuals aged 45-64 (74.1%), despite the fact that they constituted 36.7% of the labour force in 2014Q2. One plausible explanation is that the skills the labour market is looking for are more often found in older individuals and, thus, the new jobs created have a compatible content. Note also that this specific composition of skills could encourage brain drain of mostly high-skilled young people, a phenomenon which is often discussed publicly.²

	2014Q2	2018Q2	2014Q2-2018Q2	% of total employed
Total	3,539.1	3,860.4	321.3	-
Men	2,062.3	2,244.6	182.3	56.7
Women	1,476.8	1,615.8	139.0	43.3
15-24	146.9	151.5	4.6	1.4
25-29	328.3	347.6	19.3	6.0
30-44	1,590.9	1,630.4	39.5	12.3
45-64	1,416.3	1,654.4	238.1	74.1
65+	56.8	76.5	19.7	6.1

^{2.} Labrianidis, L. and Pratsinakis, M. (2015), Outward migration from Greece during the crisis. Final Report. LSE. Available at: http://www.lse.ac.uk/europeanInstitute/research/hellenicObservatory/CMS%20pdf/Research/NBG_2014_-Research_Call/LOIS%20LAMBRANIID-IS_Outward%20migration%20from%20Greece%20during%20the%20crisis%20.pdf>.

Graduates from the bottom levels of education face more serious problems in finding a job compared to graduates from the top levels of education. Since 2014 the number of employed lower secondary graduates and primary or less education graduates has decreased by approximately 102 thousand, of which only two thousand were from the first group. Given that the number of the employed graduates from the remaining education groups increased, that decrease is something that should be seriously addressed. Moreover, even during the past year, the number of employed graduates from the bottom two education levels decreased, as more than 20 thousand jobs were lost. Although at first sight these are disturbing signs, one should bear in mind that these graduates are generally much older than average, and they have a much higher retirement rate. For instance, the number of labour force participants who have completed lower secondary and primary or less education decreased by 25% in the last four years and 3% over the past year. Both decreases are bigger than the respective decreases in the number of the employed (20% and 1%).

Regarding individuals who graduated from the top levels of education, the number of PhD and/or Master's holders has increased the most, irrespective of time; approximately 40% in the past four years and 17% over the past year. Interestingly enough, recently, i.e., 2018Q1-2018Q2, it is the same group of graduates that exhibits the biggest increase (5.5%). However, it is not clear whether this increase fulfils labour market needs or is fuelled by over-education;³ this guestion cannot be answered in this short article, but it is certainly a question worth exploring and hard to discard. Moreover, it is worth noting that the number of labour force participants with this particular level of educational attainment exhibited a similar increase; such an increase could be justified on the grounds of attempts to improve employment prospects by acquiring more education.⁴ Another group that exhibits a strong increase is those holding a technical professional education degree; in four years' time their number has grown by 22% and over the past year by 6.5%, following increases recorded in PhD and/or Master's holders. Verifying previous issues of the Greek Economic Outlook, university graduates do worse, even compared to upper secondary education graduates.

Over the past four years, citizenship is another attribute that has proven crucial in getting a job, since the recovery that started in 2014 seems to involve only Greek citizens. In particular, some 320 thousand jobs were created between 2014b and 2018b, which is the sum of jobs occupied by Greek and non-Greek citizens. To be more precise, approximately 385 thousand new jobs were occupied by Greeks, while at the same time some 65 thousand jobs occupied by non-Greeks were lost. The composition of changes is similar in the past year when 53 thousand new jobs were occupied by Greeks as opposed to 16 thousand jobs that were lost by non-Greeks. Only during the second quarter of the year were new jobs occupied by both Greeks and non-Greeks, but this is probably easily explained by the seasonal expansion of the tourist industry which typically employs a lot of non-Greeks. Therefore, all the signs suggest that the recovery involves mostly Greeks, and this has probably a lot to do with the types of new jobs created and the industries involved. It is also highly likely that the difficulties non-Greeks are facing in finding a job have a lot to do with the reduction in the population of non-Greeks reported in LFS. For instance, according to LFS, since 2014Q2, the number of non-Greeks dropped more than 25%, from 58 thousand to approximately 405 thousand in 2018Q2.

Services seem to be the leading sector in job creation over the past four years where more than 270 thousand jobs were created, i.e., almost 10.7% more jobs (Graph 3.1.2). Tourism is responsible for the creation of one-fourth (approximately 81 thousand) of new jobs in the tertiary sector, and trade is responsible for another fifth (approximately 66 thousand). The secondary sector has contributed some 55 thousand new jobs (10.3% more jobs). Four out of ten new jobs were created in Manufacturing, i.e., some 13 thousand. Over the past year the same sectors and industries stand out. The only difference is that most industries have a positive balance of jobs. Surprisingly, there are a lot of new jobs in the primary sector, in which employment has generally been declining over time. A plausible explanation could be that new products and fields of business, such as bio products, have something to do with it, but no solid answer can be given based on available data. On the contrary, the number of available jobs continues to decline in some industries, such as Transport and storage (5.7 thousand), Financial and insurance activities (8.4 thousand) and Households as employers (6.8 thousand). On the oth-

^{3.} This phenomenon refers to employed individuals who embody more skills than those required by the job they hold.

^{4.} Some people choose more education in order to improve their employment prospects; either because they assume that there is a demand for better skilled persons in the market or because they are trying to stand out, i.e., to signal the skills they embody to potential employers. In any case the result is the same, i.e., better employment prospects.



er hand, other industries exhibited a strong increase in the number of jobs, such as Human health and social security (19.5 thousand) and Agriculture, forestry and fishery (15.5 thousand), i.e., the primary sector.

The number of the employed increased faster in regions that rely heavily on tourism, as the high seasonal volatility suggests. In particular, Crete, the South Aegean Islands and the Ionian Islands exhibited an annual increase in the number of the employed ranging from 4% to 5.5%. At the bottom of the ranking laid Epirus (4%) which is much less dependent on tourist flows compared to the previous three regions. Moreover, those three regions have typically higher employment rates, close to 50%. The seasonal volatility of employment seems unreal in the Ionian Islands, where it reached 30%, followed by the South Aegean, with an increase of approximately 19%, and Crete, with an increase in the number of the employed by almost 14%. Since the beginning of the employment recovery in 2014, over half of the regions exhibit a two-digit increase in the number of the employed. Surprisingly enough, Central Macedonia (15.3%) is amongst the regions with the strongest increase, along with Crete (17.7%) and the Ionian Islands (15.1%).

The characteristics of the new jobs

It has been clearly stated many times in previous issues of the *Greek Economic Outlook* that the new jobs created differ substantially from the ideal of full-time open-ended contract jobs that dominated in the past; the number of flexible types of employment has expanded considerably during the depression. To analyse the current situation, data from the LFS and ELSTAT, as well as additional data from the information system ERGANI, are used.

It turns out that 90.6% of jobs are full-time jobs in the second quarter of 2018. On a y-o-y basis, the number of part-time jobs decreased slightly as a share of total jobs, since they decreased faster than full-time jobs (3.4% vs. 2.4%). Despite the fact that the seasonal increase in the number of the employed (2018Q1-2018Q2) involved part-time jobs also, the latter fell considerably short compared to the full-time job increase (1.4% vs. 3.8%). As shown in Graph 3.1.3, the annual decrease in the number of part-time jobs, contrary to the increase in the total number of jobs, can be traced to the last two guarters of 2015 and the first two guarters of 2018. Thus, it would come as no surprise if the trend was reversed soon, similar to what happened in 2015; nonetheless, the data seem to justify some optimism. On the other hand, such optimism seems premature if one considers that the share of those working part-time because they were unable to get a full-time job has increased. That share of parttime employed was 68.2% in 2018Q2 compared to 67.2% in 2017Q2 and 65.7% in 2014Q2.

According to the reports published by ERGANI, in the first semester of 2018 some 1,359,805 individuals were hired. Of those, part-time and work-in-shift job contracts accounted for 44% up to 56%. With the exception of April, in the rest of the semester fulltime job contracts barely reached 50% of the total. It seems, then, that in the first semester of the year there has been a gradual de-escalation of flexible job contracts and a small increase in full-time job hires

GRAPH 3.1.3 Annual percentage change in full-time and part-time jobs



compared to previous years. Nevertheless, during the same months 22,757 full-time job contracts were converted to flexible job contracts (approximately 64% to part-time, 24% to work-in-shifts and 12% to work-inshifts without the employee's consent). Compared to the first semester of 2017, the number of conversions decreased following successive increases in the past years. Moreover, the share of contracts converted to part-time jobs increased faster, while conversions to work-in-shifts without the employee's consent decreased. Although it is too soon to draw solid conclusions, the signs suggest that the situation is slowly changing.

Another point that should be critically assessed is the number of the under-employed. According to ELSTAT and the LFS, in the past four years the increase in the number of the employed was accompanied by an increase in the number of the under-employed (including those employed part-time who would like to work more hours). That increase reached 17 thousand in period 2014Q2-2018Q2, and it involved mostly women (almost 82%). Moreover, under-employment is quite common amongst individuals aged 25-29 and 45-64. Interestingly, over the past year a strong decrease in the number of the under-employed has been recorded (almost 11 thousand individuals), which involves mostly women (66%), who suffer more anyway, and individuals aged 45-64. The seasonal volatility of employment (2018Q1-25018Q2) seems to favour under-employment, probably primarily due to the types of jobs created, and individuals aged 25-44, while a considerable reduction in the number of the under-employed is reported for individuals aged 45-64.

3.1.3. Unemployment

Following the increase in employment, the unemployment rate decreased in the second guarter of 2018. In particular, it dropped by two percentage points both on a y-o-y basis and on a quarterly basis to reach only 19%. Women continue to face a bigger unemployment rate than men (23.7% vs. 15.2%), but what is bothersome is the widening of the gender unemployment gap to 8.5 percentage points. Note that this is one of the widest gaps since the beginning of the depression. A plausible explanation is that the crisis forced unskilled women to enter the labour force, in order to support household income, but with much fewer chances to get a job. Nevertheless, as a share of the labour force, women still comprise approximately 44% of the total. Another explanation is that the new jobs created involve industries and occupations typically favouring men. This is an explanation more difficult to reject without the use of a richer dataset able to reveal the gender composition of the employed in various industries and how it changed.

The unemployment rate for youth aged 15-24 also dropped to 38.8%, which is five percentage points lower than 2017 and 5.6 percentage points lower compared to the first quarter of 2018. The latter is due to seasonal volatility which seems to favour youth, but the former is due to improved economic conditions, either real or perceived. The de-escalation due to improved economic conditions is faster for youth as shown by the narrowing of the unemployment gap between them and individuals aged over 25 to 21 percentage points (previously 24). The improvement of the youth standing over time in terms of unemployment prospects is partly reflected by the decrease in the share of the young unemployed (10.6% in 2018Q2) compared to both 2014Q2 (12.4%) and 2017Q2 (11.6%).

The higher the education level attained, the lower the unemployment rate. In the second quarter of 2018 that had not changed. Holders of PhD and/or Master's degrees faced an unemployment rate of 9.4%. For university graduates the respective rate was 14.1% and for upper technical vocational education graduates the rate was 19.8%, which is close to upper secondary education graduates. Nevertheless, over the past four years the unemployment rate dropped faster for lower secondary education graduates (10.3 percentage points), followed by upper secondary education graduates and upper technical vocational education graduates (7.7 percentage points). Over the past year, the situation of the latter group has improved faster than the rest of the groups (2.5 percentage points). On the other hand, seasonal volatility favours mostly the same education groups who perform better over time.

Citizenship proves very important in shaping unemployment prospects. While at the beginning of the economic downturn non-Greeks had better employment prospects than Greeks and faced a lower unemployment rate by approximately one percentage point, at the peak of the crisis in 2014Q2, the unemployment rate for non-Greeks was five percentage points higher than that for Greeks (30.3% vs. 25.1%). In the second quarter of 2018, despite the fact that the unemployment rate decreased for both groups, it did so faster for the Greeks, so that the unemployment gap between the two groups widened by approximately seven percentage points (18.6% for Greeks vs. 25.4% for non-Greeks).

Employment prospects differ across the country as is manifested by the fact that in the second guarter of 2018 the unemployment rate ranged from 11.5% in Crete to 27.1% in West Macedonia. The unemployment rate in Attica was close to the country average, while in Central Macedonia (including Thessaloniki) it was two percentage points lower than the national mean. Over the past year, the strongest drop was reported in East Macedonia & Thrace and Epirus (4.3 percentage points). Crete followed closely (4 percentage points) and so did West Greece (3.1 percentage points). Crete seems to do guite well considering that the unemployment rate dropped by approximately 11 percentage points over the past four years. Seasonality is more pronounced in the Ionian Islands, the South Aegean islands and Crete due to tourist flows: in those regions the unemployment rate dropped in the second quarter of the year by 12.7, 9.6 and 8.4 percentage points, respectively.⁵ Given that Crete, and the Ionian Islands to a smaller extent, seem to be better equipped to manage seasonal unemployment volatility, it would be interesting to explore the channels through which seasonal volatility spreads over the local economy.

Long-term unemployment is often at the centre of public discourse and, given its repercussions, it should be one of the policymakers' main concerns. By the term



^{5.} Interestingly enough, these regions exhibited a stark increase of the labour force, which suggests that many people drop out during the winter and get back into the labour force when the tourist season begins. That is why the unemployment rates fluctuate so dramatically.

'repercussions' one should think of cyclical unemployment turning to structural, causing the depreciation of knowledge and skills of the labour force and, consequently, demanding far more intensive support for the unemployed to get a job (Graph 3.1.4 above). Despite the drop in the unemployment rate and the creation of new jobs over the past four years, three out of ten unemployed individuals are still looking for a job for more than twelve months. Although the number of the long-term unemployed dropped relatively faster compared to that of the overall unemployed, i.e., 31.4% vs. 29.2%, the pace of the decrease is quite slow, and there should be efforts to increase it.

3.1.4. Institutional changes

During the economic downturn and under pressure by the Memorandums of Cooperation between the Greek state and the institutions (then Troika, i.e., the European Committee, the European Central Bank and the International Monetary Fund), there was a series of important institutional reforms in the labour market and labour relations aiming at boosting employment and competitiveness, as well as allowing firms to survive. Nevertheless, these reforms worsened the bargaining power of labour and, often, dragged working conditions with them.⁶

In July 2018, the parliament passed Law 4554/2018 which introduced changes to fines imposed on employers and firms employing undeclared workers (article 1). In particular, the fine did not change (€10,500) for the first occurrence, but it doubled for the next occurrence and tripled for the following occurrences. In case of a violation, the employer is forced to pay social security contributions for three months corresponding to the minimum wage or daily rate, unless he/she can prove that employment was shorter than that. The important twist, though, is that the employer is given the right to hire the undeclared individual under a full-time employee job contract within ten days of the day of the audit; that way he/she is entitled to a fine reduction. The fine will become €7,000 in case of a three-month employee job contract, €5,000 in case of a six-month employee job contract or €3,000 in case of an annual employee job contract, without laying off any other personnel during that time. The justified aim is to reduce the firm's/employer's cost from complying with the law⁷

(although it is still higher than employing an undeclared worker) and at the same time to secure the employee's interests, who will be legally employed henceforth.

Another important provision of the law was the responsibility of the assigner, contractor or subcontractor (article 9) according to which "Any physical or legal entity that assigns, as part of its business activity, the execution of a part of a project or a whole project (the assigner) to another physical or legal entity (contractor) is solely and mutually responsible with the contractor towards the employees of the latter regarding wage claims, social security contributions and any pending layoff compensations." The effort of the legislator to improve the protection of the employed by extending responsibility to all involved parties is obvious and welcome. Nevertheless, a few questions come up regarding the possibility of passing responsibility through to the assigner and its consequences, despite the provision for safety valves (article 9, §5). Moreover, the fact that the provision does not apply to public legal entities (NPID or NPDD) seems odd.

In August 2018, with the completion of the third programme of financial support, an effort began to counteract the negative impacts on wages that came about by labour market reforms previously implemented, as the government seems willing to utilise any space of economic policy available. Nevertheless, it should be clear that, within the modern globalised financial environment, national economic policies are constantly evaluated by world markets, which determine the cost and extent of financing. Given that Greece continues to run budget deficits, although there has been a primary budget surplus over the past few years, and, therefore, needs to borrow from world markets, it should adequately comply with its commitments. Otherwise, the cost of borrowing will increase, and that will have adverse consequences on debt sustainability and economic growth prospects.

Within the above described framework, the government expanded four sector-specific Collective Agreements in September. In particular, following the fulfilment of the criterion of adequate coverage (i.e., 51% of the employed in the sector need to be covered by the collective agreement), the government extended the effectiveness of collective agreements to all firms in the banking sector, maritime agencies and businesses,

^{6.} The reader can look for the description of the reforms in previous issues of the *Greek Economic Outlook* and in particular in issues 13, 14, 18 and 20. Moreover, an interesting review of the changes in working relations can be found at Kouzis, G. (2017), The crisis and the memorandums of understanding are crushing labour, *Social Policy*, *6*, 7-20. (in Greek)

^{7.} In the Greek Economic Outlook, issue 25, and in the article regarding undeclared work, the author commented on the size of the fine and its possibly devastating effects on small firms.

travel and tourist offices and agency firms-members of the International Maritime Union. In total, it is estimated that the decision involves some 75 thousand employed.⁸ Moreover, in the middle of September the Minister of Labour, Social Security and Social Solidarity undersigned the extension of the collective agreement for employed individuals in hotels, who account for approximately 114 thousand persons.⁹

Nevertheless, it should be noted that there are specific rules in place, in order to extend the effectiveness of the collective agreement to all firms in the sector. Otherwise, the process could lead to failure and cause a confrontation between the employers and the employed, which is highly undesirable at the moment. Note, for instance, that in order to assess whether a collective agreement applies to 51% of the industry's employed, it should first be registered with the Ministry of Labour, Social Security and Social Solidarity. Then, the High Council for Labour should call upon the employers' association that signed the agreement to submit to the Department of Special SEPE Inspectors the registry of its members for whom the agreement is binding, in order to verify through ERGANI that indeed 51% of the employed in the industry are covered by it. That means that in case the employers' association does not submit its members' registry, the procedure cannot be completed and the expansion of the collective agreement is impossible.¹⁰

Under the circumstances, it would probably be wise to have some kind of exception, at least temporarily, for firms that face acute survival issues. The aim of any reform should be to improve working conditions and increase employment at the same time. This twofold goal demands careful handling, in order to avoid an adjustment of working hours, an increase in undeclared work, an expansion of employment in firms of temporary hired work (whose employees are not covered by any collective agreement), or even the shutting down of firms; these would have detrimental effects on the desirable increase in employment and the quality of new jobs. In this respect, perhaps it would be preferable to set up a mechanism similar to the one for the revision of the minimum wage, which could quantify the expected sector-specific and economy-wide impacts on employment and competitiveness. Moreover, there should also be some consideration for those employed by the so-called professional employer organisations, i.e., employees hired by a firm, but offering their services to another usually on a temporary contract.

Last but not least, it seems that the government plans to initiate the process for the revision of the minimum wage with the participation of social partners.¹¹ Although the result of the consultation process cannot be a priori determined, the government wishes to increase the minimum wage gradually, starting January 2019, and abolish the sub-minimum wage for youth below 25 years of age. To compensate for the loss of young candidates' attractiveness and avoid their substitution by older individuals, the government is considering decreasing social security contributions for this particular group of employees. It should be noted that the impact of a change in the minimum wage on employment has been thoroughly discussed and studied worldwide, but no clear answer has been given for the time being.

3.1.5. Conclusions

In the second guarter of 2018 approximately 137 thousand new jobs were created. That means that the number of the employed in the Greek economy increased for the sixteenth consecutive quarter on an annual basis. The widening of the employment gap between men and women is a legitimate concern. Age matters when it comes to employment prospects, since the share of the employed up to 44 years of age decreased, while the share of those aged 45-64 increased. With respect to educational attainment, the biggest increase was reported for PhD and/or Master's degree holders on an annual and a quarterly basis, followed by upper technical vocational education. Moreover, the recovery of the number of the employed involves primarily Greek citizens. The greater difficulty in getting a job for non-Greeks is probably causing them to leave the country, judging by the decrease in their respective population reported in the LFS. The tertiary sector of services dominates the creation of new jobs. Tourism and Trade stand out. Not surprisingly, the geographic distribution of new jobs over the past year was in favour of regions

^{8.} See <https://www.ypakp.gr/uploads/docs/11555.pdf>.

^{9.} See <https://www.ypakp.gr/uploads/docs/11584.pdf>.

^{10. &}lt;a href="http://www.sev.org.gr/vivliothiki-tekmiriosi/miniaio-deltio-gia-to-rythmistiko-perivallon/i-epektasi-kladikon-syllogikon-symvaseon">http://www.sev.org.gr/vivliothiki-tekmiriosi/miniaio-deltio-gia-to-rythmistiko-perivallon/i-epektasi-kladikon-syllogikon-symvaseon ergasias/>.

^{11.} The interested reader can find a presentation of the mechanism in Law 4047/2012, which was discussed in the *Greek Economic Outlook*, issue 20.

which depend strongly on tourism, such as Crete, the South Aegean islands and the Ionian Islands.

The quality of new jobs improved marginally. There was a smaller share of flexible jobs created on an annual basis, but those who treat part-time employment as a solution forced by the lack of full-time jobs continue to account for a large share of the part-time employed. Available data seem to suggest that new full-time contracts, although still not as many as preferred, increased, while the conversions of employment contracts to flexible forms of employment are slowly decreasing. Moreover, over the past year a strong decrease in the number of the underemployed is evident.

The unemployment rate continued to drop in the second quarter of 2018, but what is bothersome is the fact that the gap between men and women has been widening, and it is currently one of the widest since the beginning of the recession. The de-escalation of the unemployment rate is faster for youth as shown by the narrowing of the unemployment gap between individuals aged 15-24 and those aged over 25. Upper technical vocational education graduates seem to benefit more from the reduction in the unemployment rate so far. It is interesting that the unemployment rate decreased for both Greeks and non-Greeks, but the differential widened in favour of the former. Unfortunately, despite the reduction in the unemployment rate and the creation of new jobs over the past four years, still three out of four people looking for a job qualify as long-term unemployed.

Last but not least, the attempted institutional interventions regarding collective agreements and the minimum wage should be realised within the framework already defined, in order to be useful for the society and the economy. At the same time, they must not cause any unnecessary damage to either side.

3.2. The evolution of the anatomy of material deprivation

Nikolaos C. Kanellopoulos

3.2.1. Introduction, Definitions, Data

In recent issues of the Greek Economic Outlook, the evolution of income poverty and severe material deprivation were analysed. In the current issue, the developments in the rates, the composition and the depth of material deprivation are examined, along with how these differ between the poor and non-poor in the period 2003-2017. The period under review is distinguished until 2008 as a period before the economic crisis, the period 2008-2012 as the peak of the crisis, and the period 2012-2017 as a prolongation and de-escalation of the crisis. The examination of material deprivation is of great interest as it involves issues of both social equity and economic efficiency. Moreover, it reveals the changes and adjustments of the relevant indicators during the period under review, which includes the deep economic crisis that has occurred in Greece. An interesting finding of the analysis is that, despite the deep economic crisis and the consequent dramatic increase in economic difficulties, specific indicators of material deprivation show considerable improvements, especially in recent years.

Measuring material deprivation is not an easy task because the criteria set by researchers as to who is experiencing material deprivation may vary reasonably among examined countries (for example, not owning a car in a country with a very good transport system does not necessarily indicate material deprivation, as opposed to a country without good public transportation) and over time within a country (for example, nowadays it is extremely unlikely to find a household without a colour TV, as opposed to what was the case in the past). Also, the responses given are more or less subject to the subjective perception of each respondent (for example, if the dwelling is dark or not, it may well differ even for members of the same household). For these reasons, Eurostat has decided to measure material deprivation on the basis of four main complementary components (financial stress, inability to acquire specific durable goods, housing problems, and environment related problems).¹

In particular, materially deprived persons regarding financial stress are those who cannot afford one or more of the following: a) to keep their home adequately warm; b) to pay for a one-week holiday away from home, c) to have a meal with meat, chicken, fish (or vegetarian equivalents) every second day, d) to face unexpected financial expenses, e) to be confronted with payment arrears (mortgage, rent, utility bills, etc.).

With regard to the acquisition of durables goods, one is defined as being in a state of material deprivation if he/she does not possess, not by choice, but because he/she cannot afford acquiring or maintaining, one or more of: a) a telephone, b) a colour TV, c) a computer, d) a washing machine, e) a private car.

When a resident's home has one or more of the following problems, then he/she is considered to suffer from material deprivation in housing: (a) leaking roof, damp walls/floors/foundation or rot in windows frames, (b) the house is too dark, (c) there is no bath/ shower, d) there is no indoor toilet for the sole use of the household.

Finally, with regard to the environment in which the dwelling is located, if any of the following occurs, the person is in a state of material deprivation: a) noise from neighbours or from the street, b) pollution, grime or other environmental problems, c) crime, violence or vandalism in the area.

Information on the aforementioned is derived from the European Union's Survey on Income and Living Conditions (EU-SILC). The survey is conducted annually by ELSTAT, co-ordinated by Eurostat, and offers comparable data on income distribution and composition, social exclusion, and material deprivation for 32 European countries and Turkey, as well as information on demographic characteristics of people, their position in the labour market, etc. EU-SILC data for the recent years are used until the latest available, i.e., those of 2017 (EU-SILC 2017), which were published in the summer of 2018. The most recent income-related deprivation indicators refer to 2016, while the remaining indicators use 2017 as a reference year.

^{1.} In addition to these components for which Eurostat collects detailed information on a regular basis, from time to time it also conducts more detailed surveys regarding material deprivation.

3.2.2. The anatomy of material deprivation

Figure 3.2.1 shows the evolution of material deprivation in Greece across its basic dimensions. Certain main features regarding the anatomy of material deprivation in Greece stem from the figure. In particular, the component with the largest contribution always appears to be the one that is associated with financial stress. More specifically, in 2003, 60% of the population faced some form of financial distress. This phenomenon appeared to lessen over the next few years, and in 2009 it was reduced to 55%. Since then, during the crisis, it has been rising, and in 2016 it reached its highest value, 76%, while in 2017 it marginally declined to 74.5%. It follows that, even before the crisis, a significant share of the population faced financial difficulties, which naturally spread during the crisis to a larger part of the population.

In 2003, about three out of ten Greeks experienced at least one of the remaining three dimensions of material deprivation. Interestingly, over the years, the durables dimension, as well as the housing dimension, has been steadily decreasing, implying a corresponding improvement in the standard of living of Greek households. Apart from the fall in prices for many durable consumer goods, as well as the improvement in the construction of new houses and in the materials used to renovate older homes during the period under review, it appears that even in the period of the deep crisis, Greeks managed to improve their living conditions. With regard to the environment dimension, after a deterioration that began in 2007 and peaked in 2011, there has been a downward trend in the proportion





The evolution of material deprivation by main dimension, 2003-2017

of the population declaring problems, which, however, has been reversed slightly since 2016.

Beyond the proportion of the population in one of the four main dimensions of material deprivation, the proportion of the population in each of their subcategories is also of great importance. In this respect, Table 3.2.1 illustrates in detail the composition of material deprivation for selected years, as well as its change between 2003 and 2017.

Data show that in 2003 the most common reason someone was materially deprived was the inability to pay for a one-week holiday (50.1%). However, in 2017 the main reason that puts someone in material deprivation is related to his/her inability to face unexpected financial expenses (52.7%). Inability to finance holidays ranks as the second reason (50.9%), and the third reason is the inability to pay arrears (44.9%). Although all components related to financial stress deteriorated between 2003 and 2017, the increase by 48% of those who can no longer keep their home adequately warm (2003: 17.4%, 2017: 25.7 %) is striking. Moreover, in 2017, 13% of the population could not afford a meal of meat, chicken, fish (or vegetarian equivalents) every second day.

It is interesting to see how the indicators of financial stress developed between 2003 and 2008 (i.e., before the crisis when there was a significant increase in the GDP), in the period 2008-2012 (from the onset of the crisis until its peak) as well as in the period 2012-2017 (prolongation and adaptation to the crisis). During the first period of the economic boom, all indicators of financial stress improved impressively, especially those of unexpected financial expenses or payment of arrears. During the period of the economic crisis and its peak, the deprivation indicators of financial stress worsened dramatically (only in the ability to pay for holidays was the worsening small). In the recent period, the heating, nutrition and holiday difficulties seemed to have moderated, but the payment of unexpected financial expenses continued to deteriorate significantly.

Regarding the purchase of durable goods and the housing conditions, all sub-categories in the whole period under review have improved, with the exception of the acquisition of a telephone, which, however, concerns only 0.6% of the population. What is impressive and encouraging is the steady decrease in the proportion of people who do not have money to purchase a personal computer, which from 20.6% in 2003 was limited to 6.1% in 2017. It is also noteworthy that very few declare that they are unable to acquire a washing machine (around 1%). On the other hand, despite its decline between 2003 and 2017, about 10% of Greeks

TABLE 3.2.1 The evolution of the anatomy of material deprivation, 2003-2017

		9	Change 2	Change 2003-2017		
	2003	2008	2012	2017	Absolute	%
Financial stress	66.1	58.7	68.9	74.5	8.4	13%
Keep home warm	17.4	15.4	26.1	25.7	8.3	48%
Afford holidays	50.1	49.8	52.8	50.9	0.8	2%
Afford meals	12.1	7.1	14.2	13.2	1.1	9%
Face unexpected financial expenses	44.8	26.6	40.5	52.7	7.9	18%
Payment of arrears	35.5	24.4	39.0	44.9	9.4	26%
Durables	29.8	20.3	17.3	14.2	-15.6	-52%
Telephone	0.5	0.5	0.4	0.6	0.1	20%
Colour TV	0.8	0.3	0.1	0.3	-0.5	-63%
Computer	20.6	13.1	9.3	6.1	-14.5	-70%
Washing machine	3.3	2.2	1.2	1.1	-2.2	-67%
Private car	12.2	8.8	10.0	9.7	-2.5	-20%
Housing	25.6	23.1	19.3	15.9	-9.7	-38%
Leaking roof	21	18.6	14.7	13.5	-7.5	-36%
Dark	2.0	1.6	0.7	0.5	-1.5	-75%
Bath/shower	3.5	2.5	0.5	0.3	-3.2	-91%
Indoor toilet	7.1	6.8	6.9	5.1	-2.0	-28%
Environment	31.1	32.4	41.5	34.4	3.3	11%
Noise	20.5	22.3	25.1	20.1	-0.4	-2%
Pollution	17.1	20.3	25.9	20.3	3.2	19%
Crime	9.7	12.0	20.1	13.8	4.1	42%

Source: Eurostat, EU-SILC.

declare that they cannot afford to buy or maintain a private car.

The housing dimension also shows a systematic improvement over the period under review, as all its recorded indicators, even during the crisis, are improved. However, 13.5% continue to live in a home with a moisture problem, which may also be related to the difficulty of adequately keeping their home warm.

Finally, regarding the environment dimension, the data indicate that there was a significant deterioration in the period 2007-2012 and a similar recovery in 2012-2017. The pollution and noise burden in the period 2008-2012 was restored in 2012-2017, while the deterioration regarding violence and crime, although it reversed in the period 2012-2017, still remains higher than in 2008. In 2017 one-fifth of Greeks reported living in a neighbourhood with noise or pollution problems, while almost 14% reside in areas with violence and crime problems.

Material deprivation by poverty status

The analysis so far shows that a significant proportion of the population before and during the economic crisis faced some form of inability to acquire and/or maintain specific goods or services that are widely regarded as essential for a decent standard of living. Because this weakness is not the same for all population groups, it is interesting to examine separately what more vulnerable population groups lack. To this end, Table 3.2.2 presents the anatomy of material deprivation for those who have a family income of less than 60% of the median income, i.e., for those defined as poor, as well as for all others, in the beginning and in the end of the period under consideration.

TABLE 3.2.2 Material deprivation by proverty status in 2003 and 2017

		Poor			Non-poor		
	2003*	2017*	Change %	2003*	2017*	Change %	
Financial stress	89.6	94.5	5.5%	59.9	69.5	16.0%	
Keep home warm	37.4	45.3	21.1%	12.1	20.8	71.9%	
Afford holidays	80.0	81.9	2.4%	42.2	43.1	2.1%	
Afford meals	27.8	45.8	64.7%	8.0	5.0	-37.5%	
Face unexpected financial expenses	64.8	78.2	20.7%	39.6	46.3	16.9%	
Payment of arrears	52.2	65.3	25.1%	31.1	39.8	28.0%	
Durables	42.6	29.0	-31.9%	26.4	10.5	-60.2%	
Telephone	2.1	1.4	-33.3%	0.2	0.3	50.0%	
Colour TV	2.3	1.5	-34.8%	0.4	0.0	-100.0%	
Computer	26.0	14.1	-45.8%	19.3	4.1	-78.8%	
Washing machine	7.8	2.7	-65.4%	2.1	0.7	-66.7%	
Private car	21.2	20.1	-5.2%	9.8	7.1	-27.6%	
Housing	37.1	22.9	-38.3%	22.7	14.2	-37.4%	
Leaking roof	30.1	19.1	-36.5%	18.6	12.0	-35.5%	
Dark	6.0	1.0	-83.3%	1.0	0.4	-60.0%	
Bath/shower	9.6	0.5	-94.8%	1.9	0.3	-84.2%	
Indoor toilet	8.7	8.5	-2.3%	6.7	4.3	-35.8%	
Environment	23.5	31.1	32.3%	33.1	35.2	6.3%	
Noise	16.2	16.9	4.3%	21.6	21.0	-2.8%	
Pollution	12.0	17.8	48.3%	18.4	21.0	14.1%	
Crime	7.3	13.5	84.9%	10.4	13.8	32.7%	

Source: Eurostat, EU-SILC.

Note: * Refers to proportion of relevant group (poor and non-poor).

From the table it appears that the proportion of the poor who lack a good or service is clearly higher than the corresponding proportion of the non-poor. An exception is the component that has to do with the environment dimension. In particular, the greatest difference between the poor and non-poor, both before and during the crisis, is recorded in the financial stress related components. Indicatively, the greatest difference between the two in 2003 is the ability to go on holidays, the ability to keep their home adequately warm and the ability to respond to unexpected financial expenses. Unfortunately, in 2017 the greatest difference is found in the ability to have a meal with meat, chicken, fish (or vegetarian equivalents) every other day, and then the ability to go on holidays, followed by the ability to pay unexpected expenses.

Regarding the poor, they show a high concentration in the financial difficulties of the material deprivation. Although this is an expected consequence of their low income, some dimensions of material deprivation are very upsetting and unprecedented for the Greek society, since they now concern issues of everyday living. For example, almost one in two poor individuals cannot have a decent meal on a regular basis, or cannot keep their house warm enough to live in. All these are signs that the very nature of material deprivation has been changing.

To some extent, however, it is encouraging that the components of material deprivation related to the purchase of durable goods,² as well as the housing dimension, show a decline between 2003 and 2017

^{2.} It is noteworthy that while the proportion of households owning any of the durable goods on Eurostat's list is improving, at the same time, households' inability to pay arrears (including installments for purchases) is increasing. Consequently, the positive picture from the durables dimension may not fully reflect reality.

for both the poor and the non-poor. However, even in the categories where material deprivation of the poor is declining, the poor continue to systematically fall short of the non-poor, and in some cases the difference is quite significant. Indicatively, the purchase of a private car and a computer, as well as living in a home with humidity problems is mentioned. Lastly, it is worth mentioning that between 2003 and 2017 the share of the non-poor experiencing financial difficulties (unable to buy durable goods) increased more than the corresponding proportion of the poor. Probably because there were already more poor in the respective categories.

It is clear from the aforementioned that the economic crisis did not affect the whole population in terms of material deprivation in a similar way. It also emerges that even before the crisis, the poorest part of the population faced serious material deprivation problems, while during the crisis the anatomy of their material deprivation changed substantially. Moreover, it appears that the proportion of non-poor people already experiencing material deprivation in relation to specific financial difficulties has increased significantly, indicating a wider deterioration in the population.

3.2.3. The depth of material deprivation

In addition to the proportion of the population experiencing financial difficulties and the nature of these difficulties, it is also important to see how many difficulties one faces simultaneously. It is obvious that the more difficulties one encounters, the greater the depth of material deprivation is. Table 3.2.3 records the proportion of individuals per broad dimension of material deprivation depending on how many subcomponents they are facing simultaneously.

Concerning the financial stress dimension, there has been an impressive decrease since 2008 in the share of the population that does not face any problems. In 2017, only one in four (25.5%) faced no financial difficulties, while in 2008 this figure was 41.3%. The 25.5% in 2017 is well below the corresponding 34% in 2003. Similarly, there is an increase in the number of people who lack at least two of the items examined during the period 2008-2017. It therefore appears that the depth of material deprivation on the basis of financial stress has increased systematically and drastically during the crisis.

With respect to the acquisition of durable goods, it is encouraging that the only category registering growth is those who do not face any financial problems, implying a corresponding improvement in living conditions. It is also positive that even before the crisis, the share of the population that could not afford more than one good was low, almost 6%, which fell during the crisis to 3%. Thus, regarding this dimension, the depth of material deprivation has been greatly reduced over time. The picture regarding the problems related to the residence dwelling is relatively similar as in 2003, 74.4% of the people faced no problem, while in 2017 this percentage increased to 84.1%.

Finally, as far as the environment dimension, the share of the population according to the number of problems it faces simultaneously seems to have increased during the crisis, but it is already tending to return to its previous lower levels. In particular, in 2003 almost seven out of ten people did not have any environmental problems, and in 2017, after a remarkable intermediate fall to 58.5%, they are almost two in three. Roughly speaking, a similar development is also recorded for those who declare one or more environmental problems. These increased during the crisis, but already in 2017, the situation has clearly improved. It follows that the depth of material deprivation in relation to the environment dimension has increased, but already tends to return to its original level.

The analysis so far shows that the poor are more likely to lack some of the goods or services deemed necessary for dignified living. It is therefore useful to consider not only the anatomy of the material deprivation of the poor, but also its depth. Figure 3.2.2 shows the proportion of the poor and non-poor with respect to the number of problems they face by major deprivation dimension for 2003 and 2017.

Regarding all dimensions of material deprivation, the percentage of the poor who do not face any problems is always lower than that of the non-poor. The only exception is the environment dimension. Although the proportion of the population, regardless of whether they are poor or not, generally decreases as the number of problems they face simultaneously increases, the financial stress dimension during the crisis is an exception. In particular, before the financial crisis, most of the poor faced three problems at the same time, while in 2017, the largest group is that of those facing five problems. Also, the dimension of financial stress is the only one where in 2003 both the poor and the non-poor were better off than in 2017³. Finally, the difference in rates between poor and non-poor is negligible for three or more simultaneous prob-

^{3.} A similar picture applies to the housing component, but only for the poor and to a lesser extent.
TABLE 3.2.3 The distribution of the number of material deprivation problems by main dimension,2003-2017

					Change 20	03 - 2017
	2003 *	2008*	2012*	2017*	Absolute	%
Financial stress						
0	33.9	41.3	31.1	25.5	-8.4	-24.8%
1	19.3	23.8	21.3	21.4	2.1	10.9%
2	18.7	15.7	15.8	18.6	-0.1	-0.5%
3	15.0	10.8	14.3	16.0	1.0	6.7%
4	7.3	6.4	10.7	11.6	4.3	58.9%
5	5.8	2.1	6.8	6.9	1.1	19.0%
	100	100	100	100		
Durables						
0	70.2	79.7	82.7	85.8	15.6	22.2%
1	23.5	16.4	14.0	11.2	-12.3	-52.3%
2	5.3	3.4	2.9	2.5	-2.8	-52.8%
3	0.8	0.4	0.4	0.4	-0.4	-50.0%
4	0.2	0.1	0.1	0.1	-0.1	-50.0%
5	0.0	0.0	0.0	0.0	0.0	-
	100	100	100	100		
Housing						
0	74.4	76.9	80.7	84.1	9.7	13.0%
1	19.3	17.6	16.1	12.7	-6.6	-34.2%
2	5.0	4.6	2.9	3.0	-2.0	-40.0%
3	1.1	0.7	0.2	0.1	-1.0	-90.9%
4	0.3	0.1	0.1	0.1	-0.2	-66.7%
	100	100	100	100		
Environment						
0	68.9	58.5	58.5	65.6	-3.3	-4.8%
1	18.0	20.9	20.9	19.0	1.0	5.6%
2	10.0	11.6	11.6	11.0	1.0	10.0%
3	3.1	9.0	9.0	4.4	1.3	41.9%
	100	100	100	100		

Source: Eurostat, EU-SILC.

Note: * Refers to share of the total population.

lems regarding the acquisition of durable goods and housing problems.

The evidence shows that the depth of material deprivation varies by its dimension. In particular, when using the financial stress dimension or the environment dimension, the depth of material deprivation increases significantly regardless of whether it refers to the poor or not, although for the poor, problems seem to be more pronounced. On the contrary, the intensity of material deprivation has diminished when deprivation is measured on the durables or housing dimension.

FIGURE 3.2.2





3.2.4. Conclusions

The aim of this section was to record the composition of material deprivation in Greece as well as to present its evolution over time for the whole population and separately for the poor and the non-poor.

Summarizing the findings, even before the financial crisis. Greece recorded relatively high rates of people experiencing material deprivation, and especially deprivation associated with financial difficulties. Since the outbreak and during the financial crisis, the latter increased significantly. Moreover, their relative composition also changed, with the inability to pay unexpected expenses or arrears becoming the main reasons leading to material deprivation. Although the problem of material deprivation concerns a large part of the population, it is clearly more pronounced and widespread among those below the poverty line. Furthermore, the composition of material deprivation changes over time between the poor and non-poor, with the former reporting significant difficulties even in the ability to have a decent meal on a regular basis. On the other hand, it is encouraging that both the share of the population claiming to have housing problems and the share that can no longer afford to buy/maintain certain durable goods are reduced, although at the same time the percentage of those who cannot pay instalments for the acquisition of such goods has increased. Finally, regarding the depth of material deprivation, this seems to depend and vary according to the dimension used to measure it.

Given that the main component of material deprivation now concerns problems related to the financial stress dimension, tax reduction policies, both direct and indirect, as well as policies to reduce and solve the problem of non-performing loans, are expected to contribute to the relief of a significant portion of the population. Since the poor, as is expected, are more severely hit by material deprivation, it is important to take initiatives to combat poverty. Emphasis should be placed on creating new, viable jobs that will provide some income, either through structural reforms, through active labour market policies or by attracting new investment. Although the complete implementation of the social solidarity income scheme and generally the pursuit of benefit policies, given that they are properly targeted, are expected to provide relief to those who suffer, it is necessary to re-integrate the unemployed into the labour market so that any positive results are sustainable in the long run.

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4.1. Analysis of the industrial sector based on industrial production and turnover indices

Georgia Skintzi

Industrial production is an extremely important variable since it largely depicts the economic activity and is directly linked to the economic performance of a country. The analysis focuses on industrial production and industry turnover indices, and aims to present the latest developments and identify perspective indications as far as the evolution of the industrial sectors are concerned.

4.1.1. Industrial production indices

Figure 4.1.1 illustrates the industrial production index¹ and the manufacturing index,² as well as the percentage changes of both indices for the period 2000-2017. The negative effects of the economic crisis on industrial production became apparent in 2008, when both indices started to decrease. The industrial production index decreased for seven consecutive years, from 2008 until 2014. In 2009 the deepest decrease was observed, by 9.5%, for the period 2001-2017. In 2015 the index increased by 1%, in 2016 by 2.4% and in 2017 by 4.6%, which is the largest increase observed over the period under examination. The manufacturing index decreased continuously from 2008 until 2013. In 2009 the deepest decrease was observed, by 11.2%, for the period 2001-2017. In 2014 the index increased by 1.8%, in 2015 by 1.9%, in 2016 by 4.1%, and in 2017 by 3.8%.

Compared to 2007 (the year before the economic crisis), in 2017 the industrial production index decreased by 22.5%, while the manufacturing index decreased by 21.8%. These significant reductions demonstrate the extent to which the economic crisis has affected the industrial production of Greece. Nevertheless, it should be noted that the average annual change of the industrial production index in the period before the economic crisis (2001-2007) was -0.1%, while the average annual change for the same period for the manufacturing index was -0.4%. The respective changes for the period 2008-2017 were -2.4% and -2.3%. This indicates that the country's industrial production was not



^{1.} The index of industrial production incorporates the following sectors: mining and quarrying; manufacturing; electricity, gas, stream and air-conditioning supply; and water collection, treatment and supply. Base year is 2010 and the data are seasonally adjusted.

^{2.} The manufacturing index is a sub-index of the general industrial production index, the weight used is 69.53%.

thriving even before the economic crisis. If the ten-year period 2008-2017 is divided into two five-year sub-periods, 2008-2012 and 2013-2017, it is observed that the average annual change of the industrial production index is -5.5% and of the manufacturing index -6.7% in the first sub-period, while the corresponding figures for the second sub-period are 0.6% and 2.1%. Therefore, the sign of the average annual change of both indices turns positive in the second sub-period. Despite the fact that none of the indices has reached its 2010 level, the recorded dynamic should be reinforced in order for the industrial production to recover.

In order to follow the evolution of the two indices in greater detail, Figure 4.1.2 illustrates the percentage changes of the monthly industrial production index and the manufacturing index compared to corresponding months of the previous year. Both indices follow a similar course. In 2017 the monthly changes of the in-

dustrial production index are positive for the entire year, while the manufacturing index decreased only in April (in comparison to April 2016), by 0.9%. The average monthly change of the industrial production index for the first semester of 2018 is 0.6%, while the corresponding figure for the first semester of 2017 is 6.1%. It should be noted that the index decreased in January and February 2018, compared to the corresponding months of the previous year, by 0.5% and 1.8%, respectively. The average monthly change of the manufacturing index for the first semester of 2018 is 1.85%, while the corresponding figure for 2017 was 4%. The index decreased only in March (compared to March 2017), by 0.8%.

Important information is also provided by the indices of energy, intermediate goods, capital goods, durable consumer and non-durable consumer goods. Figure 4.1.3 presents the percentage changes of these indices compared to the previous year.

FIGURE 4.1.2







Percentage changes of the industrial production indices compared to the previous year



From 2008 until 2013, all five indices decreased with the exception of the energy index, which increased significantly, by 7.5%, in 2012 compared to 2011. In 2014, three out of five indices decreased, while the intermediate goods index and the non-durable consumer goods index increased. In 2015 the energy index remained at the 2014 level, whilst the other indices increased. It is worth noting that the capital goods index increased for the first time after 11 years. In 2016 all indices increased with the exception of the durable consumer goods index. In 2017 all indices increased.

The first semester of 2018 appears to be positive for all indices with the exception of the energy index, which decreased. The average monthly change of the energy index is -1.5%. For the remaining indices, the average monthly change is: 1% for the intermediate goods in-

dex, 2.9% for the capital goods index, 5% for the durable consumer goods index and 3.4% for the non-durable consumer goods index.

4.1.2. Industrial turnover indices

Important information can also be drawn from the industrial turnover index.³ Figure 4.1.4 illustrates the industrial turnover indices (general, domestic market and non-domestic market), while Figure 4.1.5 presents the percentage changes of the three indices. From 2001 until 2008 the general turnover index and the domestic market index increased, while the non-domestic market index decreased from 2001 until 2003 and increased from 2004 until 2008. The first two indices recorded their largest increase in 2006 (the non-domes-



FIGURE 4.1.5



Percentage changes of industry turnover indices, compared to the previous year

^{3.} The general index of industrial turnover incorporates the following sectors: mining and quarrying, and manufacturing.

FIGURE 4.1.6





tic market index recorded its second largest increase). In 2009 the three indices decreased dramatically, by more than 22%, compared to 2008. The domestic market index continued to decrease until 2016, reflecting the decline of domestic demand. The general turnover index and the non-domestic market index followed a similar course, both increased during the period 2010-2012 and decreased from 2013 until 2016. For the first time since 2008, all three indices increased in 2017: the general index increased by 11.8%, the domestic market index by 5.4% and the non-domestic market index by 20.8%. It should be noted that in the period before the economic crisis (2001-2007) the average annual change of the general turnover index was 4.9%, the domestic market index was 4.7% and the non-domestic market index was 7.3%. The corresponding figures for the period 2008-2017 were -1%, -4% and 5%.

In order to follow the evolution of the three indices in greater detail, Figure 4.1.6 illustrates the percentage changes of the monthly turnover indices compared to the corresponding months of the previous year for the period January 2005-June 2018. In 2017, the monthly changes for the general turnover index are positive, with the exception of September and December. For the domestic market index, these are positive with the exception of April, August and December and for the

non-domestic market index, these are positive with the exception of September. The first semester of 2018 appears to be positive for the three indices. The average monthly change for the general index is 9.4%, for the domestic market index 7.3% and for the non-domestic market index 12%.

4.1.3. Conclusions

The industrial production index increased in 2017 for the third consecutive year. The increase, by 4.6% (compared to 2016), is the largest recorded since 2001. The manufacturing index increased for the fourth consecutive year. The indications for 2018 are positive, since the average monthly changes, for the first semester, are positive for both indices. Nevertheless, it should be noted that the corresponding figures for the first semester of 2017 were significantly higher. As far as the turnover indices (general, domestic market, non-domestic market) are concerned, all three exhibit increases in 2017 compared to 2016, for the first time during the period under examination. The course of the turnover indices during the first semester of 2018 appears to be positive, but the average monthly changes remain at a lower level compared to the corresponding figures for the first semester of 2017.

4.2. Digitisation patterns of the Greek economy and society

Alexandra Kontolaimou Georgia Skintzi

4.2.1. Introduction

The radical changes the new technologies have caused in the economy, as well as in the citizens' daily lives, are indisputable, with one in three Europeans recognizing the positive effects of the most recent digital technologies on society, the economy and their personal life (European Commission, 2017). The rapid diffusion of Information and Communication Technologies (ICT) in almost all sectors creates significant opportunities for innovation, economic growth, and improvement in the quality of life and social welfare.

These opportunities have been acknowledged at both national and European levels, and a series of initiatives have been assumed aiming at the greatest possible utilization of the so-called digital possibilities and opportunities. In particular, the European Commission has set creating an integrated digital market in Europe as a key priority and has been actively promoting it since 2015 in the context of the Digital Single Market Strategy (European Commission, 2015). In the same spirit, the National Digital Strategy (2016-2021) constitutes the road map and provides a coherent framework for the implementation of actions to accelerate the digital transformation and achieve digital development in Greece (Ministry of Digital Policy, Telecommunications and Media, 2016).

Human capital plays a crucial role in the digital transformation of the economy and society, and decisively affects whether and to what extent the benefits that emerge will diffuse across society. Therefore, the digital divide is a critical issue, whether it concerns inequalities between countries or between social groups. To address the problem and minimize the digital gap is of imperative importance in order to achieve inclusive growth (Robinson et al., 2015). One important aspect of the digital divide is the gender gap, which reinforces and is reinforced by traditional types of gender inequalities. Closing the digital gender gap by removing the barriers and tackling the gender stereotypes is one of the main goals of the EU inclusive growth policy (Fatehkia et al., 2018; EC, 2018; Robinson et al., 2015).

The present article analyses the digital performance of Greece in comparison with other European countries, putting particular emphasis on human capital and women's participation in the digital transformation of the country. The next section examines the performance of Greece in key digitisation indices undertaking cross-country comparisons, as well as analyses over time. Section 4.2.3 focuses on human capital and presents some dimensions of the digital divide between the two sexes. The last section summarizes the main conclusions of the article.

4.2.2. The digital economy and society: Main indicators and the position of Greece in the EU28

The European Commission systematically monitors the progress made by member-states in terms of their digitisation based on various measures and indicators. The Digital Economy and Society Index (DESI) is a composite index of European countries' digital performance structured around five key dimensions: (a) connectivity, (b) human capital, (c) use of internet, (d) integration of digital technology, and (e) digital public services, as briefly described in Figure 4.2.1.

As far as the DESI 2018¹ is concerned, Greece has an overall score of 38.4² and ranks 27th out of the 28 EU member-states (Figure 4.2.2). Based on this low score, Greece is classified in the cluster of low-performance countries in Europe, outperforming only Romania. Given that the average score in the EU28 is 54 (see also Table 4.2.1), it is apparent that Greece's performance is almost 16 percentage points lower than the EU average.

^{1.} The DESI 2018 is constructed from indicators referring mostly to the calendar year 2017. In cases where data is not available for that calendar year, the latest prior data was used.

^{2.} DESI scores range from 0 to 1, usually expressed in percentage units, with higher values representing better performance.

FIGURE 4.2.1 The five dimensions of the Digital Economy and Society



FIGURE 4.2.2 Replicing of FUI02 countries based on the overall Di

Ranking of EU28 countries based on the overall Digital Economy and Society index for 2018 (DESI 2018)



FIGURE 4.2.3a Overall DESI over time



FIGURE 4.2.3b

Connectivity index over time



FIGURE 4.2.3c Human capital index over time



FIGURE 4.2.3d Use of Internet index over time



FIGURE 4.2.3e

9

8

6

5

3

Integration of digital technology index over time





5 4 3 2

DESI 2014 DESI 2015 DESI 2016 DESI 2017 DESI 2018

Greece ---- EU28

Source: European Commission Digital Scoreboard dataset, own calculations.

-EU28

DESI 2014 DESI 2015 DESI 2016 DESI 2017 DESI 2018

Greece

Note: In Figures 4.2.3b-f, indices' values are computed using specific weights attributed to the main DESI dimensions.

43

	I	DESI 2018	3	I	DESI 2017			
	Greece		EU28	Gre	ece	EU28		
	Rank	Score	Score	Rank	Score	Score		
DESI-overall index	27	38.4	54.0	27	35.5	50.8		
Connectivity	28	43.1	62.6	28	39.8	58.5		
Human capital	26	38.2	56.5	26	36.7	54.6		
Use of Internet	22	45.2	50.5	22	42.0	47.5		
Integration of digital technology	24	26.9	40.1	23	26.7	36.7		
Digital public services	28	39.2	57.5	27	35.0	53.7		

Source: European Commission (2016), "Digital Economy and Society Index 2018-Country Profile Greece".

Focusing on DESI components³ (Table 4.2.1), we observe that Greece lags behind the European average with respect to all five dimensions. Connectivity, human capital, as well as digital public services are the indices in which Greece appears to lag furthest behind. The transition of the Greek society to fast broadband connections seems to be slower than in other European countries, resulting in a rather low connectivity score. Regarding the human capital dimension (as it is further analysed in the next section), the country's low performance is mainly attributed to the low percentage of Internet users, along with the low share of ICT specialists compared to the European average. Finally, the particularly low score in terms of the digital public services, which places Greece in the last position within the EU28, is mainly related to the low percentage of eGovernment users, along with the low efficiency and degree of online public services provided to businesses.

In comparing with the previous DESI report (DESI 2017), no noticeable progress is apparent in the Greek case (Table 4.2.1). There is an increase in the overall DESI score (from 35.5 to 38.5) but this does not seem enough to improve the position of Greece in the EU28 with respect to its overall performance or its performance in DESI dimensions. Importantly, a slight deterioration is noted in Greece's ranking in two dimensions, i.e., integration of digital technology

(24th in DESI 2018 vs. 23^{rd} in DESI 2017) and digital public services (28th in DESI 2018 vs. 27^{th} in DESI 2017).

Figures 4.2.3a-f above indicate that the digital gap of Greece compared to the European average persists over the whole period the DESI is available (2014-2018) and concerns both the overall index and its main dimensions. The largest distance from the European average over time is observed in the case of human capital, while the country's gap in the integration of digital technology is also of interest, since it appears to have been broadened in DESI 2016 compared to DESI 2015 and remained at high levels from that point onwards. This deterioration potentially relates to the slower progress of Greek firms in using cloud computing services and e-invoices, as well as to the worsening of businesses' performance in terms of e-commerce in comparison with the previous report (European Commission, 2016). In addition, it must be noted that the overall picture illustrated in Figures 4.2.3a-f does not reveal any clear convergence trends towards the European average. With the single exception of the digital public services dimension, in which Greece appears to have reduced its gap to some extent within the EU28 (Figure 4.2.3f), it seems that the country's attempts to improve its digital performance significantly and quickly have so far not brought about the desired result.

^{3.} DESI components correspond to the five index dimensions and have been calculated as the weighted averages of a number of related indicators.

TABLE 4.2.2 Analysis of the human capital dimension of DESI

	DESI 2018				DESI 20			
	Gre	reece EU28		Higher	Gre	ece	EU28	Higher value
	Rank	Value	Value	value	Rank	Value	Value	
2a1. Internet users (% individuals)	26	67% (2017)	81% (2017)	96.4% (Luxembourg)	26	66% (2016)	79%	96.6% (Luxembourg)
2a2. At least basic digital skills (% individuals)	25	46% (2017)	57% (2017)	85.2% (Luxembourg)	22	46% (2016)	56%	86.1% (Luxembourg)
2b1. ICT specialists (% total employment)	28	1.4% (2016)	3.7% (2016)	6.6% (Finland)	28	1.2% (2015)	3.5%	6.5 (Finland)
2b2. STEM graduates (per 1,000 individuals aged 20-29)		- (2015)	19.1 (2015)	31.5 (Ireland)	18	16.2 (2014)	18.8	24.7 (Ireland)

Source: European Commission (2018), Digital Economy and Society Index (DESI) 2018, Country Report Greece and European Commission Digital Scoreboard dataset.

4.2.3. The digital divide: Human capital and gender inequalities

In this section, we present the digital divide between Greece and the EU as far as the human capital is concerned, using the corresponding sub-indices of DESI 2018. Subsequently, we focus on the digital gender gap, using the same or similar indices with those integrated into the human capital dimension of DESI.

The human capital dimension of DESI measures the skills needed to take advantage of the possibilities offered by digitisation. As mentioned in the previous section, Greece is ranked 26th, just above Bulgaria and Romania. In Table 4.2.2 the sub-indices that constitute the human capital index are presented (the reference year for each sub-index is shown in brackets).

Greece is ranked 26th as far as the internet users are concerned. Only 67% of the Greek population aged 16-74 use the internet at least once a week, while the EU average is 81%. In countries such as Luxembourg and Denmark, the corresponding percentage exceeds 95%. Moreover, the percentage of individuals aged 16-74 with at least basic digital skills is very low in Greece, at 46% (Greece is ranked 25th), while the EU average is 57%; the corresponding percentage exceeds 77% in countries such as Luxembourg, the Netherlands and Sweden.

ICT specialists in Greece account for 1.4% of total employment, while the EU average is more than twice as

high, at 3.7%, and countries such as Finland, Sweden and Estonia exceed 5%. Greece has the lowest score in the specific sub-index. On the other hand, according to DESI 2017 (data for Greece are not incorporated in DESI 2018), in 2014 there were 16.2 STEM graduates per 1,000 individuals aged 20-29, which brings Greece to the 18th place in the ranking and relatively close to the EU average, which is 18.8. Based on Eurostat data, in 2015 Greece ranked 14th, with 16.9 STEM graduates per 1,000 individuals aged 20-29, while the EU average was 19.1. In 2016, Greece ranked 13th, among 27 EU member-states (data are not available for the Netherlands), with 17.1 STEM graduates. It is worth noting that in 2016 Slovenia ranked first with 33.3 STEM graduates per 1,000 individuals aged 20-19, while in 2015 and 2014 Ireland was first with 31.5 and 24.7, respectively. The difference between the two indicators (STEM graduates and ICT specialists) may be an indication of the brain drain phenomenon, as young people seem to study STEM in Greece, but they do not appear to work in Greece.

The digital divide between Greece and the EU, as far as human capital is concerned, appears to be significant, and there is no evidence that is diminishing, as shown in Figure 4.2.3.c. It is therefore essential to intensify existing initiatives and to take new targeted actions that will reduce the risk of digital marginalisation and close the gap between Greece and the EU.

The analysis of the digital gender gap may include a plethora of indicators and take into consideration vari-

		Greece			EU		Greece-EU
	Men (1)	Women (2)	Gap (3)=(2)-(1)	Men (4)	Women (5)	Gap (6)=(5)-(4)	Gap (Women) (7)=(2)-(5)
2011	51	44	-7	70	65	-5	-21
2012	53	48	-5	73	67	-6	-19
2013	60	52	-8	74	69	-5	-17
2014	62	57	-5	77	72	-5	-15
2015	66	61	-5	79	74	-5	-13
2016	68	64	-4	81	77	-4	-13
2017	70	65	-5	82	79	-3	-14

TABLE 4.2.3 Internet users (%) and the digital divide (in percentage points)

Source: Eurostat, own calculations.

Note: Refers to percentage of individuals, aged 16-74, who access the internet at least once a week.

TABLE 4.2.4 Individuals who have at least basic digital skills (%) and the gender gap(in percentage points)

		Greece		EU				
	Men (1)	Women (2)	Gap (3)=(2)-(1)	Men (4)	Women (5)	Gap (6)=(5)-(4)	Gap (Women) (7)=(2)-(5)	
2015	48	40	-8	58	53	-5	-13	
2016	47	45	-2	58	54	-4	-9	
2017	49	44	-5	60	55	-5	-11	

Source: Eurostat, own calculations.

Note: Refers to individuals aged 16-74.

TABLE 4.2.5 ICT specialists (% of employment in ICT sector) and the digital divide(in percentage points)

	Gr	eece	E	EU	Greece-EU
	Men (1)	Women (2)	Men (3)	Women (4)	Gap (Women) (5)=(2)-(4)
2011	84.6	15.4	84.2	15.8	-0.4
2012	81.7	18.3	83.8	16.2	2.1
2013	82.0	18.0	83.5	16.5	1.5
2014	82.9	17.1	84.0	16.0	1.1
2015	86.8	13.2	83.8	16.2	-3.0
2016	87.3	12.7	83.3	16.7	-4.0
2017	89.1	10.9	82.8	17.2	-6.3

Source: Eurostat, own calculations.

ous factors, such as the level of education and income. For the purposes of this article, the analysis focuses on indicators similar to the sub-indices of the human capital dimension of DESI. The data used are from the Eurostat database.

Table 4.2.3 above shows the percentage of male and female individuals (aged 16-74) that use the internet frequently (at least once a week), in Greece and the EU. In 2017, 70% of Greek men used the internet frequently; the corresponding figure for women is 65%. The gap between men and women over time varies between 8 and 4 percentage points (pp.). In the EU, 82% of men and 79% of women use the internet frequently; the gap between the two varies from 6 to 3 pp. The gender gap does not appear to be significantly different between Greece and the EU (columns 3 and 6 in Table 4.2.3). On the other hand, the gap between Greek women and women in the EU is noteworthy (column 7 in Table 4.2.3) and varies from 21 to 13 pp.

As far as digital skills are concerned, in 2017, 49% of Greek men and 44% of Greek women had at least basic digital skills (Table 4.2.4 above), the EU average is 60% and 55%, respectively. In Greece, the gender gap varies from 2 to 8 pp., while in the EU it varies from 4 to 5 pp., for the three year period under consideration. Therefore, the gender gap is relatively similar in both Greece and the EU (column 7 in Table 4.2.4).

The digital gender gap becomes more visible and extensive when advanced and specialised skills are taken into account. As shown in Table 4.2.5 above the ICT sector is dominated by men. Men hold 82%-89% of the jobs in the ICT sector (as ICT specialists), while women account for only 11%-18%, in Greece for the period 2011-2017. The same phenomenon is also evident in the EU. Furthermore, it is disturbing that while employment in the ICT sector in Greece increased during the period 2012-2017 (average annual change 4%), the number of women who work in the ICT sector decreased (average annual change 1%). This is not the case in the EU, as the number of women in the ICT sector is increasing (average annual change 6%) at a faster rate than the overall employment in the sector (average annual change 5%). The rates of change of employment in the ICT sector in Greece and the EU are illustrated in Figure 4.2.4.

Moreover, the field of study that men and women select reflects the gender stereotypes. Table 4.2.6 shows the number of male and female STEM graduates⁴ per thousand of population (men/women), aged 20-29. The gen-



Percentage change of employment in the ICT sector in Greece and the EU



TABLE 4.2.6 STEM graduates (per 1,000 men/women aged 20-29)

	Greece				EU	Greece-EU		
	Men (1)	Women (2)	Gap (3)=(2)-(1)	Men (4)	Women (5)	Gap (6)=(5)-(4)	Gap (Women) (7)=(2)-(5)	
2013	19.1	12.2	-6.9	24.2	12.6	-11.6	-0.4	
2014	20.0	12.4	-7.6	24.6	12.8	-11.8	-0.4	
2015	20.6	13.1	-7.5	24.9	13.1	-11.8	0.0	
2016	20.4	13.7	-6.7	-	-	-		

^{4.} Graduates in tertiary education in mathematics, computing, engineering, manufacturing, construction.

der gap is significant in both Greece and the EU, but it should be noted that the gender gap in the EU is even more extensive than in Greece. Although, both in Greece and the EU female graduates outnumber men, in Greece 59% of graduates are women and the EU average is 58%, female STEM graduates in Greece account for 40% while the EU average is 34% (the data refer to 2016).

4.2.4. Conclusions

Greece is positioned at the bottom of the EU28 ranking according to the DESI 2018 and its distinct dimensions. With the exception of the digital public services, where noticeable improvements have been recorded, it appears that the efforts to improve Greece's digital performance have not, so far, yielded the desirable results. The digital divide between Greece and the EU becomes especially apparent in terms of human capital, which plays a definitive role in the extent of the spill-over effects of digitalisation. It is therefore essential to intensify existing and engage in new initiatives that will accelerate the digital transformation of Greece, contribute to growth and reduce the gap between Greece and the EU. Finally, although the digital gender gap is evident in Greece, especially as far as employment in the ICT sector is concerned, it is at a similar level to that observed in the EU. However, the digital gender gap is an important issue that needs to be addressed at national level in order for Greece to fully take advantage of its human capital and minimize the risk of digital exclusion and marginalisation.

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4.3. The sharing economy in Greece: Developments in short-term real estate rentals

Ersi Athanassiou Agapi Kotsi

In recent years, the rapid growth of activities in the framework of the sharing economy has also taken place in Greece. The sharing economy can be described as a new economic model, in which digital platforms create an open market for the temporary use of goods and services that are often provided by private persons. Sharing economy activities spread over a wide range of sectors, among which the one that has developed the most in Greece is that of short-term real estate rentals. i.e., the rental of housing through digital platforms, for a specific time period shorter than one year. The evolution of technology and high speed networks, the growth of social networks and the increasing access of Greek citizens to the internet has played an important role in the development of the sharing economy and related digital platforms and applications. A number of international short-term rental platforms are now active in Greece, including Airbnb, TripAdvisor, Booking.com, HomeAway, HouseTrip, Flipkey, 9Flats, Roomorama, Trivago, and StayInAthens. In addition, a number of companies have been established for the management, on behalf of owners, of properties rented through digital platforms, such as EazyBnb, GuestEasy, and Airbnb management in Greece.

The legislative framework relating to short-term real estate rentals presents great differences among countries, while the new activities arising and the new forms of relationships developed among the parties involved may not be adequately regulated or may operate on the basis of unclear legal frameworks. At the European level, these issues have been identified in the European agenda for the collaborative economy (EC, 2016). In Greece, the growth in real estate short-term rentals has created the need for a clear legal framework ensuring equal terms for old and new providers, as well as safety and quality for the services provided to consumers. To this direction, the country has proceeded in recent years to a number of legislative acts regulating the operation of this market (Laws 4179/2013, 4336/2015, 4446/2016 and 4472/2017).

Exact data on the evolution of the short-term real estate rentals market in Greece do not exist, as the relevant activities are not as yet recorded by official sources. In addition, information available on short-term rentals in Greece focuses mostly on the case of Athens, with an emphasis on popular districts around the city's historical centre. However, short-term real estate rentals have been spreading across the largest part of Greece's territory, particularly in tourist areas. The present article aims to shed light on this fact, by approximating trends in short-term housing rental activity in the country, both at the national and at the regional level. The data employed in this analysis originate from the online database of the data analytics company AirDNA, which records short-term real estate rental activities though Airbnb, the largest of the international short-term rental platforms. AirDNA data are used in the relevant literature (see e.g., Coyle, & Yeung, 2016; Elíasson, & Ragnarsson, 2018; Wachsmuth, & Weisler, 2018), with the limitations and shortcomings arising from the fact that they capture a large part, but not all, of the short-term rental activity. In the case of Greece, data published by AirDNA cover the largest part of the country's territory, with the exception of a small number of municipalities, for the majority of which the lack of data is connected to the absence or limited scale of short-term rental activity.

In what follows, the trend in the number of short-term real estate rentals in the Greek regions is approximated in two ways:

- (a) First, we examine the evolution of the total number of rentals (both active and non-active¹) listed on the Airbnb platform, on an annual basis, for the period from 2010 onwards. These data provide a picture of the course of the wider number of rentals placed on the market from the beginning of the short-term rental phenomenon and until recently.
- (b) Subsequently, we examine the evolution of the number of active rentals only, on a monthly basis, for the period from January to June 2018. This mapping allows for a more accurate estimate of the number of properties actually available through Airbnb by season, over the most recent period.

^{1.} In any particular period an owner may maintain the listing of his property on the platform, with this listing being, however, non-active in the sense that the property is not open for reservations.

Region	2010	2011	2012	2013	2014	2015	2016	2017	June 2018
Attica	54	255	641	1,254	2,752	6,721	14,221	23,440	30,184
South Aegean	15	165	631	1,616	3,185	6,713	13,097	20,249	25,730
Crete	21	146	485	1,103	2,423	5,099	10,301	16,910	21,811
Central Macedonia	3	30	121	314	730	1,911	5,441	9,985	13,544
Ionian Islands	9	37	147	464	1,499	2,443	5,393	9,528	13,232
Peloponnese	12	37	83	187	476	1,118	2,672	4,907	6,474
> 5.000 rentals	114	670	2,108	4,938	11,065	24,005	51,125	85,019	110,975
Thessaly	1	18	44	120	275	713	1,756	3,039	3,880
East Macedonia & Thrace	1	3	21	43	88	229	768	1,704	2,738
Central Greece	4	16	39	80	186	449	1,107	1,911	2,489
North Aegean	6	18	33	96	203	473	1,096	1,766	2,357
West Greece	4	17	39	74	155	340	794	1,558	2,115
Epirus	2	5	12	37	77	216	589	1,077	1,481
West Macedonia			2	2	14	30	72	143	196
< 5.000 rentals	18	77	190	452	998	2,450	6,182	11,198	15,256
Greece, total	132	747	2,298	5,390	12,063	26,455	57,307	96,217	126,231
				Per	rcentage	share			
Attica	40.9	34.1	27.9	23.3	22.8	25.4	24.8	24.4	23.9
South Aegean	11.4	22.1	27.5	30.0	26.4	25.4	22.9	21.0	20.4
Crete	15.9	19.5	21.1	20.5	20.1	19.3	18.0	17.6	17.3
Central Macedonia	2.3	4.0	5.3	5.8	6.1	7.2	9.5	10.4	10.7
Ionian Islands	6.8	5.0	6.4	8.6	12.4	9.2	9.4	9.9	10.5
Peloponnese	9.1	5.0	3.6	3.5	3.9	4.2	4.7	5.1	5.1
> 5.000 rentals	86.4	89.7	91.7	91.6	91.7	90.7	89.2	88.4	87.9
Thessaly	0.8	2.4	1.9	2.2	2.3	2.7	3.1	3.2	3.1
East Macedonia & Thrace	0.8	0.4	0.9	0.8	0.7	0.9	1.3	1.8	2.2
Central Greece	3.0	2.1	1.7	1.5	1.5	1.7	1.9	2.0	2.0
North Aegean	4.5	2.4	1.4	1.8	1.7	1.8	1.9	1.8	1.9
West Greece	3.0	2.3	1.7	1.4	1.3	1.3	1.4	1.6	1.7
Epirus	1.5	0.7	0.5	0.7	0.6	0.8	1.0	1.1	1.2
West Macedonia	0.0	0.0	0.1	0.0	0.1	0.1	0.1	0.1	0.2
< 5.000 rentals	13.6	10.3	8.3	8.4	8.3	9.3	10.8	11.6	12.1
Greece, total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

TABLE 4.3.1 Number of listed short-term housing rentals in Greece by region, 2010-2018

Source: AirDNA database, www.airdna.co. KEPE calculations.

FIGURE 4.3.1 Total number of listed short-term housing rentals in Greece, 2010-2018*



Source: AirDNA database, www.airdna.co. KEPE calculations.

* The data for 2018 refer to the end of the first half of the year. Every property in Greece is covered from October 2016 onwards.

TABLE 4.3.2 Number of listed short-term housing rentals for the Attica Region of Greeceby Regional Unit, 2010-2018

	2010	2011	2012	2013	2014	2015	2016	2017	June 2018
North Athens	5	22	53	95	212	470	876	1,388	1,724
West Athens	1	4	9	13	24	61	135	271	382
Central Athens	33	141	358	681	1,493	3,560	7,534	12,452	16,088
South Athens	5	36	80	144	290	730	1,604	2,591	3,307
Piraeus		6	15	33	64	155	331	600	773
Islands		7	25	70	174	402	859	1,414	1,829
East Attica	9	37	97	209	474	1,297	2,762	4,520	5,819
West Attica	1	2	4	9	21	46	120	204	262
Attica	54	255	641	1,254	2,752	6,721	14,221	23,440	30,184
				Pe	rcentage	share			
North Athens	9.3	8.6	8.3	Pe 7.6	rcentage 7.7	share 7.0	6.2	5.9	5.7
North Athens West Athens	9.3 1.9	8.6 1.6	8.3 1.4	Pe 7.6 1.0	rcentage 7.7 0.9	share 7.0 0.9	6.2 0.9	5.9 1.2	5.7 1.3
North Athens West Athens Central Athens	9.3 1.9 61.1	8.6 1.6 55.3	8.3 1.4 55.9	Pe 7.6 1.0 54.3	rcentage 7.7 0.9 54.3	share 7.0 0.9 53.0	6.2 0.9 53.0	5.9 1.2 53.1	5.7 1.3 53.3
North Athens West Athens Central Athens South Athens	9.3 1.9 61.1 9.3	8.6 1.6 55.3 14.1	8.3 1.4 55.9 12.5	Pe 7.6 1.0 54.3 11.5	rcentage 7.7 0.9 54.3 10.5	share 7.0 0.9 53.0 10.9	6.2 0.9 53.0 11.3	5.9 1.2 53.1 11.1	5.7 1.3 53.3 11.0
North Athens West Athens Central Athens South Athens Piraeus	9.3 1.9 61.1 9.3 0.0	8.6 1.6 55.3 14.1 2.4	8.3 1.4 55.9 12.5 2.3	Per 7.6 1.0 54.3 11.5 2.6	rcentage 7.7 0.9 54.3 10.5 2.3	share 7.0 0.9 53.0 10.9 2.3	6.2 0.9 53.0 11.3 2.3	5.9 1.2 53.1 11.1 2.6	5.7 1.3 53.3 11.0 2.6
North Athens West Athens Central Athens South Athens Piraeus Islands	9.3 1.9 61.1 9.3 0.0 0.0	8.6 1.6 55.3 14.1 2.4 2.7	8.3 1.4 55.9 12.5 2.3 3.9	Pe 7.6 1.0 54.3 11.5 2.6 5.6	rcentage 7.7 0.9 54.3 10.5 2.3 6.3	share 7.0 0.9 53.0 10.9 2.3 6.0	6.2 0.9 53.0 11.3 2.3 6.0	5.9 1.2 53.1 11.1 2.6 6.0	5.7 1.3 53.3 11.0 2.6 6.1
North Athens West Athens Central Athens South Athens Piraeus Islands East Attica	9.3 1.9 61.1 9.3 0.0 0.0 16.7	8.6 1.6 55.3 14.1 2.4 2.7 14.5	8.3 1.4 55.9 12.5 2.3 3.9 15.1	Per 7.6 1.0 54.3 11.5 2.6 5.6 16.7	rcentage 7.7 0.9 54.3 10.5 2.3 6.3 17.2	share 7.0 0.9 53.0 10.9 2.3 6.0 19.3	6.2 0.9 53.0 11.3 2.3 6.0 19.4	5.9 1.2 53.1 11.1 2.6 6.0 19.3	5.7 1.3 53.3 11.0 2.6 6.1 19.3
North Athens West Athens Central Athens South Athens Piraeus Islands East Attica West Attica	9.3 1.9 61.1 9.3 0.0 0.0 16.7 1.9	8.6 1.6 55.3 14.1 2.4 2.7 14.5 0.8	8.3 1.4 55.9 12.5 2.3 3.9 15.1 0.6	Pe 7.6 1.0 54.3 11.5 2.6 5.6 16.7 0.7	rcentage 7.7 0.9 54.3 10.5 2.3 6.3 17.2 0.8	share 7.0 0.9 53.0 10.9 2.3 6.0 19.3 0.7	6.2 0.9 53.0 11.3 2.3 6.0 19.4 0.8	5.9 1.2 53.1 11.1 2.6 6.0 19.3 0.9	5.7 1.3 53.3 11.0 2.6 6.1 19.3 0.9

Source: AirDNA database, www.airdna.co. KEPE calculations.

4.3.1. Regional evolution and distribution of the total number of short-term real estate rentals

In Greece, short-term rental activity in the framework of the sharing economy was initiated around the year 2010. At that time, the market was of a limited scale and had an uncertain future, as only a few dozen rentals were offered (Figure 4.3.1 above). However, within a very short period of time, the number of listings picked up, growing at a very fast pace from year to year. By 2018, more than 126,000 rentals were listed on the Airbnb platform, thus shaping new conditions in the market, with multiple effects.

The regions of Attica, the South Aegean, and Crete possess the largest number of short-term rentals, as together they account for over 60% of the total number of listings throughout the period examined (from 76.5% in 2012 to 61.6% in 2018). Three more regions, Central Macedonia, the Ionian Islands and the Peloponnese together account for an additional significant share of total listings, ranging from 13.9% in 2011 to 26.3% in 2018 (Table 4.3.1 above). At the end of the first half of 2018, each of the aforementioned regions featured more than 5,000 listings (ranging from 6,474 in the Peloponnese to 30,184 in Attica), thus accounting together for 87.9% of the corresponding total listings. A much lower participation characterized the remaining 7 regions of the country, as their overall share in the total number of listings at the end of the first half of 2018 amounted to 12.1%, with the corresponding number of listings ranging from 196 in West Macedonia to 3,880 in Thessaly.

Examining developments in short-term housing rentals for the Attica region, which possesses the largest number of rentals, the regional unit of Central Athens seems to account for 53.3% of the corresponding listings at the end of the period examined, out of which 93% belong to the Municipality of Athens (Table 4.3.2 above). East Attica, which includes several coastal municipalities, accounts for 19.3% of Attica's listings, out of which a share of 20.3% corresponds to the Municipality of Saronicos, 19.8% to the municipality of Vari-Voula-Vouliagmeni, and 9.8% to the municipality of Marathon and Markopoulo-Mesogaia. The South Athens regional unit accounts for 11.0% of Attica's listings, out of which 25.2%, 18.2% and 16.0% belong to the municipalities of Glyfada, Palaio Faliro and Kallithea, respectively.

4.3.2. Regional distribution of active short-term real estate rentals

Figure 4.3.2 presents the evolution of the number of active short-term rentals in Greece's regions during the

first half of 2018. The six regions with the largest number of rentals possess overall 87.5% of active listings, with the total number of these listings ranging from 40,944 in February to 69,213 in June. In the remaining regions, the overall number of active rentals ranged from 5,834 in February to 9,974 in June, with the corresponding share in total active listings amounting to 12.5%.

The evolution of the number of active listings between January and June 2018 seems to reflect mainly the seasonality of short-term rental activity, while it is also connected to the continuing increasing trend in the number of rentals offered in the market. A decrease in the number of total active listings is observed in February as compared to January, while increases are registered in all subsequent months. Similar trends are recorded in almost all individual regions, with the exception of West Greece, West Macedonia, Central Greece and the Peloponnese, which register increases in all months, the former two with a small increase in February as compared to January (5.9% and 5.3%, respectively) and the latter two with a corresponding marginal increase (0.7% and 0.5%, respectively).

The increase in the number of rentals between January and June 2018 for the country as a whole amounted to 66.5%, as rentals reached 79,187 in June, from 47,558 in January. As expected on the basis of the seasonality of tourism activity in the main summer vacation destinations of Greece, the island regions recorded large increases, amounting to 123.4% in the Ionian Islands, 99.1% in the South Aegean and 73.6% in Crete (regions with high activity) and above 150% in the North Aegean (a region with lower participation). In the category of regions with lower activity, a large increase was observed in East Macedonia & Thrace (111.7%). The lowest increases were registered in West Macedonia (21.1%) and Attica (28.2%), with Attica leading as to the number of active rentals in January (12,376). but being replaced as the leader by the South Aegean islands in June (16,821).

The aforementioned developments resulted in a different situation with respect to the distribution of active rentals among regions in winter as compared to the first month of summer. Indicatively, a significant reduction in its share in June as compared to January is recorded in the case of Attica (to 20.0% from 26.0%), while considerable increases in shares are observed respectively in the South Aegean (to 21.2% from 17.8%), the Ionian Islands (to 11.7% from 8.7%) and Crete (to 18.5% from 17.7%) (Figure 4.3.3). The differences between the summer and winter seasons are likely to appear stronger once data for the remaining summer months are published and incorporated in the sample.

FIGURE 4.3.2 Number of active short-term housing rentals in Greece by region, January-June 2018



Source: AirDNA database, www.airdna.co. KEPE calculations.

* For the North Aegean region, data for January and February do not include the island of Lesvos.

FIGURE 4.3.3



Regional distribution of active short-term housing rentals in Greece (%), January 2018, June 2018

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Special topics

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Productivity developments of the Greek economy at the macro and sectoral levels

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Abstract

The improvement of productivity has a durable effect and determines the living standards in a country and the growth rate of its economy on a long-term horizon. This article focuses on the productivity developments and key determinants of the Greek economy, giving emphasis on the period following the outbreak of the crisis. First, it signifies the importance of productivity in relation to the growth strategy of the country. It then describes some stylized facts concerning the macroeconomic environment and changes in the productivity of the country, compared with other EU countries. The constituent factors of productivity are properly disentangled and major determinants are analyzed. In addition, productivity developments at the sectoral level are presented, giving emphasis on key sectors of the Greek economy and identifying those sectors with strong and weak productivity performance. The results highlight a significant decrease in productivity and a departure from the international production frontier during the crisis period as well as a considerable loss of competitiveness in almost all sectors. Finally, it provides insight into the sectors which possess the largest room for productivity enhancement and it suggests policies for improving productivity, such as growing the rate of diffusion of technology and innovation, and further harnessing human capital to promote industrial production.

JEL classification: O47

Keywords: Productivity, efficiency, benchmarking, reforms, sectoral analysis.

1. Introduction

The improvement of productivity has a durable effect and determines the living standards in a country and the growth rate of its economy on a long-term horizon. During the five decades preceding the outbreak of the economic crisis, the continuous improvement of productivity, the expanding labor supply, significant investments in gross fixed capital formation and technological change and innovation led to a considerable increase of the total long-term supply in the Greek economy, allowing it to operate at a higher level of total demand, which, in turn, led to a significant increase of the actual income (Papaioannou et al., 2017). During the period 2008-2017, Greece had the worst economic performance among EU countries, with an average annual growth rate of -2.8%. In order to reverse this negative trend, expedite the recovery of the economy and create a sustainable development path, a new growth strategy and economic production model has been put forward.

As far as the organization of the article is concerned, Section 2 outlines the role of productivity in the framework of the strategic growth plan of the Greek government and provides a brief overview and some key indices for analyzing and measuring productivity. Section 3 provides some stylized facts about the macroeconomic environment and changes in the productivity of the country, compared with other EU countries, in order to understand productivity developments in the Greek economy. In addition, sectoral productivity developments are described in Section 4, giving emphasis on key sectors of the Greek economy and

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⁻ Opinions or value judgments expressed in this article are the author's own and do not necessarily reflect those of the Centre of Planning and Economic Research.

identifying those with strong and weak productivity performance. Section 5 summarizes and concludes, providing some policy suggestions.

2. The role of productivity in the current policy context

In the framework of the national growth strategy (Greek Government, 2018), the issue of productivity is of crucial importance. Particular emphasis is given to reform policies to tackle long-standing problems of low productivity levels and to increase productivity through promoting knowledge, innovation and human capital, especially in dynamic sectors which can help improve the competitiveness of the Greek economy in globalized markets. The formulation of alternative scenarios for the labour productivity trends is also important in order to assess the impact of specific structural reforms in line with the strategic objectives of the national growth plan.

The efforts to surge productivity also include the implementation of a range of structural reforms at the sectoral level, especially upgrading the transport and logistics, energy and ICT infrastructure networks, and

TABLE 1 Key indexes related to productivity and relevant data sources

Index	Sources
Potential GDP	AMECO, OECD
Unit Labour Cost	Eurostat, OECD
Competitiveness	Bank of Greece, DHL, IMD, IMF, UNCTAD, WEF, World Bank
Export share of GDP and relevant share of high-tech, knowledge-intensive sectors	COMTRADE, Eurostat
Value chain forward-backward linkages	OECD
Economic complexity	MIT
Ratio of gross value added in international tradable goods and services	Eurostat
Ratio of gross value added in high-tech, knowledge- intensive sectors	Eurostat
FDI share of GDP	Bank of Greece
Gross fixed capital investment share of GDP	Hellenic Statistical Authority
Bank financing of enterprises	Bank of Greece
Digitization	Digital Scoreboard, European Digital Progress Report
R&D expenditure	Eurostat, National Documentation Centre, OECD
Innovation	European Innovation Scoreboard
Entrepreneurship	Global Entrepreneurship Development Institute
Human capital	Processing of data from European Digital Progress Report, Hellenic Statistical Authority
Brain drain	Processing of data from Hellenic Statistical Authority, National Documentation Centre
Unemployment of young and highly skilled persons	Processing of data from Hellenic Statistical Authority
Population aging	Processing of data from Hellenic Statistical Authority
Social and regional inequalities	Processing of data from Hellenic Statistical Authority

Sources: Literature review of various relevant studies and papers, such as Mas and Stehrer (2012), OECD (2001, 2017), Papaioannou et al. (2017), van Ark and Jäger (2017) and the Greek Government (2018).

enhancing entrepreneurship, export performance and investment influx. Emphasis is given to dynamic sectors which involve the production of larger value added and higher quality international tradable goods and services, so as their growth to pull the total economic activity (Tsekeris, 2017). Due to the significant heterogeneity pertaining to the Greek economy across sectors, the proposed policies aiming to enhance productivity should be selected, prioritized and coordinated according to the (income and employment) multiplier effects of various types of investment and fiscal measures (Athanassiou et al., 2014; Mariolis and Soklis, 2015; Papaioannou, 2015).

Estimations about the productivity of the Greek economy, including the analyses of production factors and the sectors of economic activity, are carried out –on a regular basis– by the Hellenic Statistical Authority (ELSTAT), as well as other domestic and international organizations, as included in the database ONE of the OECD (OECD, 2001), the EU KLEMS (van Ark and Jäger, 2017), the IMF statistics, the EUROSTAT database and the Penn World Tables (Feenstra et al., 2015).

Table 1 above presents several key indicators associated with developments in the productivity of the national or regional economy. These key indexes are closely related to intrinsic characteristics of the production system of the country. They depict different aspects of the production capacity utilization, the quality of production factors, the demand structure, the potential of economic output, the outward-looking orientation, the technological level, the knowledge intensity, the financing conditions, the integration into global value chains, the entrepreneurship and the competitiveness of the whole economy.

Any productivity-enhancing policy proposal should recognize the peculiarities, prospects and comparative or competitive advantages of each sector and region of the Greek economy, giving particular emphasis to the innovation content, the knowledge intensity and the value added. In addition, the institutional framework and the financing conditions underlying the functioning of the product and labour markets should be taken into consideration, such as the degree of competition, the proportion of part-time employees and the level of wages, in order to help promote a sustainable and equitable growth and diminish social and regional inequalities. The quality of government institutions and policies at both the national and regional levels (e.g., see Charron et al., 2016) can have a significant impact on the efficacy of factors influencing the economic performance in the long run.

In the current context, the proposed indexes can offer measurable attributes regarding the effective implementation of the main objectives of the new growth model of Greece. Therefore, they could be used to establish a systematic methodology for measuring and interpreting productivity developments in Greece towards the strategic direction of a sustainable and inclusive growth.

3. Macroeconomic environment and productivity change

It is widely agreed that a fundamental problem of the Greek economy refers to its low productivity and the structural weaknesses of the domestic firms to directly compete with corresponding foreign firms. There are significant differences among the productivity level of Greece and the corresponding average level of the EU-28 countries, in particular, the Euro area countries (Figure 1). The resulting productivity gap –as a percent of the productivity level of Germany, which is the best performer among the set of countries considered here– has been expanded since the crisis outbreak (2008), even with respect to Italy and Spain, while the level of Greek productivity fell behind that of Portugal in 2010 (Figure 2).

In 2016, the level of productivity in Greece was approximately 65% of the average productivity level of the OECD and EU-28 countries and 58% of the Euro area countries, having reduced by almost 9% in the period 2008-2016 (Figure 3). However, it should be noted that this reduction is not significant on an annual basis, as the considerable fall of real GDP has also been followed by considerable decrease in employment.

Figure 4 illustrates the significant reduction of the GDP per capita as well as of labour utilization, which adversely affected labour productivity after the outbreak of the economic crisis. In the process of recovering and increasing the competitiveness of the country, several previous efforts orientated toward the devaluation of the domestic economy. This strategy was followed by a severe reduction of wages and pensions, unemployment and increasing social inequalities.

Figure 5 shows the decomposition of the growth of value added in Greece into the contribution of all the underlying factors: labour, capital and total factor productivity (TFP). It is noted that TFP is included as it measures how much output is produced given all of the (capital and labour) inputs to the production process; in other words, it indicates how efficiently the inputs are turned into outputs. In this decomposition, factor inputs of labor and capital are disaggregated into quantity (hours worked and capital stock) and quality (composition of workers in terms of education-

GDP per hour worked, USD, constant prices, 2010 PPPs, for Greece, Germany, Portugal, Spain, Italy, the Euro area, the EU-28 and OECD countries, 2000-2016

FIGURE 2

Evolution of the productivity gap of Greece and other countries, as a percentage of the German productivity (GDP per hour worked, USD, constant prices, 2010 PPPs), 2000-2016



FIGURE 3

Productivity change (%) for Greece, Germany, Portugal, Spain, Italy, the Euro area, the EU-28 and OECD countries between 2008-2016



al attainment and composition of capital in terms of various asset types or asset groups such as ICT and non-ICT assets) (de Vries and Erumban, 2017).

During the whole period 2000-2016, productivity developments are dominated by the contributions of labour quantity (total hours worked) and TFP. On the contrary, the composition of labour and capital have minor contributions to output growth. The contribution of non-ICT capital is found to be negative after 2010, compared to its positive contribution in the previous period. The contribution of ICT capital is steadily positive but small, and it was significantly reduced after 2008, i.e., it dropped by almost 84% during the period 2008-2016. The contribution of labour quality to output growth is steadily positive (except for 2014) and it demonstrated an increase on average after 2010.

These results are mostly consistent with those of other EU countries, suggesting that the adoption of the knowledge economy in Europe has been lagging, compared to the US, which makes more and better use of ICT capital as well as high-skilled labour (Mas and Stehrer, 2012). However, the proportion of persons working in high- and medium-high technology manufacturing sectors as well as in knowledge-inten-

Annual change in GDP per capita, GDP per hour worked and labour utilization in Greece, 2000-2017



FIGURE 6

Employment (% of the total) in high- and mediumhigh technology manufacturing sectors in Greece, 2008-2017



sive service sectors in Greece is significantly lagging, in comparison to the corresponding proportion in the EU-28 (Figure 6 and Figure 7, respectively).

4. Sectoral productivity developments

In addition to productivity developments at the macroeconomic level, the examination of sectoral patterns can offer insight into more detailed aspects of productivity and how it evolves over time and differs from other (best-performing) countries. Table 2 and Table 3 report the level of productivity in 20 sectors of economic activity in Greece, in terms of their gross value added (GVA) per hour worked and GVA per employed person, re-

FIGURE 5

Output growth decomposition (%) for Greece, 2000-2016



Source: The Conference Board.

FIGURE 7

Employment (% of the total) in knowledge-intensive service sectors in Greece, 2008-2017



spectively, in years 2008 and 2016, the corresponding percentage change, and their participation in the country's GDP in the given years. It is noted that the labour productivity may significantly vary among sectors, not (only) because of their performance, but also because of the differences in capital/labour intensity.

In relation to both metrics, the most productive sector of the Greek economy is by far that of Real estate activities, with those of Electricity, gas, steam and air conditioning supply, Water supply, sewerage, waste management and remediation activities, and Financial and insurance activities to follow in order. It is stressed that the increased productivity in the Real estate activities is attributed to the particular characteristics of the given

TABLE 2 Gross value added (GVA) per hour worked (euro in 2010 constant prices) by sectorof economic activity and GDP participation (%) of sectors in 2008 and 2016

	20	800	20)16	
Sector (NACE rev. 2)	GDP share %	GVA per hour	GDP share %	GVA per hour	GVA per hour change %
Agriculture, forestry and fishing	2.7	5.7	3.9	6.5	14.4
Mining and quarrying	0.4	35.1	0.3	19.5	-44.4
Manufacturing	9.0	18.6	9.4	22.8	22.7
Electricity, gas, steam and air conditioning supply	1.0	50.3	1.4	56.9	13.1
Water supply; sewerage, waste management and remediation activities	1.7	61.0	1.4	45.2	-26.0
Construction	4.4	11.3	3.1	13.6	20.5
Wholesale and retail trade; repair of motor vehicles and motorcycles	12.8	12.5	9.0	8.2	-34.3
Transportation and storage	8.3	33.8	5.5	21.4	-36.6
Accommodation and food service activities	5.8	17.4	6.7	13.8	-20.6
Information and communication	4.0	46.6	3.1	29.8	-36.1
Financial and insurance activities	4.64	44.2	4.5	43.2	-2.1
Real estate activities	13.7	1,433.1	21.3	1,746.2	21.8
Professional, scientific and technical activities	3.9	16.8	3.1	10.6	-37.0
Administrative and support service activities	2.7	25.9	1.6	10.5	-59.6
Public administration and defence; compulsory social security	8.9	22.3	11.8	25.9	16.2
Education	5.6	26.4	6.5	26.8	1.5
Human health and social work activities	6.3	29.3	4.1	16.1	-45.0
Arts, entertainment and recreation	1.5	29.8	1.3	24.8	-16.9
Other service activities	2.2	12.8	2.6	12.0	-6.2
Activities of households as employers; undifferentiated goods-producing activities of households for own use	0.6	9.6	0.3	6.9	-27.7
Source: Eurostat and own calculations.					

sector, being of high capital intensity and pertaining to high transaction values, due to the land/property prices, and low number of employees. On the other hand, the least productive sectors are those of Agriculture, forestry and fishing, Activities of households as employers, and Wholesale and retail trade, repair of motor vehicles and motorcycles.

During the period 2008-2016, the sectors with the largest improvement in productivity are those of Real estate activities, Manufacturing, Construction (in terms of GVA per hour worked) and Agriculture, forestry and fishing (in terms of GVA per employed person). In the same period, Real estate activities and Manufacturing experienced an increase of their participation in GDP and, in 2016, they had the largest participation in GDP, together with the Public administration and defense, and compulsory social security, whose productivity was also considerably increased. Most of the sectors showed a significant drop of their productivity during the crisis period. The sectors with the largest reduction in productivity during

TABLE 3 Gross value added (GVA) per employed person (euro in 2010 constant prices)by sector of economic activity and GDP participation (%) of sectors in 2008 and 2016

	2008		2	GVA	
Sector (NACE rev. 2)	GDP share %	GVA per person	GDP share %	GVA per person	per person change %
Agriculture, forestry and fishing	2.7	11,206	3.9	13,680	22.1
Mining and quarrying	0.4	75,579	0.3	41,600	-45.0
Manufacturing	9.0	39,908	9.4	47,516	19.1
Electricity, gas, steam and air conditioning supply	1.0	105,641	1.4	119,366	13.0
Water supply; sewerage, waste management and remediation activities	1.7	122,999	1.4	90,568	-26.4
Construction	4.4	25,086	3.1	25,552	1.9
Wholesale and retail trade; repair of motor vehicles and motorcycles	12.8	28,349	9.0	18,023	-36.4
Transportation and storage	8.3	81,698	5.5	46,460	-43.1
Accommodation and food service activities	5.8	39,619	6.7	31,520	-20.4
Information and communication	4.0	96,884	3.1	60,220	-37.8
Financial and insurance activities	4.64	90,777	4.5	89,676	-1.2
Real estate activities	13.7	3,110,352	21.3	3,783,344	21.6
Professional, scientific and technical activities	3.9	36,176	3.1	22,014	-39.1
Administrative and support service activities	2.7	53,667	1.6	21,081	-60.7
Public administration and defence; compulsory social security	8.9	45,630	11.8	52,079	14.1
Education	5.6	38,440	6.5	35,790	-6.9
Human health and social work activities	6.3	59,412	4.1	30,251	-49.1
Arts, entertainment and recreation	1.5	58,067	1.3	46,617	-19.7
Other service activities	2.2	26,042	2.6	22,738	-12.7
Activities of households as employers; undifferentiated goods-producing activities of households for own use	0.6	19,495	0.3	12,802	-34.3
Source: Eurostat and own calculations.					

the same period are those of Administrative and support service activities, Human health & social work activities, Mining and quarrying, Transportation and storage, Professional, scientific and technical activities, Information and communication, and Wholesale and retail trade.

Figures 8-15 illustrate the evolution of the productivity index in Greece, measured in terms of the GVA per hour

worked, its annual change and the gap from the most productive country among those of the OECD (with the exception of the US, Japan and Turkey, for which detailed statistics on hours worked are not available) for the following broad sectors of economic activity:

- Agriculture, forestry and fishing,
- Mining and utilities,

Volume index, gap from the most productive country and annual change of productivity in Agriculture, forestry and fishing in Greece, 2000-2017



FIGURE 9

Volume index, gap from the most productive country and annual change of productivity in Mining and utilities in Greece, 2000-2017



Source: OECD and own processing. The most productive country is Estonia (in 2017).

FIGURE 10

Volume index, gap from the most productive country and annual change of productivity in Manufacturing in Greece, 2000-2017



Volume index, gap from the most productive country and annual change of productivity in Construction in Greece, 2000-2017



FIGURE 12

Volume index, gap from the most productive country and annual change of productivity in Wholesale and retail trade, accommodation and food services, transportation and storage in Greece, 2000-2017



Source: OECD and own processing. The most productive country is Latvia (in 2017).

FIGURE 13

Volume index, gap from the most productive country and annual change of productivity in Information and communication in Greece, 2000-2017



Volume index, gap from the most productive country and annual change of productivity in Financial and insurance activities in Greece, 2000-2017



FIGURE 15

Volume index, gap from the most productive country and annual change of productivity in Professional, scientific and technical activities, Administrative and support service activities in Greece, 2000-2017



- Manufacturing,
- Construction,
- Wholesale and retail trade, accommodation and food services, transportation and storage,
- Information and communication,
- Financial and insurance activities,
- Professional, scientific and technical activities, Administrative and support service activities.

Given that there is no single country for each sector that is steadily the most productive over the whole sample period, the use of a dynamic benchmark is adopted. This benchmark is composed of the most productive OECD countries and its composition may vary with time. The specific approach ensures that the comparison group is composed of the most productive economies. It is evident that, in almost all cases, together with the loss of productivity, the distance of the broad sectors of the Greek economy from the production frontier has increased, particularly during the last years. During the whole period 2000-2017, the services sectors of Information and communication, Financial and insurance activities, and Professional, scientific and technical activities, Administrative and support service activities showed, on average, the largest distance from the production frontier (between 60%-70%). In 2017, there were sectors wherein Greece was far behind the corresponding production frontier (<50%), such as those of Information and communication, Professional, scientific and technical activities, Administrative and support service activities, and Manufacturing. In those sectors, it can be regarded that there is the largest room for productivity improvement. During the crisis period (2008-2016), all broad sectors of economic activity in Greece increased their distance from the production frontier, except for Construction, which reduced its distance by 5.4%.

The broad sectors of the Greek economy which showed the largest departure from the production frontier during the crisis period are those of Information and communication (by 64%), Professional, scientific and technical activities, Administrative and support service activities (by 56%), Manufacturing (by 48%) and Wholesale and retail trade, accommodation and food services, transportation and storage (by 47%). Namely, sectors wherein Greece is persistently far behind the production frontier, such as Information and communication and Professional, scientific and technical activities, Administrative and support service activities, also showed the largest departure from the production frontier during the economic crisis. This outcome suggests the limited capacity of those sectors to adapt to the rapidly changing environment of global economic competition and technological progress. The need for an increase of adaptive capacity also concerns Manufacturing, which, although its productivity improved during the crisis period, departed further from the corresponding production frontier.

5. Conclusions

This article presented the developments and some longterm, persistent problems pertaining to the productivity of the Greek economy. The analysis demonstrated the important reduction of productivity in Greece and its further departure from the international production frontier during the crisis period, signifying the loss of competitiveness in almost all sectors of economic activity. The largest room for productivity enhancement is found in the sectors of Information and communication, Professional, scientific and technical activities, Administrative and support service activities, and Manufacturing.

The contribution of ICT capital and labour quality to output growth were found to be positive but considerably low, suggesting the need for improving the rate of diffusion of technology and innovation, and further harnessing human capital to promote industrial production. It is stressed that Greece is ranked at the last positions among the OECD countries in relation to the direct government funding of business R&D, tax incentives for R&D and R&D expenditure by business enterprises, although it is highly ranked in terms of the participation of young people in tertiary education and the percentage of tertiary education graduates in natural sciences and engineering (Tsekeris and Skintzi, 2017).

In addition to increasing the adaptive capacity to technological change, other factors behind low productivity (such as limited openness, (mis)regulation and lack of competition) should be addressed, hastening the required structural reforms in public administration and the product and labour markets. The role of institutional and political factors is also widely recognized, as the quality of government institutions and policies (including, amongst others, the enforcement of rules of law, government efficiency and transparency) at the national and regional level may have a significant impact on the efficacy of factors influencing the economic performance in the long run (Acemoglu, 2008; Rodríguez-Posé, 2013; Rodríguez-Posé and Di Cataldo, 2015).

Based on the national growth strategy of the country, resources from laggard firms or industries should be reallocated to more productive firms or industries, giving emphasis to internationally tradable sectors of economic activity, such as those of agriculture (as long as it relates to agricultural exports and tourism), manufacturing, transportation and storage, accommodation and food service activities, and information and communication. Finally, the upgrading and modernization of the regional governance and land-use planning system are anticipated to positively contribute to the output and productivity growth of the country (OECD, 2017).

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Relative output performance of public hospitals in Greece

Roxani Karagiannis*

1. Introduction

Hospitals maintain the core position in health care systems of all countries since they play a prime and important role in providing health care services. (OECD, 2017; WHO, 2000). On the citizen's side, hospitals are the main health care providers and, on the state's side, constitute the scope of the largest interventions in the health sector. After 2010, the structural reforms in the Greek health sector focused on the containment of health expenditures while maintaining universal access to health care and improving the quality of care. The main part of these reforms was addressed to secondary and tertiary health care services.

The level of health care expenditures for in-patient care is an indication of the size and importance of hospitals' operation. In 2016, hospital expenditures amounted to 43.4% (€6.4 billion) of total health expenditures (ELSTAT, Health system accounts, 2018). In addition, the subsidies of the general government to hospitals correspond approximately to 64% of total health expenditure in 2015 (Karagiannis, 2017). According to the government budget explanatory statement of 2018, €1.5 billion out of the €2.7 billion expected revenues of public hospitals refer to transfers from the general government budget (Hellenic Ministry of Finance, 2017). These transfers cover the operational needs of public hospitals and the salaries of human resources. Furthermore, the general government may contribute to a hospital's budget with exceptional subsidies to cover their outstanding liabilities to third parties.

The main subject in many studies is to optimize the efficient use of resources, improve the productivity and quality of health care services and the policy framework. In the literature, many studies assess the relative performance of hospital activities using either output or input indicators (i.e., Lorenzoni and Marino, 2017; Rahimi et al., 2014; OECD, 2002) or more complex methods (i.e., O'Neil et al., 2008; Kohl et al., 2018; Hollingsworth, 2008; Jacobs et al., 2006) to identify strengths and weaknesses in hospital operation and policy decision making. This article analyses the operation of public hospitals in Greece, classifying hospitals according to their geographical location and bed capacity. Empirical analysis is based on the use of output performance indicators, which can be combined simultaneously on a graph representation.

2. Methodological background

The health care activities of public hospitals are identified by a range of variables such as the number of beds, the number of in-patient discharges, the number of in-patient days, the number of out-patient visits in non-emergency and emergency departments. In addition to the aforementioned variables, output indicators such as average length of stay, bed occupancy rate, bed turnover rate and bed turnover interval are used for the analysis of the relative output performance of public hospitals. These performance indicators could evaluate the outcome of the hospitals and allow for a comparative analysis among hospitals or subgroups of hospitals (Liaropoulos, 2007).

More analytically, the average length of stay constitutes a key indicator for the evaluation of hospital activities and is defined by the equation:

$$\begin{array}{l} \text{Average length} \\ \text{of stay} \end{array} = \frac{\begin{array}{c} \text{Number of in-patient} \\ \text{days} \\ \text{Number of in-patient} \\ \text{discharges} \end{array} . \tag{1}$$

The level of the indicator is affected by the hospitalization conditions, the treatment decisions of the physicians, the characteristics of the patient's illness and the overall organization structure of the public hospitals. The shrinkage of the average length of stay is a positive sign for the operation of hospitals.

The average bed occupancy rate is defined by the equation:

$$Bed occupancy rate = \frac{100 \times Number}{365 \times Number of beds}$$
(2)

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⁻ Opinions or value judgments expressed in this article are the author's own and do not necessarily reflect those of the Centre of Planning and Economic Research.

and indicates the efficient use of hospital resources. A low bed occupancy rate defines a diseconomies operation scale, taking into account that hospitals face high fixed costs such as human resources wages. Very high occupancy rates (above 90%) may reflect an intensive use of hospital resources and the expansion of variable cost.

The bed turnover rate and the bed turnover interval supplement the analysis of the bed occupancy rate. The bed turnover rate defines the usage rate of beds over a period of time and is given by the equation:

$$Bed turnover rate = \frac{Number of in-patient}{Number of beds} . (3)$$

The bed turnover interval indicator counts how many days each bed remains empty until the next patient discharge. It is defined by the equation:

Bed turnover
$$= \frac{365}{Bed turnover} - \frac{Average length}{of stay}$$
. (4)
rate

Low values indicate efficient usage of beds. Negative values may reflect over-utilization and lack of beds.

While it is customary to analyze the aforementioned output performance indicators in isolation, the simultaneous analysis of two or more indicators can lead to more secure conclusions about the efficient operation of hospitals and thus can contribute to decision making. One of the most well-known methods to measure the relative performance of public hospitals through output indicators is the Pabón Lasso (1986) graph. The basic approach employed to combine the three indicators -average length of stay, bed occupancy rate and bed turnover rate- is to graph them on a chart (see Figure 1) where the bed occupancy rate per year is shown on the X axis, and the bed turnover rate is shown on the Y axis. These two indicators provide all the information needed to calculate the average length of stay, which can be shown on the graph by drawing straight lines out from the origin, each of which represents an average stay of a particular number of days. Each graph is then divided into four zones, the borders of which are defined by the average bed occupancy rate and average bed turnover rate found for a reasonably homogeneous group of hospitals. Each of the zones thus obtained has the following features:

- Zone 1: Hospitals with a low bed occupancy rate and bed turnover rate, which have an excessive number of beds according to the existing demand (the least desirable situation).
- Zone 2: Hospitals with a low bed occupancy rate, high bed turnover rate and low average length of stay, indicating unnecessary hospitalization, excess bed availability and/or patients who need shortterm hospitalization.
- Zone 3: Hospitals with a high bed occupancy rate and bed turnover rate, which reached an appropriate level of efficiency, with relatively few vacant beds at any time (the most desirable situation).
- Zone 4: Hospitals with a high bed occupancy rate, low bed turnover rate and high average length of



stay. These hospitals serve patients with serious chronic diseases or those whose average length of stay is high for no reason.

According to Pabón Lasso (1986), the graph makes the magnitude and the direction of change in each output performance indicator readily apparent, permits the principal change vector to be followed over time for each hospital, and provides the basis for devising policy seeking to correct weaknesses in the hospital's performance. The usefulness of examining all three charted indicators together is shown by the fact that in some cases where the bed turnover rate was improved or maintained and the average length of stay was short-ened, these gains were offset by a reduced bed occupancy rate; whereas in other cases the average hospital stay remained fairly constant, the bed occupancy rate were made.

3. Treatment/care activities of public hospitals

The empirical analysis of output performance indicators for a sample of 116 public hospitals during the period 2010-2017 is based on data published by the Bi.Health web application of the Hellenic Ministry of Health. The psychiatric hospitals, two Legal Entities of Private Law hospitals and hospitals with missing data were excluded from the analysis. The public hospitals are classified according to their geographical location, the severity of cases they are treating and their size defined by the number of beds (Table 1). According to their geographical location, the 116 public hospitals are classified into seven health regions (H.R.) (1st H.R.: Attica; 2nd H.R.: Piraeus and the Aegean Islands; 3rd H.R.: Macedonia; 4rd H.R.: Macedonia and Thrace; 5th H.R.: Thessalv and Central Greece; 6th H.R.: the Peloponnese-Ionian Islands-Epirus and W. Greece; 7th H.R.: Crete) having under their auspices 21, 19, 13, 14, 13, 28 and 8 hospitals, respectively, providing their health care services to a corresponding target population, as shown in Table 1. According to their specialty, the public hospitals distinguished into 83 general hospitals, 16 general-health centers (G-HC), 10 specialized hospitals and 7 university hospitals. According to their bed capacity, the public hospitals are divided into 30 small-sized hospitals (< 100 beds), 54 medium-sized hospitals (101-369 beds) and 32 large-sized hospitals (\geq 370 beds).

The key treatment/care activity variables of public hospitals for 2017 are presented in Table 2. The 116 public hospitals under the National Health System (ESY) have 30,160 beds and treat 2,286,282 inpatients and 12,003,432 out-patients. The health region of Attica occupies the first position among the health regions in terms of health care activities. The 1st health region, with 8,438 beds (28% of the total sample), treated 28% of total in-patients and 23% of total out-patients followed by the 6th health region with 5,276 beds (18% of the total sample), which provided health care services to 18% of in-patients and 19% of out-patients. The general and large-sized hospitals provide their health care services to the majority of patients, as expected, due to the variety of cases and the large number of available beds. The general hospitals, occupying 72% of total beds, provide health

H.R.	Total	General	G-HC	Specialized	University	Small	Medium	Large	Population target
1st H.R.	21	15	0	6	0	1	8	12	2,604,975
2st H.R.	19	11	6	1	1	8	7	4	1,731,705
3st H.R.	13	13	0	0	0	1	10	2	1,801,229*
4st H.R.	14	10	1	1	2	1	7	6	2,083,301*
5st H.R.	13	10	2	0	1	5	6	2	1,280,152
6st H.R.	28	20	4	2	2	11	14	3	1,802,410
7st H.R.	8	4	3	0	1	3	2	3	623,065
Total	116	83	16	10	7	30	54	32	1

TABLE 1 Number of public hospitals by health regions, specialty and bed capacity, 2017

Note: * The population of the prefecture of Thessaloniki is covered by public hospitals of the 3rd and 4th health regions.

Hospitals	Beds	In-patient discharges	In-patient days	Emergency out-patient visits	Non-emergency out-patient visits	Out-patient visits (afternoon oberation)			
Total	30,160	2,286,282	7,259,568	4,605,045	6,883,910	514,477			
Health Regions									
1st H.R.	8,438	634,097	2,150,443	1,098,957	1,416,557	220,232			
2st H.R.	4,324	284,173	1,017,868	575,173	949,349	39,306			
3st H.R.	2,790	206,770	603,380	509,110	664,036	12,295			
4st H.R.	4,452	359,960	992,557	696,863	1,190,267	69,736			
5st H.R.	2,673	222,472	601,594	452,981	749,482	47,960			
6st H.R.	5,276	400,799	1,331,098	893,055	1,364,426	50,130			
7st H.R.	2,207	178,011	562,628	378,906	549,793	74,818			
Specialty									
General	21,985	1,557,132	5,181,669	3,610,445	4,789,420	273,294			
General - HC	792	37,913	115,938	141,782	421,801	0			
Specialized	2,837	265,844	651,448	358,775	718,842	101,524			
University	4,546	425,393	1,310,513	494,043	953,847	139,659			
Bed capacity									
≤ 1 00	1,759	94,112	285,927	345,903	812,279	19,601			
101 - 369	10,975	822,910	2,464,247	2,129,372	3,014,356	131,525			
≥ 370	17,426	1,369,260	4,509,394	2,129,770	3,057,275	363,351			
Source: Bi.Health (20	017).								

TABLE 2 Health care activity variables of public hospitals, 2017

care services to 68% of total in-patients and 73% of total out-patients while the large hospitals, with 58% of beds, treat 60% of total in-patients and 43% of total out-patient visits.

The number of beds in public hospitals in our sample amounted to 30,134 in 2017 (Figure 2). We observe that more than 40% of beds are located in the urban centers of Athens, Piraeus and Thessaloniki. Over time, the number of beds decreased by 630 beds (an average annual negative rate by 0.3%) in 2017 relative to 2010. The reorganization of public hospitals in 2011 and 2013, which led to the administrative link-up of neighboring hospitals (83 main and 48 linked), to the change of usage of psychiatric, IKA and/or small specialized hospitals, as well as to the reorganization of wards, resulted in a respective 1.8% and 1.6% annual reduction in the number of beds. This reorganization seems to impact mostly the 2^{nd} , 4^{th} and 1^{st} health regions, while the 5^{th} and 6^{th} were expanded in terms of their bed capacity.

The number of in-patient discharges of public hospitals increased annually by 1.9%, on average, during the period 2010-2017, with the exception of the period 2013-2015 where they exhibited an average annual decrease by 1.3% (Figure 3). This reduction in 2014 and 2015 is observed in all health regions except Crete, which presents the highest average annual growth (3.0%) in the flow of in-patient discharges. Concerning the ranking of the health regions in terms of the number of in-patient discharges, the 1st health region occupies the first position with 27% of total in-patients followed by the 6th, 4th, 2nd, 5th, 3rd and 7th health regions, with 18%, 16%, 12%, 10%, 9% and 8%, respectively.
FIGURE 2 Number of beds, 2010-2017





FIGURE 3 Number of in-patient discharges, 2010-2017

FIGURE 4 Number of in-patient days, 2010-2017



Source: Bi.Health (various years).



The positive growth rate of in-patient discharges was followed by an average annual decrease (0.9%) of the number of in-patient days over the period under consideration, as presented in Figure 4 above. The highest negative growth rate (-2.3%) of the in-patient days is found in 2015. The public hospitals of the 2nd health region had the highest average annual reduction by 2.8% while the public hospitals of the 6th and 3rd health regions had the highest average annual increase by 1%.

The number of out-patient visits present an upward trend overtime, mainly due to the afternoon operation of non-emergency out-patient departments that seems to be well-established after the shutting down of IKA health care centers and the increased inflow of the uninsured population due to the economic crisis. The average annual growth rate of out-patient visits was equal to 1.5% while the public hospitals of the 2nd and 7th health regions present the highest positive growth rate by 8% and 3.5%, respectively (Figure 5 above).

4. Output performance indicators of public hospitals

Table 3 presents the descriptive statistics of the output performance indicators of public hospitals during the period 2010-2017. The average length of stay was reduced from 4.2 days in 2010 to 3.4 days in 2017. The public hospitals of all health regions present a similar downward trend with the 2nd and 1st health regions exhibiting the best performance, reducing the average length of stay by 2 and 1 days, respectively. The average length of stay ranged from 3 to 4 days and does not seem to be significantly different between hospitals in the various health regions with the exception of the public hospitals of the 1st and 2nd health regions, which, until 2014, hospitalized their patients from 4 to 5 days. After 2014, the average length of stay improved rapidly to reach the level of the other public hospitals. Comparing the minimum

	2010	2011	2012	2013	2014	2015	2016	2017
			Average I	ength of sta	у			
Mean	4.15	4.07	3.97	3.86	3.81	3.79	3.57	3.41
Minimum value	1.66	2.14	2.03	2.00	1.11	1.00	1.00	1.00
Maximum value	24.74	26.23	20.82	20.38	19.31	17.66	20.48	15.51
Standard deviation	2.54	2.63	2.13	2.30	2.16	2.07	2.17	1.47
			Bed occup	oancy rate (%	%)			
Mean	61.69	63.19	63.12	60.80	59.99	58.21	57.06	58.27
Minimum value	17.68	14.32	19.93	22.71	9.91	15.62	12.79	17.00
Maximum value	124.75	119.24	130.24	128.04	118.09	117.59	109.05	119.06
Standard deviation	19.95	18.43	17.77	17.11	17.04	17.90	18.48	16.91
			Bed tu	rnover rate				
Mean	60.96	63.35	63.91	63.70	63.05	61.70	64.60	67.61
Minimum value	8.30	10.77	11.87	9.42	13.74	8.77	14.25	12.81
Maximum value	150.02	109.63	139.08	141.26	139.66	134.46	140.45	152.13
Standard deviation	21.88	20.62	21.75	21.98	21.31	21.42	23.56	24.15
			Bed turn	over interva	I.			
Mean	3.21	2.84	2.73	2.93	2.97	3.30	3.20	2.91
Minimum value	-1.36	-4.04	-1.11	-1.01	-0.72	-0.77	-0.40	-0.79
Maximum value	19.21	28.36	16.10	18.37	16.27	24.35	18.21	13.84
Standard deviation	3.55	3.52	2.40	2.59	2.57	3.24	2.72	2.36

TABLE 3 Descriptive statistics of output performance indicators of public hospitals, 2010-2017

FIGURE 6

Frequency distribution of output performance indicators of public hospitals by health region, 2010 & 2017



and maximum values of the indicator, we can observe that they range from 1 to 15 days in 2017. This deviation is justified by the operation of specialized or large-sized hospitals that treat more serious and/or long-term cases. The frequency distribution of output performance indicators by health region for the years 2010 and 2017 (Figure 6 above) shows that in 2010, 37% of public hospitals exhibited an average length of stay from 3 to 4 days, 24% from 2 to 3 days, and 18% up to 5 days. In 2017, the frequency distribution shifts to the right and 44% of public hospitals exhibited an average length of stay from 2 to 3 days, with only 5% up to 5 days.

The average bed occupancy rate of the total sample was gradually reduced to 58.3% in 2017 relative to 61.7% in 2010. With regard to the health regions, the bed occupancy rate ranged from 50% to 66%. The 1st health region reports the highest bed occupancy rate during the period under consideration (from 70.3% in 2010 to 65.7% in 2017) relative to the other health regions, while the 2nd health region reports the lowest bed occupancy rate (from 55.3% in 2010 to 50.8% in 2017). With regard to the hospitals, we can observe a great deviation in the bed occupancy rate from 17% to 119% in 2017. The general-health centers and smallsized hospitals exhibit a relatively low level of bed occupancy rates relative to the general, university and large-sized hospitals where the average bed occupancy rate exceeds 100%, indicating the overutilization of beds. Figure 6 shows that 42% of the public hospitals exhibit an average bed occupancy rate ranging between 40% to 60%, 38% between 60% to 80% and 8% between 80% to 100%; 11% of hospitals exhibit a bed occupancy rate less than 40%. The frequency distribution of the indicator does not change significantly between the two years 2010 and 2017 with the exception of the portion of the public hospitals with over-utilized beds, which decreased from 4.3% in 2010 to 0.9% in 2017.

On average, the bed turnover rate improved over time from 61 patients in 2010 to 68 in 2017 (Table 3 above). The indicator ranged from 13 to 152 patients per bed indicating a significant deviation between hospitals, mainly due to the severity of cases that each hospital treated. The general, university and large-sized hospitals exhibit a better bed turnover rate relative to the general-health centers and small-sized hospitals. Regarding their location, the public hospitals of the 4th and 3rd health regions exhibit a better performance relative to the public hospitals of the other health regions. In 2017, the frequency distribution shifts to the right, indicating an improvement in the bed turnover rate (Figure 6 above). The portion of public hospitals with a bed turnover rate greater than 80 in-patients increased from 16% in 2010 to 31% in 2017.

The bed turnover interval supplements the analysis of the bed turnover rate. On average, the bed turnover interval equals to 3 days, and over time it was relatively stable. The indicator takes negative values for a number of public hospitals, indicating excess utilization and lack of beds. On the other side, the general-health centers and small-sized hospitals exhibit a higher bed turnover interval (from 28 days in 2011 to 14 days in 2017) relative to the other hospitals. Fifty-four percent of the total sample hospitals exhibit an average bed turnover interval ranging from 1 to 3 days. However, over time we can observe a reduction in the portion of public hospitals with an over utilization of beds (from 16% in 2010 to 13% in 2017) and an increase in the portion of public hospitals with a bed turnover interval greater than 4 days (from 20% in 2010 to 21% in 2017).

5. Relative output performance of public hospitals

In this section we use the Pabón Lasso model (1986) to measure the relative output performance of a reasonably homogeneous group of public hospitals combining average length of stay, bed occupancy rate and bed turnover rate indicators for the years 2010 and 2017. The public hospitals are divided into three subgroups according to their bed capacity to satisfy homogeneity.

Table 4 presents the descriptive statistics of output indicators per hospital subgroup for two years. On average, small-sized hospitals (≤ 100 beds, n = 30), medium-sized hospitals (101-369 beds, n = 54) and large-sized hospitals (≥ 370 beds, n = 32) improved the average length of stay by 1 day, increased the bed turnover rate by 10%, 10% and 13%, respective-ly, and decreased the bed occupancy rate by 8%, 3% and 8%, respectively.

Figure 7 presents the relative output performance of small (7A), medium (7B) and large-sized (7C) public hospitals for the years 2010 and 2017 using the Pabón Lasso graph. The axis X depicts the average bed occupancy rate and the axis Y the bed turnover rate. The straight lines out from the origin depict the average length of stay of particular number of days. Each of the graphs depicts the minimum, maximum and selected indicative values of average length of stay for each subgroup of hospitals through a clear and readable representation. Vertical reference lines on the X and Y axes illustrate the mean values of the bed occupancy

		2010			2017	
	Average length of stay	Bed occupancy rate	Bed turnover rate	Average length of stay	Bed occupancy rate	Bed turnover rate
		Small hos	spitals (≤100 beds	, n=30)		
Mean	4.25	47.17	44.41	3.73	43.40	48.75
Minimum value	2.19	17.68	11.77	1.00	11.77	12.81
Maximum value	12.52	124.75	82.51	15.51	82.51	90.19
Standard deviation	2.07	21.50	18.17	2.41	14.87	19.57
		Medium hos	pitals (101-369 be	eds, n=54)		
Mean	4.10	61.31	65.39	3.21	59.68	71.85
Minimum value	1.66	35.92	8.30	2.07	33.88	35.08
Maximum value	24.74	100.70	150.02	7.02	119.06	120.06
Standard deviation	3.30	12.89	22.88	0.99	13.75	20.11
		Large hos	spitals (≥370 beds	, n=32)		
Mean	4.14	75.94	69.02	3.46	69.81	78.13
Minimum value	2.72	52.27	46.95	1.73	36.97	39.62
Maximum value	6.80	122.98	108.2	5.54	97.57	152.13
Standard deviation	1.17	18.61	14.37	0.88	13.25	24.98

TABLE 4 Descriptive statistics of output performance indicators by hospital size, 2010 & 2017

rate and the bed turnover rate, respectively, for each subgroup of hospitals (see Table 4).

In 2010, the majority of the 30 small-sized hospitals were located in Zone 1 (43%) and Zone 3 (33%) (Figure 7A). Twelve percent of small-sized hospitals were located in Zones 2 and 4. In 2017, the number of small public hospitals remained stable in Zones 1 and 2, while 2 hospitals shift from Zone 3 (27%) to Zone 4 (17%) (see Table 5). According to the Pabón Lasso (1986), 27% of small-sized hospitals located in Zone 3 exhibited both a high bed occupancy rate and a bed turnover rate achieving a satisfactory degree of relative output performance. A small portion of hospitals were located in Zones 2 and 4, indicating a high number of beds and/or unnecessary long-term hospitalization, which may be justified by the severity of cases or their geographical location in remote or island regions. Forty-three percent of small hospitals were located in the least desirable Zone 1, presenting both a low bed occupancy rate and a low bed turnover rate.

In 2010, the majority of the 54 medium-sized hospitals were located in Zones 1 and 3 (35% and 31%, respectively) (Figure 7B), while 22% and 12% of the medium-sized hospitals were located in Zones 2 and 4, respectively. In 2017, a portion of medium-sized hospitals moved between the four Zones (Table 5). More analytically, 24% of the medium-sized hospitals were located in the most desirable Zone 3, indicating a satisfactory degree of output performance. On the other side, 40% of medium-sized hospitals were located in the least desirable Zone 1, reporting both a low bed occupancy rate and a low bed turnover rate. Also, the portion of medium-sized hospitals located in Zone 4 increased to 20% in 2017.

The large-sized hospitals show significant variation between 2010 and 2017, as presented in Figure 7C. The portion of large hospitals located in Zone 3 increased from 19% in 2010 to 38% in 2017, indicating a significant improvement in their relative output performance. We can, also, observe a significant reduction in the portion of large hospitals located in Zone 2 (from 37% in 2010 to 9% in 2017) and in Zone 4 (from 22% in

FIGURE 7 Relative output performance of public hospitals



		2010		2017		Change 2017-201	D
	Hospitals	Number of hospitals	%	Number of hospitals	%	Number of hospitals	%
Zone 1	Small	13		13		0	
	Medium	19		21		2	
	Large	7		12		5	
	Subtotal	39	34	46	40	7	18
Zone 2	Small	4		4		0	
	Medium	12		9		-3	
	Large	12		3		-9	
	Subtotal	28	24	16	14	-12	-43
Zone 3	Small	10		8		-2	
	Medium	17		13		-4	
	Large	6		12		6	
	Subtotal	33	28	33	28	0	0
Zone 4	Small	3		5		2	
	Medium	6		11		5	
	Large	7		5		-2	
	Subtotal	16	14	21	18	5	31
	Total	116	100	116	100		

TABLE 5 Distribution of public hospitals by relative output performance by Zone, 2010 & 2017

2010 to 16% in 2017) (Table 5). On the other side, the portion of large hospitals located in Zone 1 increased from 22% in 2010 to 37% in 2017, exhibiting both a low bed occupancy rate and a low bed turnover rate relative to the demand of health care services.

6. Concluding remarks

Various indicators for the measurement of hospitals' relative performance were introduced in the literature. These indicators play an important role in assessing the performance of public hospitals, thus contributing to the optimal utilization of their resources. However, the analysis of these indicators in isolation may lead to false conclusions regarding the overall performance of the public hospitals. To avoid misleading information, we adopt the Pabón Lasso model, which combines and assesses the bed occupancy rate, bed turnover rate and average length of stay together in a graph, to analyze the relative output performance of public hospitals.

The comparative analysis of output performance indicators for a sample of 116 public hospitals during the period 2010-2017 demonstrates improvement in the average length of stay by 1 day, on average, while the majority of hospitals treated their patients from 2 to 3 days. The average bed occupancy rate reduced over time and the majority of hospitals exhibited a value ranging from 40% to 80%. The large-sized and university hospitals exhibited a higher bed occupancy rate relative to medium- and small-sized hospitals and to general and specialized hospitals. A small portion of hospitals had a low bed occupancy rate, indicating an under-utilization of hospital resources. This weakness could be eliminated through the improved allocation of resources among regions and/or hospital specialties and through the employment of gualified health care staff and new equipment, especially in rural areas. The number of hospitals with excess bed occupancy and excess utilization of hospital resources reduced significantly over time. Furthermore, the average bed turnover rates and bed turnover interval improved over time. The general, university and large-sized hospitals show a better bed turnover rate relative to the general-health centers and small-sized hospitals. The bed turnover interval ranged from 1 to 3 days for the majority of public

hospitals while the number of hospitals with over-utilization of beds decreased significantly.

The combined graphical representation of output indicators shows that 33 out of 116 public hospitals have achieved a satisfactory degree of relative output performance with a relatively low level of empty beds. A portion of the low relative output performance of public hospitals may be justified by the kind and the severity of cases seen, the geographical location, mainly if they are located in remote and island areas, and from the number of available human resources and technological equipments. We must note that the main technical limitation of the Pabón Lasso model is that the effect of some factors such as ease of access to hospitals, lack of access to home or community long-term care, geographical position, status of hospitals and hospital policies on output indicators cannot be measured by this simple tool. The public hospitals under consideration can improve their relative output performance by reducing the unnecessary and long-term hospitalizations, improving the quality of their services, providing subspecialty equipment and experts, enhancing the skills of human resources and improving the admission and administrative system of hospitals to facilitate the access of the patients.

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Private education in Greece

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1. Introduction

The important role of education in social and economic development is well recognised worldwide. Education services are typically provided by schools and involve the award of degrees to certify knowledge and skills acquired. Over the past decades there have been systematic efforts to classify as forms of education all knowledge, skills and experiences a person accumulates during his/her lifetime, irrespective of the ways they were acquired; that is usually referred to as lifelong learning. Education should not be confused with the Greek "paideia". "Paideia" is the result of a process that involves both the narrow familial and the wider social environment, but it is also the outcome of an internal, personal process. Education, on the contrary, is provided by specific organisations, either public or private, and it can be either formal or non-formal.

This article focuses on private formal education, which is provided within organised structures, i.e., schools, and under a well-defined framework, which includes certain curricula, books, selected courses, teaching in classrooms, etc., and leads to a certificate in the form of a degree. Attending private schools is less common in Greece compared to other European countries (OECD, 2012); therefore this article wishes to inform interested readers regarding the legislative framework for private education, to discuss the most popular arguments in favour of private education, to present empirical evidence regarding the characteristics of households that prefer private education over public and to explore how the industry evolved during the times of the depression in terms of the number of schools, students and teaching staff.

2. The legislative framework for private education

Article 16 (§4) of the Greek constitution provides for free-of-charge education services for all Greek citizens. The provision of education services is a key state mission and it aims at educating Greeks morally, mentally, vocationally and physically, to develop their national and religious consciousness and to mould them into free and responsible citizens (§2). Although it is clearly stated in the constitution (§5) that only state owned and operated institutions can provide tertiary education services (state entities of public law - NPDD), the operation of privately owned schools of primary and secondary education is provided for (§8). It is also clearly stated that such schools will operate under the supervision of the Ministry of Education, Research and Religious Affairs (MoE). In practice, one could distinguish between two types of privately owned education institutions: the first one involves typical education and includes privately owned primary and secondary education schools (both lower and upper), and the second involves non-typical education and includes privately owned foreign language schools, cram schools (i.e., private support classes) and post-secondary non-tertiary education institutions (IEK), which usually address vocational education needs. This article focuses on the first type of institutions.

Law 682/1977 is the core legal document for the establishment and operation of privately owned primary and secondary education schools.¹ It states that privately owned schools operate under the same rules and restrictions as public schools. Therefore, the degrees awarded are equivalent to those awarded by public schools. The rationale behind state supervision of private schools relies on the assumption that education is a public good² and as such its output affects the entire society. Moreover, private school graduates compete with public school graduates for jobs, and employers often take seriously into account the academic record of the candidate. In other words, private

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⁻ Opinions or value judgments expressed in this article are the author's own and do not necessarily reflect those of the Centre of Planning and Economic Research.

^{1.} Foreign schools are not included in the group of private schools discussed in this article, since they operate under the supervision of the states they come from. In foreign schools that come from EU member-states, Greek students can apply and attend also, ever since the terms and conditions of their operation were equalised to those of private schools. A more thorough presentation of their legal framework can be found in Papaevangelou (2015).

^{2.} The reader can find an interesting discussion regarding the character of education as a public good in Anomaly (2018).

	No. of schools	Average tuition fees	Maximum tuition fees	Minimum tuition fees*
Kindergartens in Attica	220	4,250	8,100	700
Kindergartens outside Attica	196	3,000	5,500	1,000
Primary schools in Attica	83	4,800	11,363	700
Primary schools outside Attica	48	4,116	7,000	2,000
Lower secondary schools in Attica	54	5,600	9,783	700
Lower secondary schools outside Attica	37	4,900	7,500	2,500

TABLE 1 Number of private schools and annual tuition fees (in €), 2017-2018

Source: Ministry of Economy and Development, General Secretariat for Trade and Consumer Protection.

* The minimum tuition fees of €700 involve the Armenian Red Cross in Attica. The second cheapest school charges at least twice as much.

schools are not just businesses. Rather, they involve a strong social footprint instead. As a result, the legislative framework for private schools involves all aspects of school life and education services provided, ranging from time schedule, syllabus and extracurricular activities to building and space requirements, owners' and teachers' qualifications, and monitoring labour relations between school owners and teachers. Some of the provisions have changed over the years with ministerial decisions or articles of laws regarding specific points of interest. Law 4415/2016³ is the most recent and crucial intervention of the past years regarding the operation of private schools. With respect to their supervision, Law 4452/2017 (article 15) re-established the Independent Directorate for Private Education⁴ which operates separate departments for private school personnel, foreign schools, cram schools and foreign language schools.5

In this context, strictly private schools⁶ have to follow the same syllabus as public schools, but they are allowed to offer extra subjects (including foreign languages) and other education activities after completion of the typical school hours.⁷ In such a case, they are obliged to report extra subjects and activities to the MoE (more specifically, to the respective supervisory body, i.e., the Regional Board of Education), along with the number of students and teachers involved. With respect to hiring procedures, private school teachers should have the same qualifications as public school teachers, a prerequisite that holds also for extracurricular activities.

Last but not least, private schools are self-funded in the sense that students pay tuition fees and there is no state subsidy or tax redemption for students or their parents⁸ as is the case in other countries (IOBE, 2013). The General Secretariat for Trade and Consumer Protection of the Ministry of Economy and Development publishes annually a list of private schools and their tuition fees.⁹ The list involves kindergartens, primary schools and lower secondary

6. Foreign schools which are subsidized by the states they come from are excluded.

9. The list is available at <http://gge.gov.gr/?page_id=3715>.

^{3.} The FEK is available at https://www.esos.gr/sites/default/files/articles-legacy/nomos_4415_2016.pdf>.

^{4.} This is a long-standing request for OIELE. See ">https://www.oiele.gr/megali-mera-gia-tin-idiotiki-ekpedefsi-epanasistinete-avtote-lis-diefthinsi-idiotikis-ekpedefsi-sto-ipourgio-pedias-afximenes-epoptikes-armodiotites/.

^{5. &}lt;https://www.esos.gr/arthra/50116/xekina-simera-ti-leitoyrgia-tis-i-aytotelis-dieythynsi-idiotikis-ekpaideysis>.

^{7.} The same is true for special types of public schools, such as music and arts schools.

^{8.} On the contrary, tuitions in private schools are considered as proof of income by the tax services and can be taxed separately. This is most unpleasant, but otherwise necessary, in order to fight extensive tax evasion in Greece. See https://www.newsbeast.gr/financial/ar-thro/3505092/ti-ischii-me-ta-tekmiria-gia-ta-idiotika-scholia-ke-to-voithitiko-prosopiko.

schools only.¹⁰ Table 1 above summarizes some of the reported results. Almost two thirds of all private schools are located in Attica, which is expected considering that half of Greece's population resides in Attica. Moreover, the cost of private education is also higher in Attica, which is not surprising given the substantially higher income of the region compared to the national average. Interestingly, there is a considerable gap between maximum and minimum tuition fees, which is probably justified by the fact that some schools address population groups with specific characteristics. Admission rules can be school specific since sometimes there are specific requirements, such as a certain ethnic origin. Furthermore, some private schools rely on entry examinations for the admission of their students. Apart from the tuition fees, some private schools also charge extra money for extracurricular activities and transportation services, if required. Some secondary education private schools offer full or partial scholarships to students with exceptional academic skills verified through tests.11

Since private schools are not funded by the state, they have to rely on their own revenues to finance their operation; therefore they rely on an adequate demand for their services, just like any other business. It comes as no surprise then that, irrespective of the level of education involved, private schools are concentrated in big cities and densely populated areas. There were only two private schools in primary and secondary education in the South Aegean islands, three in the Ionian Islands and none in Western Macedonia (Kanellopoulos, 2011). The same report argues that there is a big cost associated with entering the market of private education services; there are narrow profit margins, probably due to the nature of the business and institutional restrictions,12 while recurring investments are necessary to remain attractive. Moreover, a strong brand name is very important to win parents' trust and attract students, since it accommodates safety and trust. All these elements taken together suggest that it is not an easy task for a firm to enter the market of private education services in Greece, at least as far as typical education is concerned.

Given the economic and social importance of education, it is interesting to explore the developments in private education in Greece during the depression, at least in quantitative terms. In this framework, the demand for private education services is expected to decline due to the reduction in the disposable income of households. On the other hand, concerns expressed by many regarding the deterioration of public education services, reflected in lower state funding, teacher vacancies, increased number of temporary teachers paid by the hour and facing worse terms of employment compared to permanent teachers and frequent strikes by teachers in response to one-sided institutional reforms, may force households, which can afford it, to resort to private education services.

3. Discussion of the arguments in favour of private education

A series of arguments in favour of private education are put forward in the relevant literature (Sakellariou, 2016). The most widely featured is that private schools have, on average, better education results compared to public schools.¹³ Although a lot can be said about that, PISA results for 2015 show that, on average, students in private schools perform better than students in public schools in OECD countries. However, once the socio-economic background of the students is taken into account, the ranking is reversed, so that students in public schools perform better than their counterparts in private schools.¹⁴ The same is true for Greece. According to the 2015 results, private school students outperformed public school students in sci-

^{10.} The Ministerial Decision MD91354/2017 published in FEK 2983B/30.8.2017 abolished, allegedly because the European Commission demanded it, the obligation of school owners to report their tuition fees to the ministry. That means the list will not be updated for the next school year and, thus, a source of information for interested parents will be lost. However, private schools, both formal and non-formal, are obliged to display on their premises the cost of tuition fees along with other related costs.

^{11.} Every school has its own admission tests. Candidates are usually tested in Greek language and mathematics. Some schools offer scholarships to students with special academic, music or athletic skills. A quick search of the internet sites of well known private schools can verify these claims.

^{12.} There used to be administratively set tuition fees for the first grade in every separate level of education and annual increases had to conform to certain boundaries. However, that was abolished in 2013. (see http://www.kathimerini.gr/478119/article/oikonomia/ellhnikh-oikonomia/ellg8era-ta-didaktra-sta-idiwtika-sxoleia).

^{13.} See for instance <https://www.huffingtonpost.gr/2016/12/09/eidiseis-koinonia-oi-mathites-ton-ellinikon-idiotikon-sxoleion-einai-duo-xronia-mprosta-ekpliktikes-epidoseis-ston-diagonismo-pisa_n_13529382.html> or IOBE (2013).

^{14. &}lt;https://www.oecd.org/pisa/pisa-2015-results-in-focus.pdf>

ence by one of the widest margins amongst OECD countries that participated in the PISA test (-68 PISA score,¹⁵ ranking 52/58). However, once the socio-eco-nomic status of the student and the school (based on ESCS¹⁶) was taken under consideration, public school students actually outperformed their counterparts in private schools (37 PISA score, ranking 9/58).¹⁷ The same result is confirmed by the 2009 results, thus it can hardly be considered a coincidence.¹⁸

Thus, private school students seem to possess certain attributes that distinguish them from their counterparts in public schools. The effect of the socio-economic status on students' achievement has been widely documented, and research has shed light on specific mechanisms linking economic, social and cultural assets in the familial context to students' education outcomes (e.g., Bianchi et al., 2004; Feinstein, Duchworth and Sabates, 2008; Jager and Breen, 2016). For instance, students whose parents have higher levels of education and more prestigious and better-paid jobs typically benefit from a wider range of financial (e.g., private tutoring, computers, books), cultural (e.g., extended vocabulary, time in active parenting) and social (e.g., role models and networks) resources that make it easier for them to perform better in school, compared to peers who come from families with lower levels of education or that are affected by chronic unemployment, low-paid jobs or poverty (OECD, 2015). Evidence reported in Tsakloglou and Antoninis (1999), Antoninis and Tsakloglou (2001) and Koutsampelas and Tsakloglou (2015) also shows that the overwhelming majority of private school students in Greece come from households that belong at the top quintile and, particularly, the top decile of the income distribution. These are also the households with an educational background substantially higher than the national average.19

Moreover, the student population is more heterogeneous in public schools. Additionally, heterogeneity has been reinforced in the past few years with immigrant and refugee flows increasing and the children of immigrants entering the formal education system. Despite the implementation of support classes for non-Greeks, the operation of Intercultural Schools and the establishment of special Reception Structures for the Education of Refugees (DYEP), there is still considerable heterogeneity within school classes. On top of that, restrictions and controls imposed by the MoE on public schools make them less desirable for parents, especially when they can afford a private school.

An important advantage of private education is that parents get to choose the school of their children and the special characteristics they want it to have. For example, they may wish their children to focus more on learning a foreign language, such as German or French, or to put more effort on sports. In addition, parents can always change their mind and choose another school for the following year. This is not an option for children attending public schools, since they must attend the school nearest to their home. Another argument often cited in Greece in favour of private schools involves the pursuance of teachers' labour rights and student union activities; it is not unusual for public schools to remain closed for a number of days during the school year, because teachers are on strike or because of secondary education occupations of school premises by students ("sit ins"). When such actions are prolonged, they can disrupt the education process and cause problems to employed parents who have no one to attend to their children when they are away. On the other hand, such practices are rare in private schools. It should be noted, though, that these phenomena were more common before the depression. Nevertheless, it is still an appealing argument to many parents.

Additional arguments, irrespective of the level of education, refer to a stricter and better organised daily environment in private schools, which is hard to find in public schools. Moreover, in Greece, public school teachers have a permanent job contract and practically no assessment takes place, while private school teachers are continuously evaluated and have an open-ended contract that can be terminated under specific requirements and procedures. That is believed to force the latter to perform better. Last but not least, parents are often under the impression that they can more easily influence what is happening in private, rather than public, schools.

There are also arguments that seem to depend on the level of education. For example, parents of primary school children may prefer private schools because

^{15.} A minus sign shows that public schools perform worse than private ones. A positive sign shows the opposite. Tests involve only performance in science.

^{16.} ESCS is an index of economic, social and cultural status used by PISA.

^{17. &}lt;http://gpseducation.oecd.org/CountryProfile?primaryCountry=GRC&treshold=10&topic=PI>

^{18. &}lt;https://www.oecd.org/pisa/pisaproducts/pisainfocus/48482894.pdf>

^{19.} For a short discussion see Tsakloglou and Cholezas (2005).

they offer lots of additional services. Almost all private primary schools offer an extensive extra curriculum including sports, art classes, music classes, support classes, foreign language classes, homework classes, etc. Hence, when children return home from school. they are able to spend their time on other activities, play or spend time with their parents. On the other hand, a considerable number of public schools cannot offer extended school hours, despite the fact that the law provides for the right to operate as an all-day school. In practice, there has to be a minimum number of children in order to operate all-day classes, which is not always easy to ensure. Moreover, teacher vacancies often prevent the operation of all-day classes. In several cases, public schools lack adequate infrastructure, too; for example, they may not be equipped with a kitchen and/or a proper dining room. They certainly do not have support staff to attend such activities.

Another argument which is important for younger children in particular is the option to drive children to and from school, commonly offered by private schools at an extra cost, which relieves parents, who work and/ or cannot drive their children to school, from a very specific daily task, even if it involves a public school nearby.

It would be interesting to compare the success rate of students from private schools with those of public schools in Pan-Hellenic exams for accessing tertiary education institutes, but the data necessary for carrying out such an exercise are not readily available. Nevertheless, it should be noted that such an attempt could also be misleading, since many private school students are set to leave the country right after graduation and study abroad. Therefore, they minimise their efforts or do not even sit for the Pan-Hellenic exams at all and prefer to focus on International Baccalaureate (IB) instead. Moreover, as already discussed, a number of factors should be considered that affect students' chances to access tertiary education, such as various attributes of the family and the parents.

4. Education spending in Greece

Despite the fact that education is provided by the state free of charge in Greece, there is a demand for private education services. This is easily understood given the operation of private schools, the demand for which depends primarily on household income. Table 2 presents the distribution of education spending based on household income classified in eight income brackets. The data come from the annual Household Budget Survey (EOP) conducted by ELSTAT. Note that spending does not involve private school spending inclusively. A large share involves private support classes which are supplementary to formal schooling, i.e., 'frontistiria' or cram schools, including those that prepare students for Pan-Hellenic exams and access to tertiary education.

The first observation is that households with higher incomes spend more on private education. In 2016 households with more than €3,501 monthly income spent €27.29 on primary education which is approximately ten times more than the national average. In that same year, households with monthly incomes lower than €750 spent almost nothing on primary education. The difference between top income households and the national average is wider at the lower levels of education. That could be a sign that those households value initial education more or a sign that bottom income households value it less. For example, richer households spent 3.1 times more money compared to the national average in pre-school and primary education in 2008, 4.3 times more in 2012 and 8.2 times more in 2016. Moreover, the amount spent increased from €27.87 in 2008 to €42.45 in 2016. It is interesting that the difference between richer households and the national average has widened since 2008 for all levels of education. That means that there is an escalating inequity in accessing private education services which could lead -through widening deviations in terms of opportunities and job prospects- to a widening income inequality in the future.²⁰

Overall, education spending is an almost stable share of overall household expenditure, close to 3% on average (see Table 3). That share ranges from 1.6% for households at the bottom end of the income distribution to 4.4% for households at the top end of the income distribution in 2016. Only the share for richer households increased during the depression, i.e., during period 2008-2016. Moreover, all households, irrespective of their position on the income distribution, direct the largest share of education spending to other education services, such as cram schools, private tutoring, foreign language schools, dance schools, computer schools, etc., that is on non-formal education. According to Table 3, those expenses account for 70% of total

^{20.} Comparisons should be treated with caution, since they do not take into account demographics, such as the household's composition. However, Tsakloglou (2011) studies shadow education services in depth and concludes that private spending is closely linked to the household's income, especially as far as private tutoring is concerned. For a wider review of relevant findings, see Bray (2011).

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Income bracket (in €):	All (average)	<750	751-1,100	1,101-1,450	1,451-1,800	1,801-2,200	2,201-2,800	2,801-3,500	>3,501
Education level					2008				
Preschool*	3.74	0.09	0.58	0.26	1.97	2.33	3.73	6.21	8.11
Primary	5.34	0.00	0.01	0.10	0.10	0.47	3.75	2.50	19.76
Secondary**	5.98	0.00	0.09	0.10	0.40	0.32	06.0	4.16	23.44
Post-secondary***	2.83	0.46	0.92	0.43	0.89	1.48	3.81	6.00	4.77
Tertiary	2.36	0.00	00.0	0.00	0.87	0.25	5.96	3.04	4.49
Other education services****	44.57	2.94	7.02	14.74	25.14	32.97	47.07	51.73	97.36
Total	64.82	3.49	8.62	15.63	29.37	37.82	65.22	73.64	157.93
					2012				
Preschool*	4.47	2.17	0.26	0.91	0.42	2.20	2.65	10.36	20.87
Primary	4.28	1.85	0.05	3.90	0.07	3.72	1.38	9.08	16.87
Secondary**	4.00	0.50	0.17	0.24	1.39	0.54	3.04	0.92	25.89
Post-secondary***	3.11	8.05	1.66	0.92	5.59	1.41	1.91	5.90	1.76
Tertiary	3.33	2.69	0.20	1.05	0.32	4.14	4.70	11.10	6.40
Other education services****	38.14	14.26	10.74	15.09	23.28	41.40	44.45	75.75	103.70
Total	57.33	29.52	13.08	22.11	31.07	53.41	58.13	113.11	175.49
					2016				
Preschool*	2.37	0.66	0.18	0.49	0.63	2.18	3.70	6.93	15.16
Primary	2.81	0.51	0.54	0.10	0.56	0.77	0.54	11.07	27.29
Secondary**	3.01	0.08	0.78	1.20	2.41	2.28	1.96	9.28	20.02
Post-secondary***	2.62	2.92	1.36	2.74	0.79	1.54	5.08	5.19	4.10
Tertiary	3.87	1.18	0.52	1.60	2.14	4.80	10.97	7.09	11.94
Other education services****	30.42	8.57	11.78	17.04	28.95	31.83	56.35	64.53	90.93
Total	45.10	13.92	15.16	23.17	35.48	43.40	78.60	104.09	169.44
Source: Household Budget Survey, ELST	AT, author's calculatic	ons.							

* It involves day-care centres and kindergartens. ** It includes both lower and upper secondary education. The latter consists of general and vocational education. *** It involves public and private IEK. **** It involves spending on cram schools, foreign language schools, computer schools, etc.

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lncome bracket (in €):	All (average)	<750	751-1,100	1,101-1,450	1,451-1,800	1,801-2,200	2,201-2,800	2,801-3,500	>3,501
Education level					2008				
Preschool*	5.8	2.6	6.7	1.7	6.7	6.2	5.7	8.4	5.1
Primary	8.2	0.0	0.1	0.6	0.3	1.2	5.7	3.4	12.5
Secondary**	9.2	0.0	1.0	0.6	1.4	0.8	1.4	5.6	14.8
Post-secondary***	4.4	13.2	10.7	2.8	3.0	3.9	5.8	8.1	3.0
Tertiary	3.6	0.0	0.0	0.0	3.0	0.7	9.1	4.1	2.8
Other education services****	68.8	84.2	81.4	94.3	85.6	87.2	72.2	70.2	61.6
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
% of total expenditure	2.5	0.4	0.8	-	1.7	1.8	2.6	2.4	3.5
					2012				
Preschool*	7.8	7.4	2.0	4.1	1.4	4.1	4.6	9.2	11.9
Primary	7.5	6.3	0.4	17.6	0.2	7.0	2.4	8.0	9.6
Secondary**	7.0	1.7	1.3	1.1	4.5	1.0	5.2	0.8	14.8
Post-secondary***	5.4	27.3	12.7	4.2	18.0	2.6	3.3	5.2	1.0
Tertiary	5.8	9.1	1.5	4.7	1.0	7.8	8.1	9.8	3.6
Other education services****	66.5	48.3	82.1	68.2	74.9	77.5	76.5	67.0	59.1
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
% of total expenditure	2.9	2.8	1.1	1.5	1.8	2.7	2.5	3.9	4.4
					2016				
Preschool*	5.3	4.7	1.2	2.1	1.8	5.0	4.7	6.7	8.9
Primary	6.2	3.7	3.6	0.4	1.6	1.8	0.7	10.6	16.1
Secondary**	6.7	0.6	5.1	5.2	6.8	5.3	2.5	8.9	11.8
Post-secondary***	5.8	21.0	9.0	11.8	2.2	3.5	6.5	5.0	2.4
Tertiary	8.6	8.5	3.4	6.9	6.0	11.1	14.0	6.8	7.0
Other education services****	67.5	61.6	7.77	73.5	81.6	73.3	71.7	62.0	53.7
Total	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
% of total expenditure	2.6	1.6	1.4	1.7	2.1	2.2	3.3	3.5	4.4
Source: Household Budget Survey, ELSTA	T, author's calculatic	ns.	-	:	-	-	-		-

* It involves day-care centres and kindergartens. ** It includes both lower and upper secondary education. The latter consists of general and vocational education. *** It involves public and private IEK. **** It involves spending on cram schools, foreign language schools, computer schools, etc.

education spending. Households at the bottom end of the income distribution bear the biggest burden reflected on the largest share of spending for other education services.²¹ For instance, in 2016 households with monthly incomes lower than €750 directed 61.6% of their education spending towards other education services; the respective share for households with monthly incomes bigger than €3,501 was 53.7%. The biggest share is reported for households that belong in the income brackets €1,451-€1,800 (2016), €751-€1,100 (2012) and €1,101-€1,450 (2008). That may be an indirect sign that the public education system cannot support its students effectively, so that parents are forced to resort to non-formal education services. The closer students get to Pan-Hellenic exams, the stronger the need for non-formal education services is expected to get, due to the increased competition for a post in public tertiary education institutes.

5. The evolution of private education during the depression

This section explores the evolution of private education during the depression in terms of private schools, number of teaching staff and number of students. Moreover, it utilises an index which has often been the centre of public discourse over the past few years, especially in comparison with other countries, and used as a measure of the quality of the education system.

Graph 1 presents the evolution of the number of private schools during period 2001-2014. With the exception of kindergartens, the number of private schools decreased, but without any sign of acceleration during the depression. There was an important decrease in private vocational upper secondary schools (EPAL), which were practically extinct by 2014.22 According to available data, only six private EPALs were still operating in 2014, when in 2002 there were 86 such schools. That decrease does not bear the slightest resemblance to that of public EPALs. Despite the fact that their number has decreased since 2010, in 2014 it was nevertheless similar to that in 2010 (571 vs. 584). The significantly divergent course of EPALs based on the ownership regime caused the share of private schools to decline from 12.6% in 2001 to 1% in 2014. That decline partly reflects the ever decreasing importance attached to vocational education in Greece that is hopefully changing.

Another inconsistency involves the evolution of the number of public and private kindergartens. While the number of private kindergartens increased, the number of public kindergartens decreased considerably. For instance, compared to 2001, there were 350 fewer public and 332 more private kindergartens. As a result, the share of private kindergartens increased to 7.9% of total



^{21.} Perhaps that is because lower income households usually cannot afford private schools; so they pay for cram schools, foreign languages schools, etc. to improve their children's prospects.

^{22.} The decrease in the number of private upper secondary vocational schools (EPAL) is very big and should be treated with caution, since there may be causes not captured by the data.

kindergartens in 2014. A plausible explanation is that the big increase in the number of private kindergartens was caused by the implementation of Law 3518/2006, which provided for the mandatory enrolment in kindergarten of 5-year-old children, despite the fact that public kindergarten infrastructure could not accommodate such an increase in the number of students.²³

The share of private general upper secondary schools (GEL) has been almost stable throughout the years and is similar to that of private kindergartens, i.e., approximately 7%. The share of private primary schools has been approximately 6.9%, although it decreased over the last three years under investigation due to the fastest decrease in the number of public primary schools. It should be noted that there were 1,395 fewer public primary schools in 2014 and 66 fewer private primary schools compared to 2001. Moreover, the decrease in the number of private schools has been much more pronounced amongst primary schools compared to the rest of the education levels, with the exception of EPAL.

The overall picture is one of a decreasing number of both public and private schools over time. There are two possible forces that may be responsible for that. The first, and probably the strongest one, is the decrease in the number of students, which is discussed next, including the movement of the population to urban centres. The second one is the increase of the school size, which intensified during the depression following efforts to merge schools situated mostly in rural areas. Public upper secondary general schools were the only exception to the rule, but it is likely that they substituted for the reduction in EPALs (2.2% reduction of public EPALs vs. 1.2% increase in public GELs), since they appeal to students of the same age.

The number of students (Graph 2) attending private schools is the second criterion that can be used to explore the evolution of private education. Most private school students attend primary schools, which is in accordance with the bigger number of private schools discussed earlier. In 2004, the number of those students had reached a maximum of approximately 49,000 and represented 7.5% of the total number of students in primary schools. Undoubtedly, the share of students attending private schools is bigger in primary education, since 7.1% of the total number of students attended private schools during period 2001-2014; the respective share in upper secondary general schools was 6.6% and in lower secondary 5.1%.

The number of students attending private schools has been decreasing irrespective of the level of education, with the exception of kindergartens. The biggest percent decreases in period 2001-2014 were reported for EPAL and lower secondary schools (25.8%), followed by primary schools (16.6%) and upper secondary general schools (13.5%). Compared to the decrease in the number of students attending public schools,²⁴



^{23.} The law was implemented for the first time during the school year 2007-2008, when the first increase of students was recorded. Private schools probably needed time to absorb the increased demand for education services, i.e., to increase the available posts through, e.g., expanding or overhauling buildings.

^{24.} See Table A.2 in the Appendix.

it becomes obvious that private schools are facing the biggest decreases, since the reduction in the number of students is multiple times bigger. In particular, although there used to be variation in the number of students attending private schools even before the depression, it seems that the decreases during the depression were stronger and more consistent. Thus, the number of students had been steadily decreasing in private primary schools, lower secondary and upper secondary general schools since 2010. Therefore, it is difficult to reject the possibility that the decrease in the number of students attending private schools is due to the economic difficulties households were facing during the depression.

The change in the number of students attending private kindergartens is interesting. Until 2006 the number of students had been declining, in 2007 it stabilised and in the following two years it increased rapidly, i.e., in 2008-2009. These big changes (26% in 2008, 87.3% in 2009) cannot but be attributed to the change in the institutional framework regarding the mandatory enrolment of 5-year-old children in kindergartens, which led to the increase of private kindergartens contrary to the general declining trend already discussed. Despite the temporary increase, since 2012 the number of students attending private kindergartens has been decreasing; in 2014 the annual rate of change reached 10%. During the entire period under study, the number of students attending kindergartens increased, admittedly because of the institutional changes, but the increase was faster for students attending private kindergartens, probably due to the inability of public kindergartens to respond to increased demand. Nevertheless, it seems

that the situation had been normalising since 2012 and the demand for private kindergartens has been decreasing following developments in other education levels.

The number of teaching staff increased in kindergartens and primary schools over the period 2001-2014 and decreased in all the other education levels (see Graph 3). In contrast, the number of teachers increased only in private kindergartens, which is probably related to the increase in the number of private kindergartens and the number of students attending due to the institutional changes already discussed. Unsurprisingly, the biggest share of teachers employed in private schools during period 2001-2014 is registered in primary schools (10.1%), kindergartens (7.5%) and upper secondary general schools (7%), all of which complies with evidence so far. The evolution of their number is interesting. In particular, because of the different changes that occurred, in 2014 the share of teachers in private schools was almost the same between kindergartens and primary schools. That convergence came about from the increase in the number of teachers in private kindergartens (65.9%) and the reduction in the respective number in private primary schools (22.1%).

Just like the case for students, the number of teachers employed in private schools exhibited systematic declines, especially during the depression. Even in private kindergartens, where the number of teachers had been increasing since 2008, recently all annual changes had a negative sign, which means that the sector has been contracting. The picture is similar for the rest of the education levels. Only upper secondary general schools seem to diverge from the norm; the number







of teachers in 2011 and 2012 was almost stable. Nevertheless, that is not enough to reverse the general downward trend. Indeed, it seems that the number of teachers in upper secondary general schools started decreasing already in 2007.

Changes in the number of teachers and students are expected to impact the student/teacher ratio in various ways. Typically, the critique in the case of Greece is that this ratio is too low and should be increased for reasons of economic efficiency (OECD, 2011). That claim, although quite simplistic at first sight, since it seems to ignore the peculiarities of the Greek case,25 such as the morphology of the terrain, the existence of many remote islands and mountainous areas, and other practical matters also, such as the small size of schools and the need for investments in school infrastructure, cannot be a priori rejected. Table A.5 in the Appendix shows that the difference between Greece and the European average stands, despite reforms implemented during the depression to push for mergers of schools, increases in the teaching load, etc. It is also interesting that the student/teacher ratio is smaller in private schools than public ones,²⁶ while changes over time are negative in public kindergartens, primary schools and lower secondary schools, contrary to what would be expected as a result of the reforms.

In this framework, the increase in the student/teacher ratio observed in private kindergartens and primary schools (see Graph 4) can be viewed as the outcome of efforts to improve economic efficiency during the depression. The fact that the trend had been reversed in 2011 in private kindergartens and in 2012 in private primary schools may involve adjustments and should be more thoroughly investigated to provide a clear explanation. On the other hand, in private lower secondary and upper secondary general schools there seems to be a fluctuation of the ratio, but without any serious deviation from the value of 7-8 students per teacher. It could be that the greater fluctuation observed in kindergartens were driven by the institutional changes already discussed that caused the ratio to float.

6. Conclusions

Private formal education, kindergarten, primary and secondary, which is the focus of this article, is supervised by the Ministry of Education, Research and Religious Affairs, despite the fact that it involves private businesses. The main argument is that private schools have a strong social footprint because they provide the public good of education; therefore, state supervision and control is necessary. It is deemed necessary for private schools to operate under the same rules and restrictions with public schools, in order for their degrees to be equivalent to those awarded by public schools. To fund their operations, private schools collect tuition fees, while there is no provision for tax redemption of the fees, as it is the case in other coun-

^{25.} In a recent study, OECD takes note of the reasons why such a small student/teacher ratio is observed in Greece (OECD, 2018).

^{26.} That could result from registering the support staff in private schools as teaching staff for some unknown reason or by mistake.

tries. Tuition fees between schools can differ substantially, contrary to their geographic distribution, since they are concentrated in big cities. This is a rational behaviour indeed, given that private schools are, after all, firms.

The arguments in favour of private education usually involve support services, such as the provision of extra curricular activities and the transport of students to and from school, but can also address more key issues, such as the quality of services offered, the uninterrupted provision of those services, etc. Some of those arguments are not easy to support because of the differences between students attending public and private schools, but others are hard to reject. The second group of arguments seems to provide parents, who can afford to send their children to a private school, with strong motives and it could be used as a grounds for dialogue regarding the upgrade of public school services. The large share of household expenditures being directed towards education services other than private schools is a sign of the inefficiency of public schools, either true or perceived. As such, it should give rise to social dialogue, since it often widens the inequity of opportunities between students due to the different economic and social background of their parents.

Last but not least, private schools have been facing the consequences of the depression, which are reflected in the decrease in the number of schools, students and teachers. Kindergartens seem to be the exception to the rule. The most plausible explanation seems to involve institutional changes regarding the mandatory enrolment of five-year-old students in kindergartens and, at the same time, the inability of public kindergartens to respond effectively to the increased demand for education services. Moreover, the impact of an aging population on the number of students and the demand for education services, either public or private, should not be ignored.

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Appendix

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	Ÿ	ndergarte	sue	Prir	nary scho	slo	Low	er second	Jary	Upper se	∋condary (GEL)	general	Upper se	condary v (EPAL)	ocational
Year	AII	Priv.	% Priv.	AII	Priv.	% Priv.	AII	Priv.	% Priv.	AII	Priv.	% Priv.	AII	Priv.	% Priv.
2001	5,624	113	2.0	6,094	386	6.3	1,870	110	5.9	1,289	06	7.0	668	84	12.6
2002	5,628	110	2.0	5,989	389	6.5	1,867	105	5.6	1,238	92	7.4	677	86	12.7
2003	5,670	110	1.9	5,925	384	6.5	1,819	86	5.4	1,268	97	7.6	684	50	7.3
2004	5,646	111	2.0	5,854	383	6.5	1,918	107	5.6	1,290	66	7.7	663	62	9.4
2005	5,676	119	2.1	5,778	380	6.6	1,920	107	5.6	1,312	100	7.6	664	60	9.0
2006	5,672	119	2.1	5,675	378	6.7	1,946	112	5.8	1,352	106	7.8	654	49	7.5
2007	5,693	117	2.1	5,594	374	6.7	1,958	111	5.7	1,361	109	8.0	643	40	6.2
2008	5,768	139	2.4	5,546	372	6.7	1,957	106	5.4	1,369	105	7.7	623	20	3.2
2009	5,979	319	5.3	5,496	369	6.7	1,968	109	5.5	1,367	103	7.5	640	16	2.5
2010	6,064	406	6.7	5,440	365	6.7	1,965	105	5.3	1,361	96	7.1	643	13	2.0
2011	6,027	455	7.5	5,356	365	6.8	1,928	102	5.3	1,338	94	2.0	622	12	1.9
2012	5,861	460	7.8	4,746	354	7.5	1,829	100	5.5	1,320	92	7.0	626	10	1.6
2013	5,792	483	8.3	4,698	348	7.4	1,827	98	5.4	1,318	93	7.1	627	0	1.4
2014	5,606	445	7.9	4,633	320	6.9	1,794	98	5.5	1,306	93	7.1	577	9	1.0
Source: E	ELSTAT, auth	or's calcula	ations.												

TABLE A	.2 Numb	er of stu	dents by l	level of ed	ucation ¿	and owner	ship regir	ne							
	Kir	ıdergarteı	SL	Prin	nary scho	ols	Low	er second	ary	Upper se	scondary ((GEL)	general	Upper sec	ondary vc (EPAL)	ocational
Year	AII	Priv.	% Priv.	AII	Priv.	% Priv.	AII	Priv.	% Priv.	AII	Priv.	% Priv.	AII	Priv.	% Priv.
2001	145,513	5,173	3.6	639,932	46,838	7.3	348,758	18,916	5.4	241,214	16,157	6.7	157,392	7,008	4.5
2002	144,653	4,942	3.4	646,331	48,484	7.5	336,150	17,253	5.1	230,165	15,804	6.9	160,451	6,885	4.3
2003	142,305	4,733	3.3	648,487	48,233	7.4	321,869	16,233	5.0	228,747	16,119	7.0	153,311	6,333	4.1
2004	141,008	4,786	3.4	654,780	48,819	7.5	323,333	16,115	5.0	233,723	16, 193	6.9	145,020	4,528	3.1
2005	142,369	4,599	3.2	647,543	47,700	7.4	327,578	16,290	5.0	235,097	15,963	6.8	134,623	4,089	3.0
2006	143,637	4,438	3.1	643,200	46,548	7.2	334,235	17,144	5.1	238,975	16,456	6.9	124,141	3,095	2.5
2007	143,716	4,490	3.1	639,961	46,378	7.2	343,765	18,303	5.3	232,926	15,825	6.8	110,622	1,394	1.3
2008	150,079	5,658	3.8	637,309	46,818	7.3	341,107	18,716	5.5	239,532	16,125	6.7	108,729	825	0.8
2009	158,290	10,598	6.7	637,476	46,836	7.3	341,315	19,073	5.6	241,726	16,219	6.7	108,010	686	0.6
2010	159,502	11,896	7.5	635,935	46,357	7.3	336,938	18,063	5.4	247,441	15,675	6.3	110,771	623	0.6
2011	166,233	12,016	7.2	634,048	43,845	6.9	332,005	16,399	4.9	247,209	15,627	6.3	113,658	534	0.5
2012	165,931	11,535	7.0	633,291	43,221	6.8	324,402	16,217	5.0	247,717	15,572	6.3	121,806	553	0.5
2013	166,576	11,035	6.6	630,043	41,211	6.5	319,950	15,087	4.7	245,892	14,894	6.1	123,881	309	0.2
2014	160,994	9,975	6.2	625,165	39,054	6.2	310,389	14,042	4.5	241,905	13,972	5.8	112,869	298	0.3
Source: EL	STAT, autho	or's calcula	tions.												

KEPE, GREEK ECONOMIC OUTLOOK 2018/37

TABLE /	A.3 Numb	er of tea	chers by l	evel of edu	ucation a	and owner	ship regin	ne							
	Ϋ́.	ndergarte	su	Prin	nary scho	slo	Low	er second	dary	Upper se	scondary (GEL)	general	Upper sec	ondary vo (EPAL)	cational
Year	AII	Priv.	% Priv.	AII	Priv.	% Priv.	AII	Priv.	% Priv.	AII	Priv.	% Priv.	AII	Priv.	% Priv.
2001	10,085	616	6.1	45,349	4,643	10.2	39,667	2,327	5.9	25,381	1,897	7.5	21,514	1,546	7.2
2002	10,682	697	6.5	47,267	5,366	11.4	40,892	2,135	5.2	25,409	1,989	7.8	23,529	1,569	6.7
2003	11,246	786	7.0	48,395	5,385	11.1	40,987	2,095	5.1	25,598	1,993	7.8	22,702	1,411	6.2
2004	11,543	814	7.1	50,379	6,086	12.1	43,924	2,297	5.2	26,503	2,075	7.8	23,092	1,112	4.8
2005	12,012	952	7.9	51,941	6,793	13.1	45,805	2,309	5.0	28,034	2,020	7.2	22,433	1,018	4.5
2006	12,334	962	7.8	51,308	6,059	11.8	46,923	2,446	5.2	30,271	2,172	7.2	22,124	7,520	3.4
2007	12,717	1,024	8.1	51,960	6,219	12.0	49,101	2,495	5.1	29,131	2,103	7.2	20,845	3,980	1.9
2008	13,242	1,092	8.2	51,734	6,241	12.1	50,200	2,473	4.9	30,124	2,036	6.8	20,149	2,460	1.2
2009	13,652	1,019	7.5	50,956	4,598	9.0	51,858	2,523	4.9	30,683	1,927	6.3	20,706	1,550	0.7
2010	13,931	1,108	8.0	51,170	4,200	8.2	52,605	2,397	4.6	31,018	1,821	5.9	22,143	1,270	0.6
2011	13,986	1,106	7.9	50,474	3,948	7.8	49,039	2,277	4.6	29,837	1,822	6.1	19,814	1,210	0.6
2012	14,018	1,094	7.8	49,545	3,692	7.5	45,273	2,202	4.9	27,672	1,855	6.7	19,194	1,070	0.6
2013	13,853	1,046	7.6	49,617	3,614	7.3	42,665	2,080	4.9	27,327	1,760	6.4	18,378	660	0.4
2014	13,526	1,022	7.6	48,466	3,615	7.5	38,655	2,010	5.2	24,345	1,720	7.1	15,659	410	0.3
Source: E	LSTAT, autho	or's calcula	ttions.												

	Kindergartens		Primary schools		Lower secondary		Upper secondary general (GEL)		Upper secondary vocational (EPAL)	
Year	Public	Private	Public	Private	Public	Private	Public	Private	Public	Private
2001	14.8	8.4	14.6	10.1	8.8	8.1	9.6	8.5	7.5	4.5
2002	14.0	7.1	14.3	9.0	8.2	8.1	9.2	7.9	7.0	4.4
2003	13.2	6.0	14.0	9.0	7.9	7.7	9.0	8.1	6.9	4.5
2004	12.7	5.9	13.7	8.0	7.4	7.0	8.9	7.8	6.4	4.1
2005	12.5	4.8	13.3	7.0	7.2	7.1	8.4	7.9	6.1	4.0
2006	12.2	4.6	13.2	7.7	7.1	7.0	7.9	7.6	5.7	4.1
2007	11.9	4.4	13.0	7.5	7.0	7.3	8.0	7.5	5.3	3.5
2008	11.9	5.2	13.0	7.5	6.8	7.6	8.0	7.9	5.4	3.4
2009	11.7	10.4	12.7	10.2	6.5	7.6	7.8	8.4	5.2	4.4
2010	11.5	10.7	12.6	11.0	6.4	7.5	7.9	8.6	5.0	4.9
2011	12.0	10.9	12.7	11.1	6.7	7.2	8.3	8.6	5.7	4.4
2012	11.9	10.5	12.9	11.7	7.2	7.4	9.0	8.4	6.4	5.2
2013	12.1	10.5	12.8	11.4	7.5	7.3	9.0	8.5	6.7	4.7
2014	12.1	9.8	13.1	10.8	8.1	7.0	10.1	8.1	7.2	7.3

TABLE A.4 Student/teacher ratio by level of education and ownership regime

Source: ELSTAT, author's calculations.

TABLE A.5 Student/teacher ratio by level of education

		2013	2014	2015	2016
Preschool education	EU	13.8	13.7	-	14.3
Preschool education	Greece	11.9	11.8	10.9	10.7
Primary (Dimotiko)	EU	15.0	14.8	15.1	14.4
Primary (Dimotiko)	Greece	9.5	9.4	9.6	9.3
Lower secondary (Gymnasium)	EU	12.2	12.5	12.6	12.3
Lower secondary (Gymnasium)	Greece	7.3	7.8	8.1	7.7
Upper secondary general (GEL)	EU	11.9	12.7	-	12.5
Upper secondary general (GEL)	Greece	9.0	-	10.1	10.1
Upper secondary vocational (EPAL)	EU	13.2	12.6	13.4	11.6
Upper secondary vocational (EPAL)	Greece	6.7	6.8	7.3	7.2
Source: EUROSTAT.					

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