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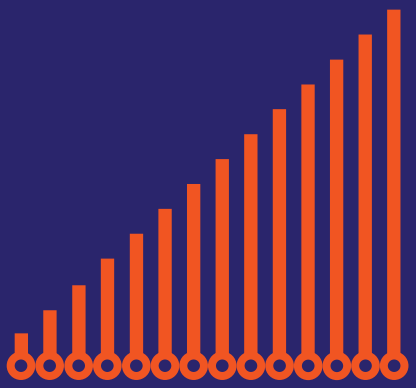
Issue 42, June 2020

GREEK ECONOMIC OUTLOOK



- **Recent (macro-)economic developments**
- **Fiscal developments**
- **Human resources and social policies**
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GREEK

Economic Outlook

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Executive Summary

The pandemic interrupted (temporarily) the dynamism of the Greek economy at the beginning of 2020

By the beginning of 2020, the Greek economy (with the exception of private investment) had begun to show remarkable momentum (see section 1.1). Having solved its main macroeconomic problems, it was growing at a faster pace than other Eurozone countries. It has been a decade since Greece was in the throes of the economic crisis. However, concerns about the country's development model had begun to develop in the public debate. In fact, since January 2020, the government has set up a committee headed by Nobel Prize-winning economist Christoforos Pissaridis to submit a development plan.[1] At a time when there were these concerns, a non-economic external-global disorder, the pandemic of COVID-19, came to overturn the dynamics that, with the efforts and sacrifices of the Greek people, had begun to take shape in the Greek economy. The new recession has taken the place of growth and the frustration has taken the place of optimism.

The first effects of the pandemic were visible from the reaction of the Athens Stock Exchange index and from the rise in bond interest rates (see section 1.6). The impact of COVID-19 on tourism, which is a key component of the country's GDP, is also large (see relevant special topic). The 30 million tourists who traditionally come to Greece support a number of additional activities in catering, entertainment and transportation. Another consequence is the effect on investor fears. Experience shows that when fear spreads due to external events, investors try to find safe "ports" for their capital. Finally, a direct impact is associated with the temporary closure of businesses and organizations as well as the temporary freezing of certain activities (see section 1.5).

Macroeconomic forecasts, as captured by the Greek government in the stability program, predict a recession of 4.7% (basic scenario) to 7.9% (unfavorable scenario), while there are forecasts of a recession of around 10% (European Commission, IMF) or even higher (OECD). Respectively, the forecast for the primary deficit ranges from 1.9% of GDP in the first and 2.8% of GDP in the second scenario of the Ministry of Finance (the IMF forecasts 5.1% of GDP).

The forecasts for the amount of the General Government's gross debt for 2020 are correspondingly ominous (see section 2.1.2). The Greek government's stability plan is for an increase of 6.1 billion euros (it will rise to 337 billion), but with the parallel decline in GDP, it will increase by 12.2 points as a percentage of GDP, reaching 188.8%. The European Commission expects an increase of 20 percentage points, reaching 196.4% of GDP, while the IMF believes that the debt will exceed 200% of GDP.

ELSTAT's recent announcement of a 0.9% recession in the first quarter on an annual basis demonstrates resilience on the part of the economy and that compared to Germany (-2.3% in the first quarter on an annual basis), France (-5.3%), Spain (-4.1%), and Italy (-5.4%), Greece's performance was clearly better. Today, most analysts are reassessing the situation with a milder recession. For example, the OECD considers that we will have a recession of (only) 8% in 2020 and a growth of 4.5% in 2021.[2] ***KEPE now estimates the recession in the range of 5.67% to 7.16%*** (see section 1.4). The most important element of this change is the ***trust and reliability*** created in Greece by the management of the health and economic crisis by the Greek state. Trust and reliability have been the "lost" weapons of Greek economic policy for decades. Reliability means adherence to the goals of the country's policy with honesty, consistency, transparency and responsibility. Reliability effectively strengthens trust both inside and outside the country. In turn, confidence improves expectations and these reward the government's efforts, bringing the desired result, which is nothing more than a quick and steady recovery of the economy. The first signs support the above hypothesis. They are reflected in the country's successful exit to the markets for

1. <https://www.naftemporiki.gr/finance/story/1551071/sugkroteitai-epitropi-gia-to-sxedio-anaptuksis-tis-ellinikis-oikonomias-proedros-o-xr-pissaridis>.

2. <https://www.capital.gr/oikonomia/3459810/oosa-mikroteri-i-ufesi-stin-ellada-to-2020-se-sxesi-me-tin-eurozoni>.

a ten-year bond with an interest rate of 1.5%.[3] This is not the first time the country has entered the markets. But this is the first time that the cost of borrowing has been so low for a ten-year bond. In March 2019, the corresponding lending rate was 3.9%. ***So trust is a "sine qua non" condition in the economy***. And this is an important message we need to keep in mind for the coming months. Foreign investors are lending to Greece with low interest rates. And, in fact, in a period of geopolitical tensions where Greece is threatened by Turkey's aggression. ***This is proof of how important it is for a country to be tied to the euro.***

Tourism is negatively affected

The tourism sector is expected to face one of the most significant blows from the international spread of the new coronavirus (COVID-19) because this sector contributes significantly to the Greek economy. The practice that is usually followed for the assessment of the contribution of tourism to the Greek economy is to divide the domestic tourism expenditure by the GDP of the economy. Such an estimate would give a contribution of tourism to the Greek economy for the year 2018 of 9.7%. However, the modern recognized approach to assessing the contribution of the tourism sector to the economy is through the system of Satellite Tourism Accounts, which estimates the tourism gross value added, which estimates the tourism gross value added, the tourism gross domestic product and the tourism ratio index. The tourism ratio, which is defined as the ratio of total (inbound and outbound) tourism consumption to the total supply of the economy, is an internationally recognized indicator of the specific gravity of the tourism sector in an economy. In part B (special topics), we assessed the contribution ratio of tourism to the economy (tourism ratio) using data of domestic tourism expenditure (€17.9 billion) as well as the overall contribution to the economy for 2018 and found it to be 5.6%. This size may seem small compared to what is usually published about the contribution of tourism to the Greek economy, but it is in stark contrast to the relative size of other European Union (EU) countries.[4] It should also be noted that the contribution of tourism to the economy should not be confused with the multiplier effects caused by changes in tourism demand. In a recent "KEPE Contemporary Analysis", we calculated that in the hypothetical extreme scenario of the country's zero international travel receipts, the reduction in the GDP of the economy would be, *ceteris paribus,* 10.4%, a decrease in employment 11.2% and an increase in the deficit of the Balance of Goods and Services by approximately €12.226 billion.[5] At the same time, however, the multiplier effects of government spending on the Greek economy are significantly stronger than those of the tourism sector. Given that the public sector accounts for about 1/5 of the Greek economy in terms of production and employment, the expansion of fiscal policy combined with the exercise of appropriate sectoral policies is likely to offset a significant part of the negative impact of declining international travel revenues. Consequently, the estimates of the Ministry of Finance for a recession of 4.7% to 7.9% seem, with the current data, quite reasonable.

Non-performing loans will increase

Non-performing loans (NPLs) are one of the major consequences of the long-running crisis in the Greek economy that emerged after the 2007-2009 global financial crisis. It is noteworthy that the percentage of "red" loans of total loans reached an average of 29.6% in Greece compared to 6.5% in the Eurozone for the period 2009-2015. This ratio skyrocketed in Greece to an average of 47.8% in the next period until September 2018, as the European average was then below 4%, while in September 2019 it dropped to 42.1%. The above demonstrates the seriousness of this issue and the great distance that Greece must cover in its management. In this context, the government's initiative for the "Hercules" plan, which was passed by the Greek Parliament in December 2019, was included in this framework.

The question that arises in the new economic situation that is created due to the spread of the COVID-19 pandemic is to what extent will the attempt to reduce the NPLs from the recession of the Greek economy in the coming months be affected. In a study conducted at KEPE, we found that the impact of economic growth, and in this case the rate of change of real GDP and employment in the growth of NPLs, appears to be sta-

3. <https://m.naftemporiki.gr/story/1607198/neo-10etes-poioi-agorasan-to-elliniko-omologo>.

4. The contribution of tourism to these economies ranges between 3.9% (Italy) and 5.8% (Malta), while the corresponding average of EU countries is 3.4%. That is, the contribution of tourism to the Greek economy is significantly higher (on average by about 50%) than the average of EU countries, but in absolute proportion to that of other countries in the European south. Therefore, our assessment of the contribution of tourism to the Greek economy is absolutely realistic and in line with the relevant estimates of other EU countries.

5. <https://www.kepe.gr/index.php/el/ta-nea.html>.

tistically the most powerful factor influencing the number of NPLs.[6] In particular, the acceleration of the unemployment rate by 1% could lead to a corresponding acceleration of the increase in NPLs in percentages ranging between 0.33% and 0.96% for business and consumer loans. On the other hand, reducing the rate of change in real GDP by 1% would lead to an increase in housing NPLs by about 3%.

Given the difficulty in the private economy, at the level of economic policy, the main compensatory factor may be the increase in government spending to support the real economy. ***This may mean a reduction in the required primary surpluses of the state budget for as long as is required, in order to support the economy under extraordinary conditions of reconstruction.*** The relatively small effect of the amount of public debt on the increase in NPLs is an encouraging message to those responsible for drawing up a more intervening policy support for businesses and households. In addition, the role of the budget balance and the state budget deficit in the development of NPLs should be assessed in conjunction with the expected positive effect of public spending on income and GDP support, which are the main factors influencing non-income serviced loans. On the other hand, the financial strength of banking institutions, as reflected in the maintenance of strong capital adequacy of banks, is the second important line of defense to stop new non-performing loans of all categories in the future. Finally, the negative impact of possible adverse changes in real estate prices in housing loans is expected to be small, while the increase in incentives to credit institutions to strengthen credit expansion to the economy will be beneficial in the short term. ***Therefore, the main lever to support the economy and suspend NPLs should be to increase government spending as a major pillar of income in times of crisis while taking care of maintaining the financial strength of banks as the necessary bridge for the next day of the Greek economy.***

The daily lives of workers, households and businesses will change

The unprecedented outbreak of the COVID-19 pandemic has drastically affected the daily lives of workers, households and businesses worldwide. The Greek government, prioritizing the health of its citizens, has immediately adopted the proposals of the scientists of the National Organization for Public Health (EODY) and has implemented several bold measures in a very short period of time. The measures were meticulously observed by the citizens, leading to the reduction of the spread of coronavirus and the small number of cases, hospitalized and deaths by the beginning of May 2020. In this context, the compulsory closure of almost all retail businesses, the closure of sports venues and entertainment venues were imposed and at the same time unnecessary travel was banned. At the same time, measures were implemented to support the income of workers who became inactive, the duration of the unemployment benefit was extended and policies were implemented to maintain the existing jobs. Companies that could continue their production process, under the broader framework of restricting travel and the need to protect the public health and safety of their employees, where possible, applied for part or all of their personal employment status by home, while the public sector encouraged where work could be done from home. Overall, the percentage of workers who could work from home is 32.8% (see specific topic in part B). However, the possibility of expanding work from home to the post-corona virus era requires careful steps, as it may widen the existing inequalities between good and less good jobs, while it may harm the effective employment of some workers. The productivity of work from home is not necessarily and permanently the same as in the workplace. It is necessary to rationally regulate the work from home taking into account, in addition to the opinion of those involved, the structural features and the operation of the individual labor markets. The degree of expansion of work from home also depends on the technological capabilities of the country, which, although improving, in some geographical areas still remain limited.

It is also advisable to take into account the interactions from the decision to work from home. For example, the widespread implementation of homework for a professional group may require staying at home for other members of the household. In other cases, working from home can have significant mutual benefits for employees and employers and help in the professional integration of people with mobility problems, as well as expand the period of service. However, it is necessary for the employer to bear the cost (equipment, increased operating costs of the house due to longer stay). In addition, it is necessary to strictly adhere to the working hours and this should not be extended under the pretext of staying at home, while the conditions of hygiene and safety at home are essential.

6. <https://www.kepe.gr/index.php/el/ta-nea.html>.

Like everything new, homework, which is a manifestation of flexibility in the job market, has advantages and disadvantages. ***If there is a political will, the necessary legal framework can be formed, which will ensure the rights of the employee and will not make it difficult to choose a job from home for business.*** Recent experience has shown that working from home on extreme occasions, such as the COVID-19 pandemic, is necessary for both psychological and economic reasons.

The size and duration of the recession will be judged by external and internal factors

Whether the recession will be closer to -10% or -4.7% depends on exogenous and endogenous factors. Medical progress is the first determining factor. The sooner an effective antiviral drug is found, or even better, a vaccine against coronavirus, the faster the recovery from the damage and, of course, the less severe the recession. The data so far show that by the end of the year at the latest, a vaccine against coronavirus will have been found, while earlier we will have effective antiviral drugs.

The second exogenous factor is related to the success of the crisis in other countries. Our economy is small and open and, unfortunately, it depends to a large extent on one sector, tourism, with obvious interconnections with the outside world. We would be in a better position if we had taken measures before the arrival of the coronavirus, e.g., during the previous crisis, to change our production model, strengthening sectors other than tourism, like agri-food and processing industry.

The third factor is related to the European Union. Here things are positive for two reasons. First of all, the European Central Bank (ECB) is now our ally, in contrast to the previous crisis where we were not able to take quantitative easing measures. Second, the rest of the European Institutions (the European Council, the European Commission, the European Stability Mechanism) responded positively, to a greater or lesser degree. The €22.5 billion in subsidies (12% of GDP in 2019), as well as the €9.4 billion in loans that appear to be from the European package in Greece, is a very large amount. If we add it to the other financial instruments, we end up with a financial support of more than 60 billion euros for the next seven years. This support marks a new Marshal Plan for our country. The European Commission has taken the coveted step to strengthen cohesion and solidarity in the European Union. It is now up to us to use all this money. And this must be done with proper planning and targeting.

The fourth factor is related to the government's management of the economic crisis. So far, the crisis has shown the credibility of politics and technology to be strong allies in the battle with the pandemic. The two together contributed to the country's rebranding and acted as accelerators of its digital transformation. If a similarly successful tactic is followed in the economic treatment of the pandemic, that is, based on honesty, reliability, determination and consistency, then the recession will be closer to 4.7%. The data so far are encouraging as various precursors show improvement after the crisis erupted. For example, the fear index compiled by KEPE shows a continuous decline from April 2020, reaching 29.56% on 29/5/2020 from 32.66% on 30/4/2020 and 48.94% on 31/3/2020.[7] ***This significant drop in the index reflects the reduction of uncertainty in the Greek market associated with the effective management of the coronavirus pandemic in Greece.***

The fifth factor is related to the continuation of the country's digital transformation. The project that has already been implemented by the State is impressive. But we cannot be complacent. There is still much to be done to reach the digital maturity levels of technologically advanced countries.

Finally, much will depend on the continuation of reforms in areas such as justice, education, health, the green economy and the state. Accelerating reforms strengthens the country's attractiveness and attracts investors.

The road ahead: a comprehensive plan for recovery and reform (2020-2030)

In any case, it will take planning, patience and social tolerance to manage the next day. It will take a plan to recover the economy and rebuild the country on which political forces and social partners will agree. A plan that will include profound reforms for the state, the justice system, education, health and many other areas. A plan that will support healthy and innovative business forces. A plan that will liberate the productive forces and enable us to weave another perception of the country's development. The necessary Recovery Plan of our country must support the doctrine that says: "We produce and export". A useful basis for the preparation of this project could be the integrated development

7. <https://www.capital.gr/epixeiriseis/3458982/kepe-stadiaki-meiosi-tis-abebaiotitas-ton-ependuton-gia-tin-elliniki-agora>.

plans as well as sectoral studies and studies for the evaluation of structural reforms in key sectors of the economy, which have been prepared by universities and public and private bodies.[8]

It is also important that not a single euro be "lost" from the money of the EU support package for our country. This means that the state mechanism must be ready to manage an overall recovery plan. It is necessary to start the preparation in time and to have coordination. But the absorption of funds is not enough because it is not a question of financing consumer activities, as has been done several times in the past in the case of the EU's structural support packages. Efficiency is also needed. And in order to do that, it is necessary to formulate a broader plan for the recovery and reform of the decade (2020-2030), which will include all Development Programs, regardless of their source of funding (NSRF, National PDE, PPP, SURE, Recovery Fund, NBG, own resources of local authorities, etc.), under the coordination of an overriding authority (e.g., Government Presidency or the Ministry of Development and Investment) with a single operating system that will keep pace with the EU's strategic priorities (green development, digital transformation, etc.). The government has the golden opportunity to challenge the transformation of the country's productive model by strengthening the primary and secondary sectors, highlighting local production in order to reduce our dependence on other countries. This can be done by stimulating the primary sector with new technologies and ideas. And then focus on the secondary sector, which can play a role in multiplying the value of our production. ***Greek production in all its forms could be the alternative supplier in a market model that is now changing focus from the speed of delivery to the safety of delivery.*** To achieve this, however, we need to look at key issues, such as energy and/or labor costs (e.g., insurance deductions). These are issues that we have been discussing for years that have to do with the country's competitiveness. A national strategy to resolve these can only bring benefits to the country.

Professor PANAGIOTIS G. LIARGOVAS
President and Scientific Director of KEPE

8. Through its many years of action, KEPE has led the way in preparing of corresponding development plans. Despite the progress made in several areas since the writing of these studies, the key issues and policy directions included in these plans remain relevant.

1. Recent (macro-)economic developments

KEPE, *Greek Economic Outlook,* issue 42, 2020, pp. 8-15

1.1. Positive developments in most of the demand components before the onset of the Covid-19

1.1.1. Introduction – Domestic and external demand

Yannis Panagopoulos

In this section the general trends of the aggregate demand up to the end of 2019 are recorded. Thus, the macroeconomic data analysed here does not contain the negative effects of the COVID-19 pandemic, which has been in Greece from March 2020 onwards.

Based on the annual data of the ELSTAT's *National Accounts,* as shown in Table 1.1.1, we observe a steady growth rate of the Greek economy, compared to 2018. More specifically, in 2019, as in 2018, the growth of the economy was around 1.9%. We could briefly point out here that the main contributing factors for GDP growth in 2019, compared to 2018, were the significant change in public consumption (from -2.5% to 1.1%) and the change in the fixed capital formation (from -12.2% to 4.7%). Of course, the total exports were a positive contributor, but at a lower rate than that of 2018 (8.4% vs. 4.2%, respectively).

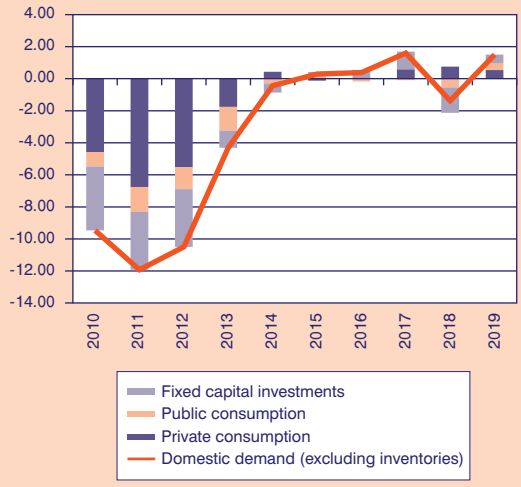
TABLE 1.1.1 Basic macroeconomic figures

	Million euro (current prices)	Annual % (constant prices)	
	2019	2018	2019
Private consumption	127,425	1.1	0.8
Public consumption	36,537	-2.5	2.1
Fixed capital formation	21,405	-12.2	4.7
Domestic demand*	187,474	0.5	1.0
Exports of goods and services	69,710	14.1	8.2
Exports of goods	37,265	16.4	7.8
Exports of services	32,446	11.5	8.7
Imports of goods and services	69,728	9.7	7.9
Imports of goods	59,780	8.9	7.6
Imports of services	9,948	16.6	8.8
Balance of trade (goods & services) (%, GDP)	0.00		
GDP	187,456	1.9	1.9
Contribution to the change in GDP			
Domestic demand*		-1.32	1.50
Balance of trade (goods & services)		1.34	0.76
Change in inventories		1.80	-0.44

Source: National Accounts (ELSTAT) & EC Forecasting, Spring 2019.

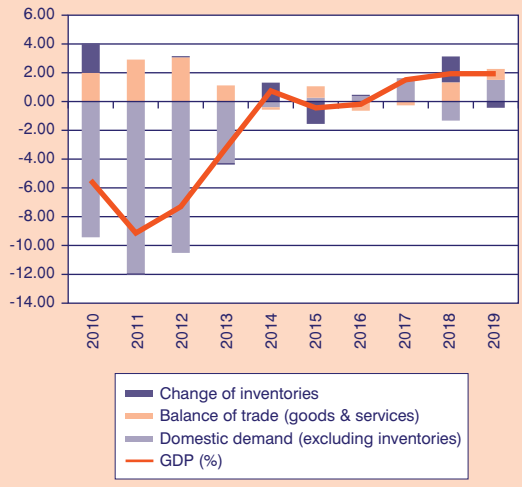
* Without change of inventories.

FIGURE 1.1.1a
Components of domestic and external demand



Source: National Accounts, ELSTAT, data processing by the author.

FIGURE 1.1.1b
Domestic and net external demand (components)



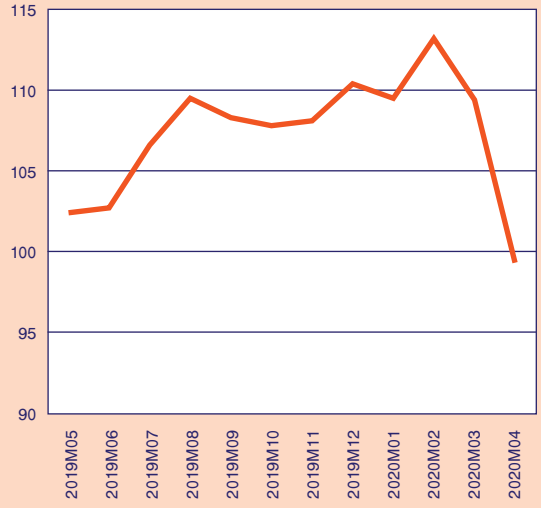
Source: National Accounts, ELSTAT, data processing by the author.

With regard now to the existing components of recorded *domestic demand*, for 2019, the positive contribution of all of them is demonstrated (see Figure 1.1.1a). Thus, both the private and public consumption as well as the gross fixed capital formation contributed positively with 0.54, 0.44 & 0.52, respectively (while in 2018, only the private consumption made a positive contribution to the recorded domestic demand). In conclusion, as shown in Table 1.1.1 and Figure 1.1.1a and in contrast to the 2018 data, the overall contribution of domestic demand to the rate of GDP growth, for 2019, is measured as the most positive factor (1.50).

In accordance with the above analysis, we have the (positive) coexistence of the domestic and external demand sectors (i.e., the balance of goods and services, see Figure 1.1.1b). More specifically, it appears that in 2019 the relatively positive drift of international demand continued with some positive impact on the country's exports, but to a lesser extent with respect to 2018. This event is also reflected in the contribution of the balance of goods and services to the rate of change in GDP, where only 0.76 of a percentage point is recorded (see Table 1.1.1).

As regards the trend of the Economic Sentiment Index (ESI), as a "proxy" of future demand, it is known that, like some other leading indices, it offers valuable information from both business and household perspectives concerning the economy. In Figure 1.1.2, the ESI, from the period 5/2019-4/2020, is shown. From this Figure, it is obvious that while the drift is relatively upward until February 2020, things changed completely in March due to the emergence of the COVID-19 pandemic. In simple terms, we had the ESI 'peak' at 113.2 points in February, followed by a severe drop to 99.3 points in April. It is expected that the end of the quarantine will mark the moment of reversal concerning the economic climate.

FIGURE 1.1.2
Economic Sentiment Index (2019-2020)



Source: EUROSTAT.

Next, a more detailed discussion follows regarding the contribution of the trade balance of goods and services with respect to the GDP, for 2019.

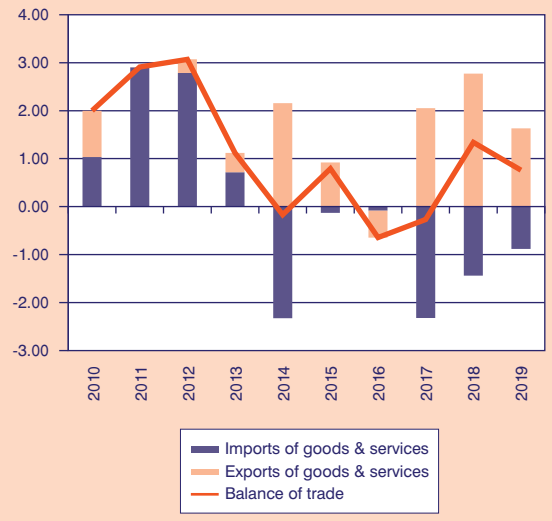
Trade balance (goods and services)

As already mentioned, the contribution of the external sector (exports minus imports) regarding the growth of GDP for 2019 ends up with a positive sign and reflects mainly the importance of international demand as well as the perspectives of the international economic climate.

More specifically, we will refer separately to the rate of change of goods and the rate of change of services. Starting now from exports, we should underline that services were a relatively smaller portion of total exports (see Table 1.1.1), with an average annual increase of 8.7% in 2019, while goods, which are the majority of exports, experienced an annual average growth of 7.8%. With respect now to the imports of goods and services, unlike the composition of the exports, these are less balanced as a distribution. The imported services had an average annual increase rate of 8.8% (lower than that of 2018, which was 16.6%) and the imported goods had an average annual rate of 7.6% (lower than the corresponding rate of 2018, which was 8.9%).

Concerning now the contribution of the trade balance of goods and services to the GDP growth rate, we can report that it was formulated at 0.76 points for 2019, in contrast to the higher 1.34 points in 2018. More analytically, we record the positive contribution of exports to GDP growth estimated at 1.63 points (reduced by 1.14 points compared to the 2018), while the (negative) contribution of imports to GDP growth was 0.88 points (minus 0.56 points compared to 2018). The reduced, compared to 2018, contribution of the trade balance of goods and services to GDP growth is also illustrated in Figure 1.1.3. Additionally, between 2017 and 2019, the size and trends of the corresponding imports and exports histograms demonstrate this progress.

FIGURE 1.1.3
Components of external demand



Source: National Accounts, ELSTAT, data processing by the author.

1.1.2. Private consumption and investment

Konstantinos Loizos

1.1.2.1. Private consumption

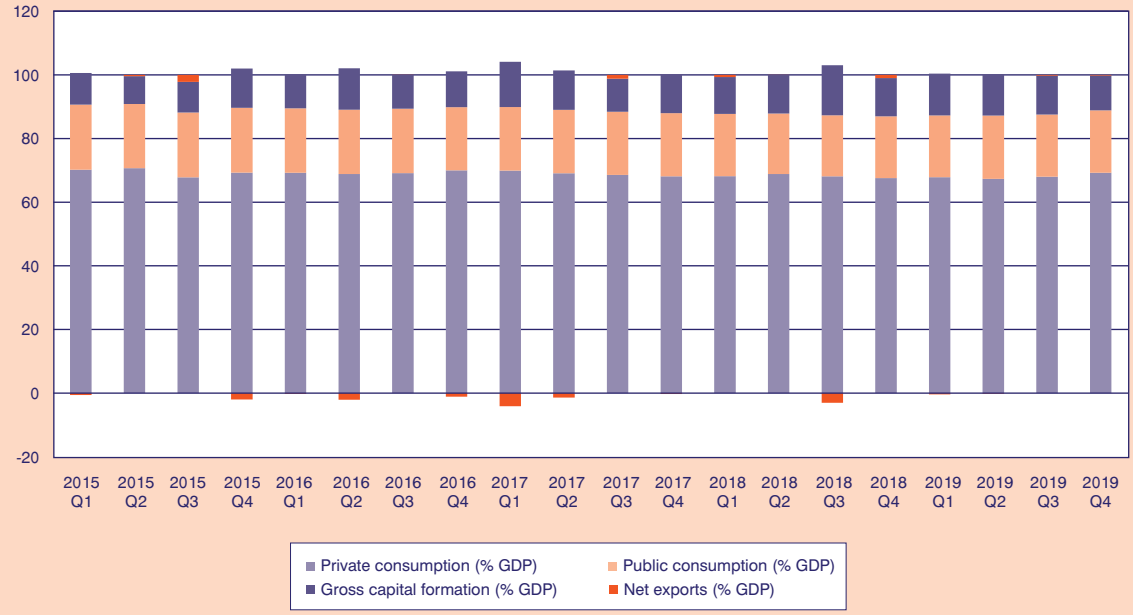
Private consumption has increased

Based on quarterly, seasonally adjusted *National Accounts data,*[1] private consumption reached 32,193 million euros in current prices during the fourth quarter of 2019, higher than the 31,883 million euros of the previous quarter. Moreover, in terms of chain-linked volumes, private consumption rose from 32,743 million euros during the third quarter of 2019 to 32,984 million euros in the fourth quarter of the same year. This rising trend observed in the last two quarters of 2019 is also confirmed by the relevant percentage changes of seasonally adjusted chain-linked volumes. Private consumption increased during the last two quarters of 2019 with respect to the corresponding quarters of 2018 at rates 0.6% and 1.8%, whilst it also rose with respect to the immediately preceding quarter of 2019, by 0.6% and 0.7%, respectively.

In addition, private consumption as a percentage of total Gross Domestic Product (GDP) increased from 68.01% during the third quarter to 69.25% in the fourth quarter (Figure 1.1.4). Public consumption as a percentage of GDP rose as well but at a slower pace (from 19.53% to 19.59% for the corresponding quarters). On the contrary, during the same quarters, gross capital formation (fixed capital and changes in inventories)

1. *Quarterly National Accounts,* Press release, ELSTAT, March 6, 2020.

FIGURE 1.1.4
The evolution of private consumption and other components of demand as percentages of GDP
(expenditure approach) (seasonally adjusted data in current prices)



Source: ELSTAT, data processing by the author.

and net exports fell as percentages of GDP. Gross capital formation declined from 12.23% to 10.93%, whilst net exports dwindled from 0.24% to 0.23%. These observations indicate the primacy and rising importance of private consumption as a component of total expenditure along with public consumption, at least for the last few months of 2019.

Positive developments in retail trade

Figure 1.1.5 depicts the evolution of retail trade according to the monthly data provided by ELSTAT. This data indicates positive percentage changes with respect to the same month of the previous year, starting from August 2019 until January 2020, in all indices except in December for food items. Finally, the overall index was, on average, positive in terms of percentage changes during this semester with a mean value of 4.38%. We observe the same positive trend in the food items index (mean value 2.20%), the other items index (mean value 6.05%) and the automotive fuel index (average value 3.87%). Hence, the developments in retail trade during the semester August 2019-January 2020, with respect to the corresponding quarter of the preceding year, appear to be positive on average in all sector indices.

Expectations in retail trade have yet to stabilize

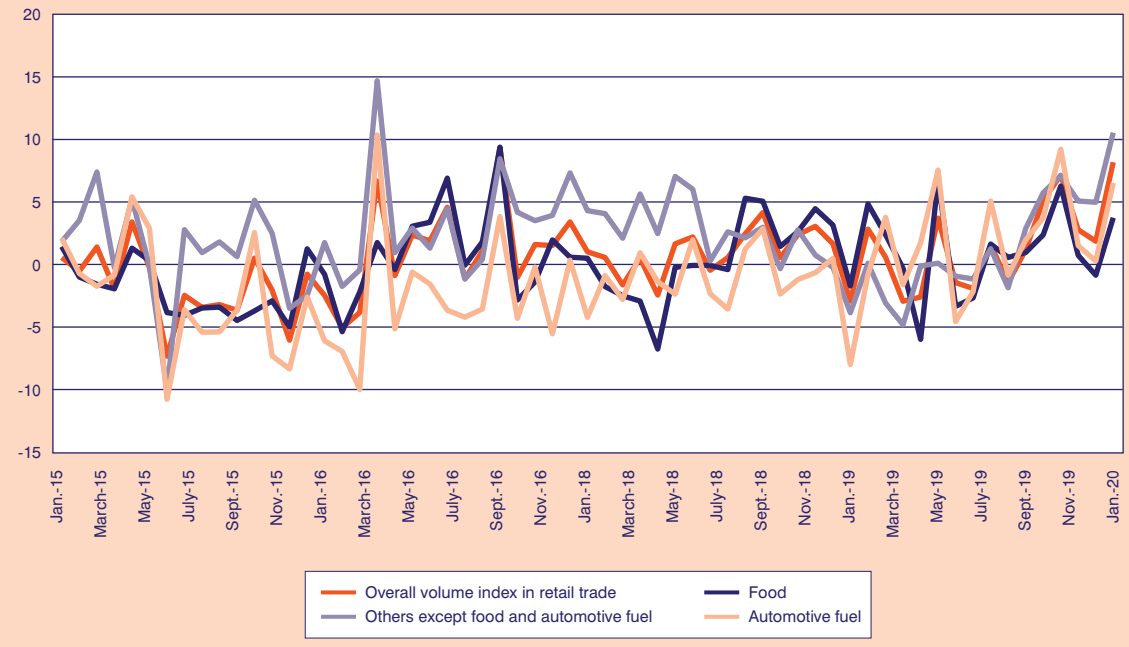
Confidence indicators published by EUROSTAT (Figure 1.1.6) show an unstable downward trend starting from September 2019, which is much more evident in the retail confidence indicator than in the consumer confidence indicator. Moreover, these two indices seem to decline during the first quarter of 2020, despite their fluctuation, presumably because they discount imminent developments in consumer demand given the outbreak of the COVID-19 pandemic.

1.1.2.2. Investment

Investment does not show any clear recovery

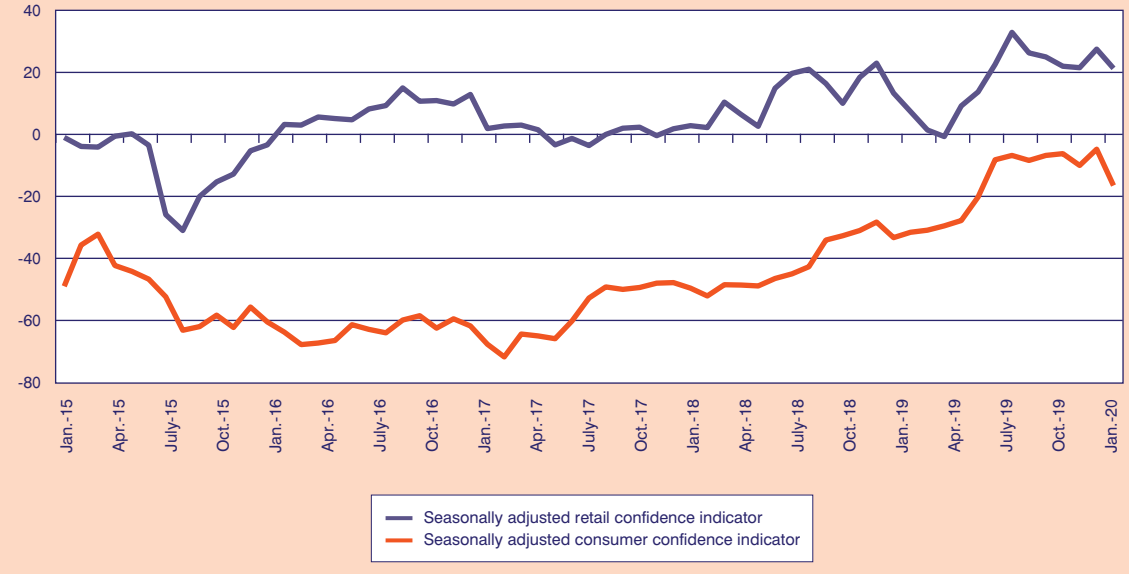
Gross fixed capital formation in current prices reached 5,329 million euros during the fourth quarter of 2019, a figure lower than the third quarter (5,423 million euros). On the contrary, in terms of chain-linked volumes, there was a rise from 5,407 million euros during the third quarter to 5,771 million euros in the last quarter of 2019. Indeed, inspecting percentage changes with respect to the previous quarter in terms of seasonally adjusted chain-linked volumes, we observe a negative change (-4.5%) in the third quarter, but a positive change (6.7%) during the fourth quarter of 2019. Con-

FIGURE 1.1.5
Percentage changes in the seasonally adjusted overall volume index and the main sector indices in retail trade



Source: ELSTAT, data processing by the author.

FIGURE 1.1.6
Confidence indicators in retail trade



Source: EUROSTAT, data processing by the author.

trary to this, percentage changes with respect to the corresponding quarter of 2018 are both positive (2.7% and 14.4% respectively).

The evolution of the contribution of gross investment and its components to GDP, as measured by their percentage changes with respect to the preceding quarter, is of particular interest (Figure 1.1.7). The "Buildings" category showed a rise of 14.22% during the third quarter, followed by a fall of -5.97% in the fourth quarter. The "machinery and transport equipment" category demonstrated the opposite trend since a decline of -1.43% during the third quarter was followed by a rise of 2.62% in the last quarter. However, gross capital formation as a percentage of GDP fluctuated overall in terms of percentage changes from positive (4.05%) to negative (-0.9%).

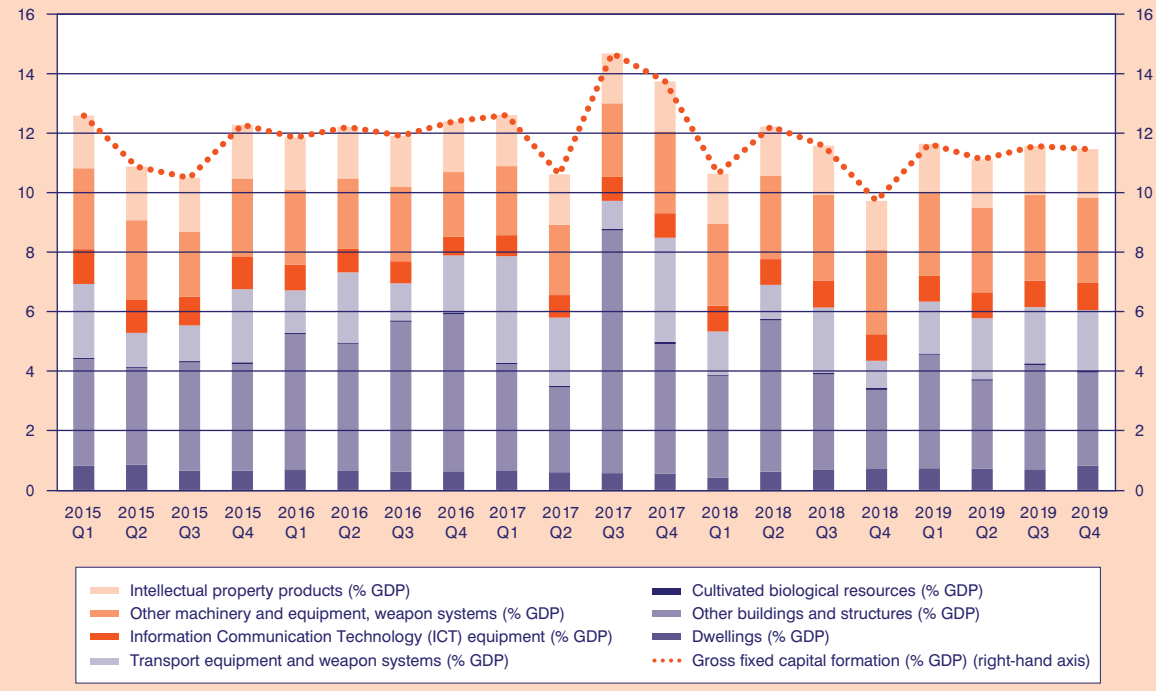
Machinery and transport equipment increases compared to buildings

Focusing on the two major components of gross investment, the share of buildings in total gross capital formation lost ground (from 36.30% to 34.44%) in favour of machinery and transport equipment (from 49.07% to 50.81%) during the last quarter of 2019 with respect to the previous quarter (Figure 1.1.8). It is notable that machinery and transport equipment remains the main component of gross investment from mid-2018. The crucial question is whether this finding connotes a change in the direction of investment or just a fallback in the buildings sector.

Expectations in the construction sector have improved

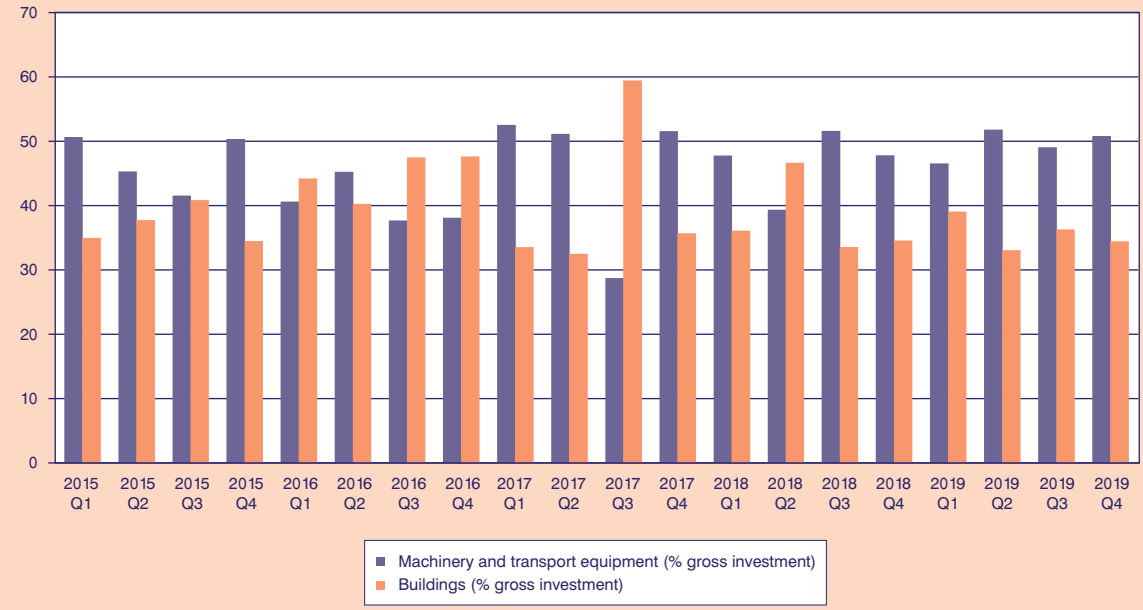
The evolution of business expectations in the construction sector are depicted in Figure 1.1.9. The relevant confidence indicator rose substantially after September 2019, especially in December (from -56.2 in September to -24.2 in December of 2019), and thereafter has remained close to this figure (-30.5 in March 2020). Despite the fluctuation in the first months of 2020, its significant increase is an encouraging sign of a possible rebound in future investment demand in this sector. However, one must always keep in mind the possible adverse consequences of the COVID-19 pandemic, not yet incorporated in our data.

FIGURE 1.1.7
Gross fixed capital formation as a percentage of GDP (overall and by asset)
(seasonally adjusted data in current prices)



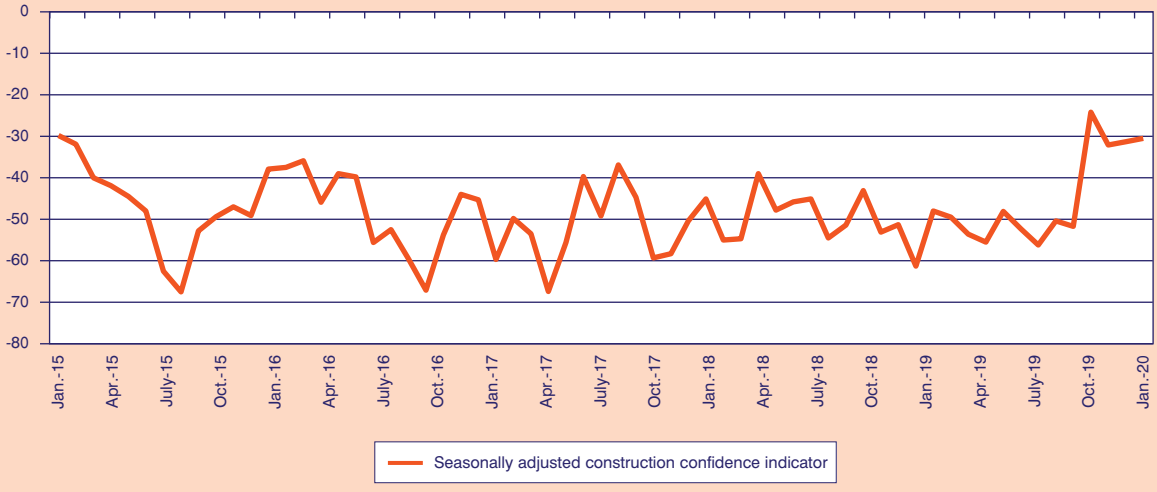
Source: ELSTAT, data processing by the author.

FIGURE 1.1.8
Machinery, transport equipment and buildings as percentages of gross fixed capital formation



Source: ELSTAT, data processing by the author.

FIGURE 1.1.9
Construction confidence indicator



Source: EUROSTAT, data processing by the author.

1.1.2.3. Conclusions

The above analysis shows that the Greek economy is treading towards the possible economic storm which the COVID-19 pandemic brings along, with a rather fickle step, notwithstanding its better performance in terms of domestic demand as compared to 2018. Even as private consumption demonstrated signs of recovery, especially during the first and the last two quarters of 2019, expectations in retail trade, which

reflected the economic climate (the first quarter of 2020 included), did not confirm this positive point of view, if one takes note of the data from September 2019 onwards. On the other hand, gross investment, despite its improvement during the first quarter of 2019, fluctuated without any clear indication of recovery throughout the whole year, whilst expectations, at least in the construction sector, seemed promising, especially in the last months of 2019. Finally, the rise in public consumption that was recorded until the end of 2019 might indicate a trend to be established in the next few months of being an important contributor to aggregate demand during the era of the health crisis, supplementary to private consumption. However, there remains a need for the Greek economy to boost the share of private investment in aggregate spending as a necessary step for a prosperous future.

KEPE, *Greek Economic Outlook,* issue 42, 2020, pp. 16-18

1.2. Consumer Price Index fell during COVID-19 lockdown

Emilia Marsellou

Greece

The necessary measures to reduce the spread of the COVID-19 virus in the last two months in Greece and most countries of the world have caused adverse effects on the demand and supply of goods and services, employment, disposable income and inflation. Regarding inflation, according to ELSTAT, the National Consumer Price Index (CPI) in April 2020 recorded an annual decrease of -1.4%, compared to zero change in March 2020 (Table 1.2.1). Core CPI fell by -0.1% in April 2020 (as the Energy Price Index, which declined significantly, is not included). Accordingly, a significant decrease was recorded in the harmonized CPI (HICP) by -0.9% while the core HICP remained unchanged (0.0%).

More specifically, the annual decrease of the General CPI in April 2020 by -1.4% is a combined result of the following changes in the price indices of the subgroups of goods and services. More specifically, the following reductions were recorded:

- **-4.7% in Housing sector.** This decrease is mainly due to the significant fall in the prices of *Heating oil* (-25.1%), *Natural gas* (-28.6%) and *Electricity* (-0.4%).
- **-1.6% in Household equipment.** This is mainly due to the decrease in the prices of *Household textiles* (-5.1%), *Household appliances and repair* (-3.6%) and *Non-durable household articles* (-0.7%).

TABLE 1.2.1 Inflation in Greece (April 2020)

	Headline inflation (Greece)	Core inflation (Greece)	Harmonised inflation (Greece)	Core Harmonised inflation (Greece)
2019:M1	0.4	0.3	0.5	0.5
2019:M2	0.6	0.2	0.8	0.5
2019:M3	0.9	0.4	1.0	0.8
2019:M4	1.0	0.5	1.1	0.8
2019:M5	0.2	0.2	0.6	0.6
2019:M6	-0.3	0.3	0.2	0.8
2019:M7	0.0	1.0	0.4	1.3
2019:M8	-0.2	0.7	0.1	0.9
2019:M9	-0.1	0.7	0.2	1.0
2019:M10	-0.7	0.4	-0.3	0.6
2019:M11	0.2	1.0	0.5	1.2
2019:M12	0.8	0.7	1.1	1.2
2020:M1	0.9	0.7	1.1	1.0
2020:M2	0.2	0.3	0.4	0.4
2020:M3	0.0	1.1	0.2	0.9
2020:M4	-1.4	-0.1	-0.9	0.0

Source: ELSTAT.

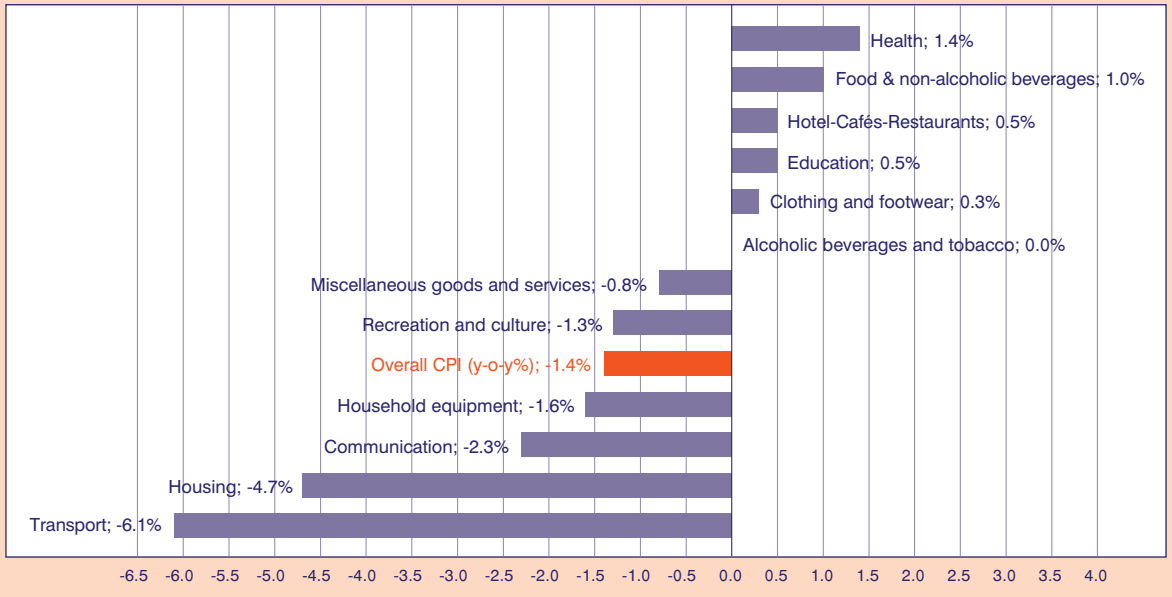
- **-6.1% in Transport.** This decrease is mainly attributed to the fall in the prices of *Fuels and lubricants* (-15.5%),[1] which was partly offset by the increase, mainly, in the prices of *New motorcars* (1.8%).
- **-2.3% in Communication,** due to the decrease, mainly, in the prices of *Telephone services* (-2.2%).
- **-1.3% in Recreation and culture.** This decrease is mainly attributed to the fall in the prices of *Audiovisual and information processing equipment* (-5.6%).
- **-0.8% in Miscellaneous goods and services.** This decrease is mainly attributed to the fall in the prices of *Other appliances and articles for personal care* (-2.2%) which was partly offset by the increase, mainly, in the prices of *Motor vehicle insurance* (1.1%).

On the other hand, prices increased in the following groups of goods and services:

- **1.0% in Food and non-alcoholic beverages.** This is mainly due to the increase in the prices of *beef; pork; dried, salted, or smoked meat; fresh whole milk; yoghurt; fresh fruit.* This increase was partly offset by the decrease, mainly, in the prices of *bread and cereals, fish, oils and fats, fresh vegetables, potatoes, sugar-chocolates-sweets-ice creams, other food, coffee-cocoa-tea, fruit juices*.
- **0.3% in Clothing and footwear.** This increase is mainly attributed to the increase in the prices of *Clothing and footwear.*
- **1.4% in Health.** This increase is mainly attributed to the increase in the prices of *Pharmaceutical products* (3.9%), which was partly offset by the fall, mainly, in the prices of *Paramedical services* (-0.9%).
- **0.5% in Education.** This is mainly due to the increase in the prices of fees of *Pre-primary and primary education* (2.2%).
- **0.5% in Hotel-Cafés-Restaurants.** This is mainly due to the increase in the prices of *Restaurants-confectioneries-cafés-buffets* (0.5%).

It is noted that prices in the sub-group *Alcoholic goods and tobacco* remained stable (0.0%).

FIGURE 1.2.1
Annual changes in the sub-categories of goods and services CPI (April 2020)



Source: ELSTAT.

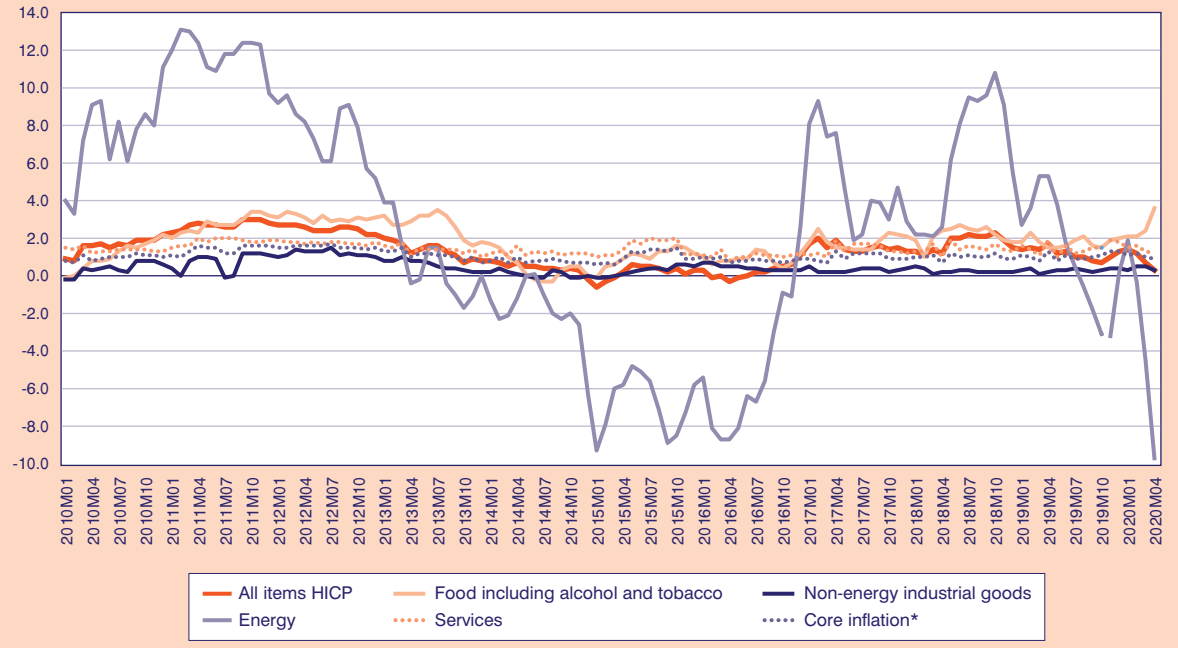
1. In more detail: Motor oil -17.4%, Gasoline -15.9%, Other fuels -10.2%, Lubricants -1.0%. It is noted that in March 2020, annual reductions were also recorded, though expectedly of lower intensity.

The euro area

According to Eurostat's estimates, annual inflation in the Eurozone in April 2020 was 0.3%, down from 0.7% in March 2020 and 1.2% in February 2020. The last two months are marked by the measures to reduce the spread of COVID-19 that have been applied in the countries of the euro area and the world in general. Regarding individual member states of the euro area, the highest inflation is recorded in April 2020 in Slovakia (2.1%) and Austria (1.5%), while Slovenia (-1.3%) and Cyprus (-1.2%) recorded the most intense deflationary tendencies.

Key inflationary factors in the euro area in April 2020, were Food, alcohol and tobacco (3.6%), keeping a positive pace since the previous year, followed by Services, with an annual increase of 1.2% in euro area HICP, and Non-energy Industrial products, with an increase of 0.3%. On the other hand, there is a significant drop in energy prices by -9.7%, mainly due to the restriction of transportation, in particular during April. Finally, the core of euro area inflation was 0.9%, slightly down from 1.0% in March 2020.

FIGURE 1.2.2
HICP in the euro area, annual change (2015=100)



Source: Eurostat.

* Overall index excluding energy, food, alcohol and tobacco.

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 estimate of the rate of change of real GDP in Greece for 2020,[1] based on KEPE's dynamic structural factor model.[2] The underlying time series database used to estimate the model and produce the forecasts includes 126 variables,[3] covering the main aspects of economic activity in the country on a quarterly basis, spanning the time period from January 2000 up to March 2020. In addition, this section includes a reference to the altered conjuncture related to the COVID-19 pandemic. It is noted that, at this stage, the estimates rely on statistical data pertaining only to a very short period characterised by the implementation of emergency measures restricting and suspending economic and social activity in the country due to the pandemic. Existing evidence for the months of April and May, which is not included in the data sample due to partial availability, already indicates the unprecedented effects of the implemented measures aimed at containing the spreading of the pandemic. A more representative projection of the overall course of real GDP in 2020 will be given after the incorporation of statistical data for the second quarter, allowing an updated estimation of KEPE's factor model. In any case, the immense shock caused by the pandemic, alongside the arising uncertainty, generally complicate the forecasting of the evolution of major macroeconomic aggregates in 2020. The difficulty in projecting economic developments in 2020 further lies in the fact that it is not straightforward to accurately quantify the potential positive impact of the extraordinary measures taken to shield the domestic health system, address the arising liquidity shortfalls of firms and support households financially. The related effects are expected to pass through to economic aggregates in the short to medium term.

According to the econometric estimates based on data up to the first quarter of 2020 (which indicate that real GDP contracted by -0.9%, compared to the respective quarter of 2019, on the basis of seasonally and calendar adjusted figures, and by -1.2%, on the basis of unadjusted figures), the mean annual rate of change of real GDP would have been expected to move around -0.2% in 2020, provided that the underlying shock would be restrained to the first quarter of the year. Therefore, it can be assumed that, in the current uncommon conjuncture, the model considerably underestimates the depth of the economic recession in Greece for 2020, which is projected by international and national institutions to be far more profound. The underestimation can be attributed, on the one hand, to the fact that the incorporated data reflect the particularly positive developments in the Greek economy during the first two months of the year. On the other hand, they include only partially the severe shock that the Greek economy is undergoing as a result of the public health emergency and the onset of the implementation of the lockdown measures in March.

Regarding the course of the economic variables used to estimate the factor model[4] and beginning with the major GDP components, private consumption, investment and services' exports decreased in the first quarter of 2020, compared to the same quarter of 2019, while General Government consumption, goods' exports and goods' and services' imports increased. Increasing trends were further depicted in the course of the general volume index in retail trade and a number of the related sub-indexes, the economic sentiment indicator for Greece, the General Index of the Athens Stock Exchange and building activity (in terms of volume, based on permits issued). In addition, all the included indicators reflecting expectations and assessments by agents moved upwards in the first

1. The date of the forecast is June 18, 2020.

2. A detailed description of the model can be found in Issue 15 (June 2011, pp. 19-20) of KEPE's scientific journal entitled *Greek Economic Outlook*. See <https://www.kepe.gr/images/oikonomikes_ekselikseis/issue_15enb.pdf>.

3. The database incorporates both real economy and nominal variables, as well as a considerable number of variables reflecting expectations and assessments of economic agents, as reported in earlier issues of the *Greek Economic Outlook*. The seasonal adjustment of the time series is carried out by use of the Demetra+ software, using the TRAMO/SEATS filter.

4. The ascertainments refer to the course of the variables on a non-seasonally adjusted basis, except for the economic sentiment indicators.

quarter of 2020, while a favourable course characterised spreads (the difference between Greek and German 10-year bonds), which declined significantly compared to the respective quarter of 2019. Furthermore, improvements were recorded in terms of competitiveness, as implied by several of the underlying indicators. More importantly, the unemployment rate declined significantly (on an aggregate level, as well as for the long-term and the newly unemployed), while the rising trend in employment was preserved (on an aggregate level, as well as in the secondary and tertiary sectors).

On the contrary, decreasing trends characterised the general industrial production index (mainly due to the fall in the category of energy), the general turnover index in industry for the overall, the domestic and the non-domestic markets (with the category of energy once again significantly contributing to the decline), the production index in construction (mainly due to the considerable fall in the sub-category of production of civil engineering), travel and transport receipts, passenger cars (based on licenses issued), the turnover index for wholesale trade and the turnover index for motor trades. The economic sentiment indicator for all European Union countries also declined.

The course of the real GDP in 2020 and, hence, the overall economic developments are expected to be far more adverse than implied by the above estimate, as is clearly signaled by the limited evidence provided by statistical data referring to the months of April and May, which are already published. Indicatively, reference can be made, compared to the corresponding months of 2019, to: the decline by -9.9% in the general industrial production index in April; the fall by 28.9% in receipts on the basis of the services' balance in April, driven by the unprecedented decrease by -98.7% in travel receipts; the decline by -18.8% and -21.3% in April and May, respectively, in the General Index of the Athens Stock Exchange (closing prices); the fall by -2.6% and -13.6% in April and May, respectively, in the economic sentiment indicator for Greece; the decrease in April and May by -6.5% and -19.5% in business expectations in industry, -3.6% and -31.6% in business expectations in retail trade, and -74.6% and -65.5% in business expectations in construction, respectively.

Overall, the Greek economy is expected to be severely hit by the pandemic shock due to its dependence on external demand and the high contribution to the total economic activity of sectors which are most adversely affected by the shock. More specifically, the contribution of services' receipts to the domestic economy, through the tourism and transport sectors, renders the country particularly vulnerable to the underlying pandemic disturbance. The scope of the expected contraction, which is subject to substantial uncertainty, will crucially depend upon the course of the pandemic in the country during the upcoming months and its repercussions regarding demand and supply dynamics, Greece's export performance, investment and saving decisions by businesses and households, employment and unemployment and, thus, incomes, as well as regarding financial conditions and fiscal aggregates.

The anticipated positive effects of the timely and wide-ranging exceptional compensatory measures implemented by the Greek government are also expected to contribute significantly to the developments in 2020. Major significance is further ascribed to all the related fiscal and financial support measures planned to be implemented at the European level. In parallel, it should be stressed that in early 2020, and before the outbreak of the pandemic, the Greek economy positively progressed in terms of basic economic aggregates, the rebalancing of major fiscal aggregates and the implementation of crucial reforms. As a result, based on the effective management of the pandemic so far, and if the impact of the associated shock remains short-lived and subsides towards the end of the year, the Greek economy is expected to gradually recover and return to positive real GDP growth rates in 2021.

KEPE, *Greek Economic Outlook,* issue 42, 2020, pp. 21-24

1.4. The Greek economy has temporarily (re-)entered a recession

Nikolaos Rodousakis, George Soklis

1.4.1. Introduction

It is commonly accepted that the Greek economy will face a very strong blow from the international spread of the new coronavirus (COVID-19). According to the European Commission's spring forecast, the pandemic is sinking the Greek economy. Thus, the Gross Domestic Product (GDP) is projected to decline by 9.7%. The estimates of the Ministry of Finance predict a recession of 4.7% for this year.

In this article, we explore the multiplier effects that the change of the components of autonomous demand (government spending, investment, exports) due to the pandemic of COVID-19, will have on GDP, employment and imports of the Greek economy. For this purpose, we use (i) the framework of the Sraffian multiplier; (ii) data from the Supply and Use Tables to capture the structure of the Greek economy; (iii) two alternative scenarios for the changes to the components of final demand, based on the projections of the European Commision and the Greek Ministry of Finance projections, respectively.

In Section 1.4.2, we briefly present the multiplier effects of COVID-19 in the Greek economy. In Sections 1.4.3 and 1.4.4, we present the results of the analysis, based on the forecasts of the European Commission and the Ministry of Finance, respectively, for the developments of the components of the autonomous demand of the Greek economy in 2020. Finally, the relevant conclusions are drawn.

1.4.2. Multiplier effects on the Greek economy

Based on the concept of the Sraffian Multiplier (see relevant Special topic of this issue) and using data from ELSTAT, we first estimate the multiplier effects of the increase in government spending, the decline in investments and the decline in exports on GDP, employment and imports of the Greek economy.[1]

Our analysis indicates that for every €1 million increase in government spending, the GDP increases about €1.487 million, while for every €1 million decrease in investment, exports and international travel receipts, the GDP of the Greek economy decreases about €0.682 million, €0.784 million and €1.076 million, respectively.

In the same way, we estimate that for every €1 million increase in government spending, employment increases by about €33.524 persons, while for every €1 million decrease in investment, exports and international travel receipts, the employment decreases about 18.930 persons, 16.604 persons and 26.403 persons, respectively.

Finally, we estimate that for every €1 million increase in government spending, imports increase about €0.359 million, while for every €1 million decrease in investment, exports and international travel receipts, the imports decrease about €0.608 million, €0.507 million and €0.324 million, respectively.

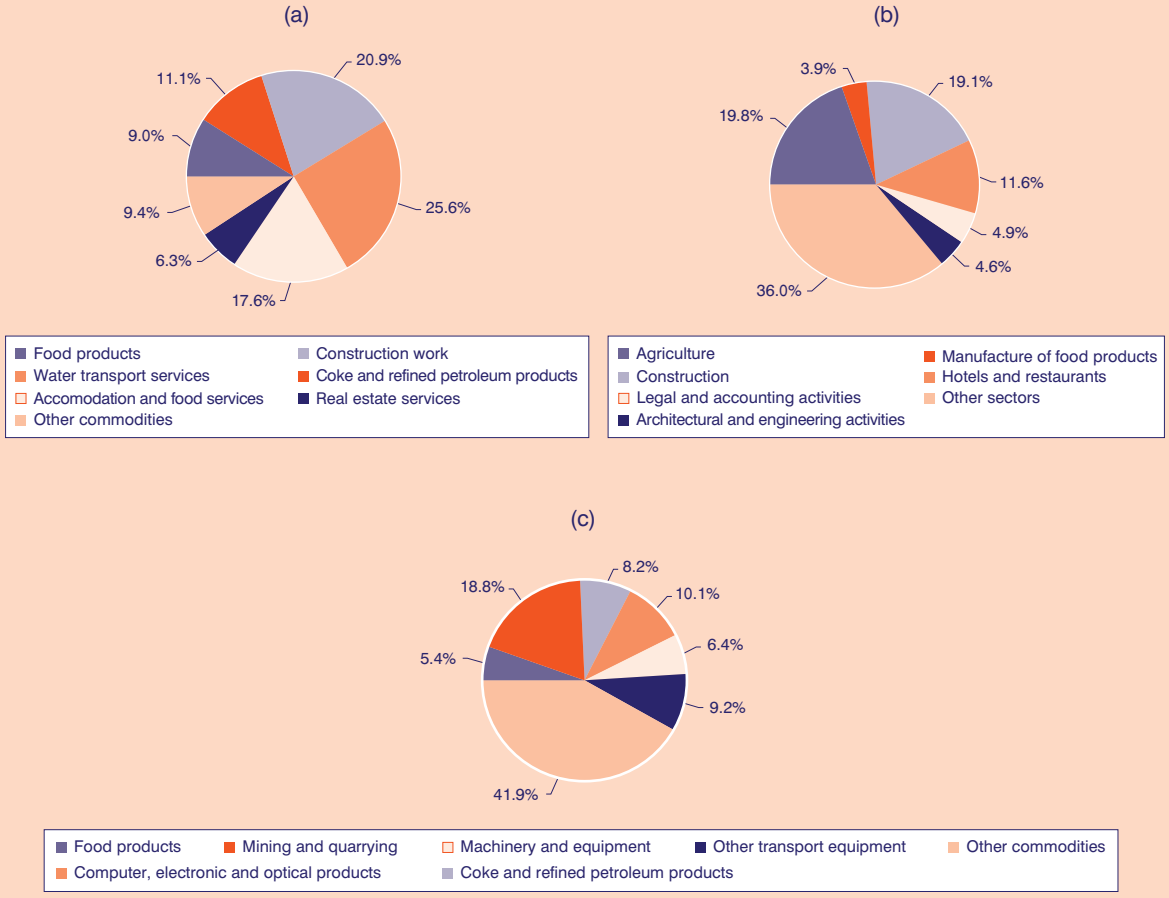
1.4.3. The multiplier effects of the European Commission's projected changes on autonomous demand

According to the European Commission Spring 2020 forecast (let's say Scenario 1) for the changes in the elements of autonomous demand of the Greek economy in 2020, the government's final consumption is expected to increase by approximately 1.782 billion euros, gross fixed capital formation is expected to decrease by approximately 6.422 billion euros, and exports are expected to decrease by approximately 14.918 billion euros.[2]

1. For details on the methodological framework, see: <https://www.kepe.gr/index.php/el/erevna/dimosieyseis/ergasies-gia-sizitise-el/item/2735-dp_142.html>.

2. European Commission (2020), European Economic Forecast, Spring 2020, Institutional Paper 125, May 2020, Luxembourg: Publications Office of the European Union.

FIGURE 1.4.1
The total effects of COVID-19, Scenario 1:
(a) the distribution (%) of the losses in GDP per commodity;
(b) the distribution (%) of the losses in employment per sector; and
(c) the distribution (%) of the losses in total imports per commodity



Thus, the European Commission's projections correspond to a total (direct and indirect): [3]

- decrease in GDP of about 7.16%, whose distribution per commodity is described in Figure 1.4.1a;
- decrease in the levels of total employment of about 7.20%, whose sectoral distribution is described in Figure 1.4.1b;
- decrease in total imports of about 15.53%, whose distribution per commodity is described in Figure 1.4.1c.

The majority of output losses correspond to 'Water transport services' (25.6%), 'Construction work' (20.9%) and 'Accommodation and food services' (17.6%). The most significant decreases in the levels of employment correspond to the sectors 'Agriculture' (19.8%), 'Construction' (19.1%), and 'Hotels and restaurants' (11.6%), and the most significant decreases in total imports correspond to 'Mining and quarrying' (18.8%), 'Computer, electronic and optical products' (10.1%) and 'Other transport equipment' (9.2%).

3. For details on the multiplier effects of investment and exports, see: KEPE (2020), National Productivity Board Annual Report 2020, Athens, forthcoming.

1.4.4. The multiplier effects of the Ministry of Finance's projected changes on autonomous demand

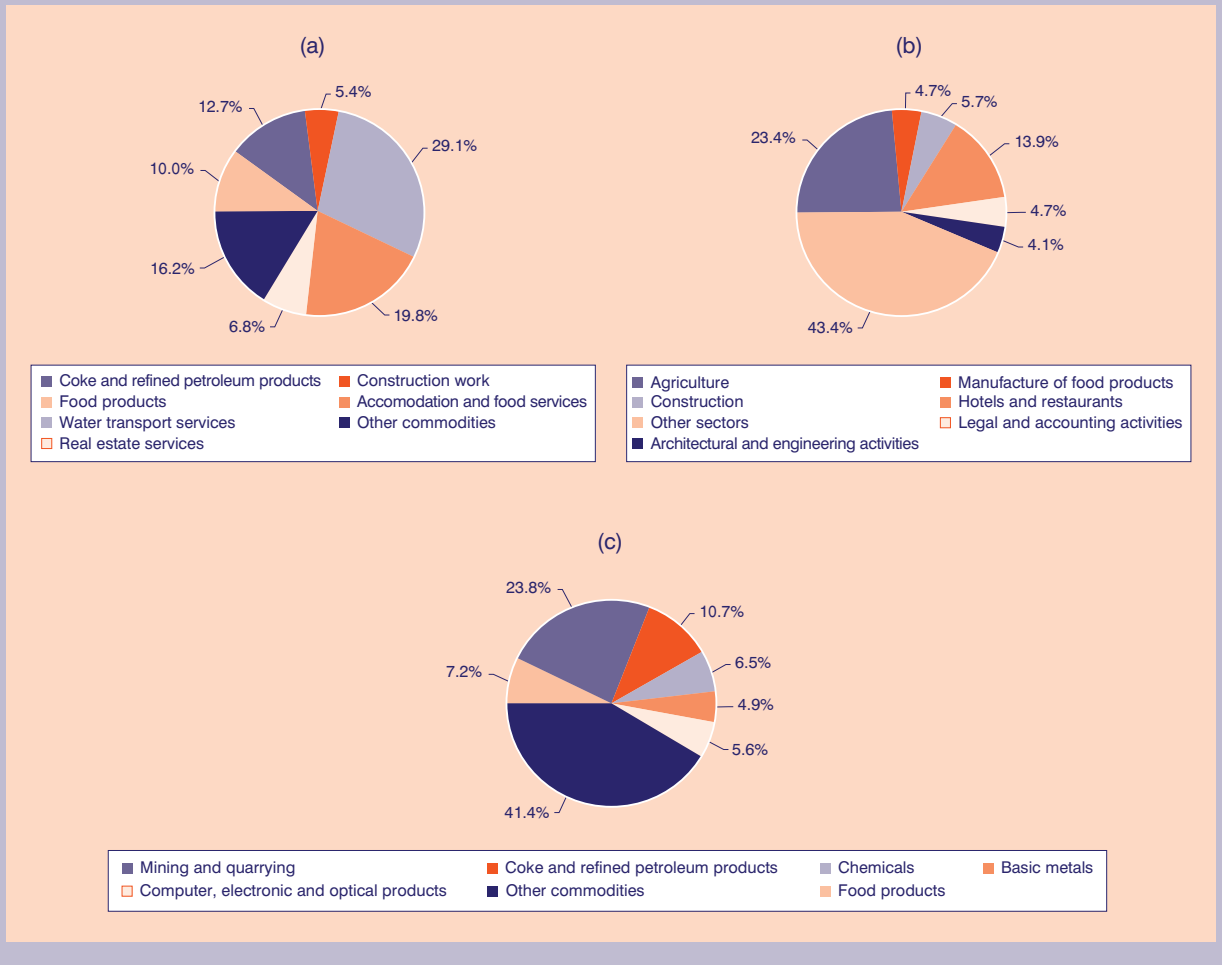
According to Ministry of Finance (MinFin) projections for the changes in the elements of autonomous demands of the Greek economy in 2020 (let's say Scenario 2), the government's final consumption is expected to increase by approximately 0.364 billion euros, gross fixed capital formation is expected to decrease by approximately 0.985 billion euros, and exports are expected to decrease by approximately 13.384 billion euros.[4]

Our estimations suggest that MinFin projections correspond to a total (direct and indirect):

- decrease in GDP of about 5.67%, whose distribution per commodity is described in Figure 1.4.2a;
- decrease in the levels of total employment of about 5.32%, whose sectoral distribution is described in Figure 1.4.2.b;
- decrease in total imports of about 10.40%, whose distribution per commodity is described in Figure 1.4.2c.

As it follows, the majority of output losses correspond to 'Water transport services' (29.1%), 'Accommoda-

FIGURE 1.4.2
The total effects of COVID-19, Scenario 2:
(a) the distribution (%) of the losses in GDP per commodity;
(b) the distribution (%) of the losses in employment per sector; and
(c) the distribution (%) of the losses in total imports per commodity.



4. Ministry of Finance (2020), Stability Program 2020, Hellenic Republic, April 2020, Athens.

tion and food services' (19.8%) and 'Coke and refined petroleum products' (12.7%). The most significant decreases in the levels of employment correspond to the sectors 'Agriculture' (23.4%), 'Hotels and restaurants' (13.9%) and 'Construction' (5.7%), and the most significant decreases in total imports correspond to 'Mining and quarrying' (23.8%), 'Coke and refined petroleum products' (10.7%) and 'Food products' (7.2%).

1.4.5. Conclusions

The analysis of the multiplier effects of COVID-19 in the Greek economy shows that, based on the projections of the Ministry of Finance and the European Commission for autonomous demand changes, we estimate a decrease in GDP of about 5.67% and 7.16%, in employment of about 5.32% and 7.20%, and in total imports of about 10.40% and 15.53%, respectively.

These results are in line with our previous analyses, where we focused on the effects of the decline of tourism revenues and the increase of government spending, in which we highlighted the potential for limiting the recession. This is mainly due to the fact that the contribution of tourism to the Greek economy (tourism ratio) is equivalent to other countries in the European South, and not multiple, as is sometimes said by various estimates (see relevant Special topic of this issue).

Our estimates show that most of the downturn in the economy is expected to be due to the negative effects of declining exports, especially in the tourism and shipping sectors, while the impact on domestic demand is mainly in the construction sector. About the reduction in GDP, our estimates are closer to the forecasts of the Ministry of Finance, which speaks about a recession of 5%. Regarding the reduction of employment and the increase in the deficit of the Balance of Goods and Services, both the Ministry and the European Commission seem to underestimate them.

All of the above, in combination with the fact that the differences between the two scenarios for government spending, investment and exports could lead to significant differences in the impact on GDP, employment and total imports by sector (commodity), we conclude that tackling the effects of the pandemic requires planning and targeted sectoral policies. Therefore, on the basis of these policies, we can be optimistic that the Greek economy has entered only temporarily into a recession.

KEPE, *Greek Economic Outlook,* issue 42, 2020, pp. 25-32

1.5. The key labour market variables had been improving until the introduction of restrictive measures in early March 2020

Ioannis Cholezas

1.5.1. Introduction

Until the enforcement of social distancing due to the coronavirus in early March, the key variables of the Greek labour market had been improving, despite seasonal volatility. The number of the unemployed was decreasing, while the number of the employed was constantly increasing, leading to an ever decreasing unemployment rate. Despite variations amongst population groups, the improvement permeated the entire economy. March was dominated by social distancing, which had an adverse impact on economic activity, and interrupted, at least for the time being, the rise of employment. The most recent data from the Labour Force Survey involve the end of 2019, when the pandemic was not yet a Greek concern. When the market is moving smoothly, relying on six-month-old data is not uncommon. However, under the circumstances that impacted the course of the economy and the labour market, relying on recent data for paid employment by the informational system ERGANI seemed the only logical option.

This means that the analysis of the short-term developments in employment that follows focuses solely on paid employment. This choice was preferable for another reason. Self-employed individuals can theoretically keep their businesses open in the short-term, even if their income, for as long as the emergency restrictions apply, is close to zero or even negative. In the Greek case, this ability was surely supported by the state's decisions to suspend all payments to the public sector (e.g., taxes and arrears) and to decrease the constant cost of businesses by reducing rents. However, if businesses were shut down following the state's decision to protect public health, such as restaurants, cinemas and theatres followed by shops and hotels soon after, then the employment contracts were suspended and all paid employees were eligible for a special purpose allowance. Alternatively, in the case where businesses decreased their activities but continued to operate, they were given the option to employ their workers for fewer hours either under a part-time job contract or under a work-in-shifts job contract.

In any case the actual result is the same, since employment is reduced. In this difficult situation, the Greek state, as expected and required, is trying to alleviate the negative impact of the shock by setting up a safety net for the adversely impacted employed individuals, either employees or the self-employed. The main stake is to preserve the jobs following the end of the emergency restrictions and to restore, at least to some extent and as soon as possible, employment growth.

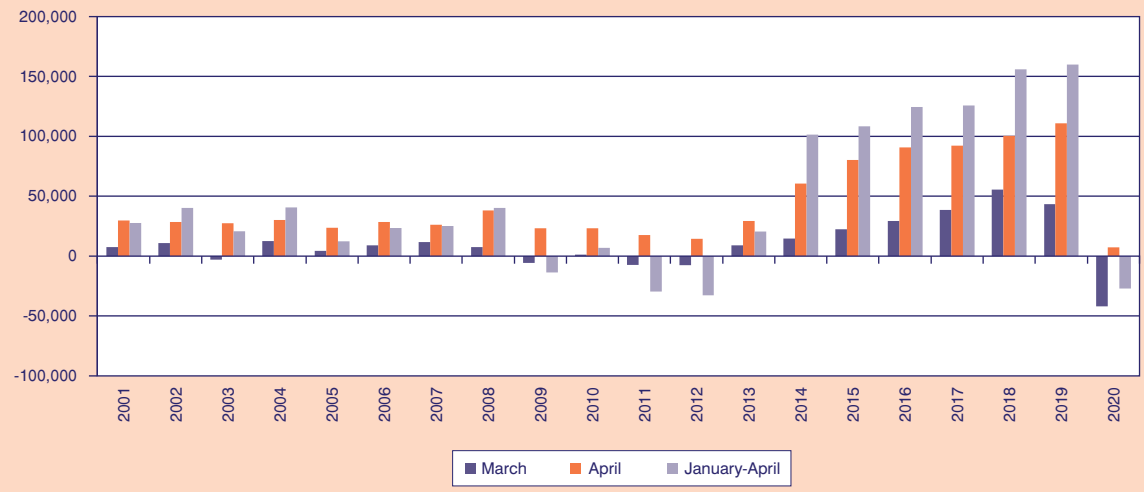
1.5.2. Paid employment

In the first two months of the year, paid employment, more or less, followed the same path with previous years, at least since 2014 onwards. In January, the number of layoffs and quits was bigger than the number of hires; thus, there was a negative balance in paid employment flows. In particular, 17,318 jobs were lost, almost 5,000 fewer compared to 2019 and approximately 800 fewer compared to 2018. In February, on the other hand, there were more hires, which led to a positive balance of 24,867 new jobs of paid employment. This corresponds to 3,000 fewer new jobs compared to February 2019, but 8,000 more jobs compared to February 2018.

The outbreak of the coronavirus and the restrictions imposed as a result force this analysis to focus on March and April (Graph 1.5.1). Traditionally, these two months are associated with an increase in hires and a reduction in layoffs, which turn the balance of flows positive. At least this is recorded in most years since 2001. The most plausible explanation for increasing employment in March is the strengthening of economic activity in many regions due to soaring tourism flows. Note that there was a record of new paid employment jobs for the past 20 years in March 2018: hires exceeded layoffs and quits by 55,494. A similar record was achieved in April 2019, when more than 110,000 new paid employment jobs were created.

In particular, there were half as many hires in March 2020 compared to March 2019: approximately 99,000 fewer (Table 1.5.1). Similarly, the hires this April were one-sixth of the hires in April last year; thus, there were more than 230,000 fewer hires. The main difference between March and April is that, in April, apart from

FIGURE 1.5.1
Balance of paid employment flows (hires minus layoffs and quits)



Sources: Informational System ERGANI, Ministry of Labour and Social Affairs, KEPE processing.

hires, layoffs and quits also decreased. Layoffs and quits this April were fewer than one-quarter of layoffs and quits in April 2019, while in March their number declined by approximately 14,000 on a year-on-year basis. Moreover, the decrease in the number of hires continued, and got even stronger, in April. Compared to March, there were about 54,000 fewer hires, while last April there were more than 80,000 more hires compared to March 2019.

It seems, then, that the sign in paid employment flows and the size of the imbalance is determined by the hires and not the layoffs and quits.[1] This quality difference is important because it shows that the prevailing uncertainty, due to the pandemic and the imposed restrictions which are gradually being lifted, is responsible for the poor performance of the labour market. Additional uncertainty is added to the system, regarding the tourist season and the terms and conditions under which accommodation services will be provided, that should not be ignored, especially since tourism is the main driver of hires in March and April. Other industries, directly or indirectly related to tourism, are also waiting to see how big the hit on tourism will be before they make their hiring plans.

The facts discussed so far led to a negative balance of paid employment flows and the loss of 41,903 jobs this March as well as a marginally positive balance of paid employment flows in April, where only 7,205 new jobs were created. During the respective months last year, 43,373 and 110,895 new paid jobs were created. Consequently, for the first four months of 2020, the balance of paid employment flows was negative by 106,874 jobs, while in the first four months of 2019, there were 159,775 new jobs created. Overall, were the economy to produce as many jobs as it did last year in the absence of the emergency restrictions, the loss of paid employment jobs in the first four months of the year would have been even greater and close to 187,000 (see the cell in the last column and last line in Table 1.5.1), since jobs that were not created would have been included in the calculation.

Analysing the industries and occupations that stood out during March and April leads to some interesting conclusions. The ERGANI reports list the five industries with the biggest positive balances of paid employment flows and the five industries with the biggest negative balances. Table 1.5.2 clearly demonstrates that in March and April, throughout period 2014-2019, the industry *accommodation facilities* systematically ranked first, with the biggest positive balance of paid employment flows. The industry *restaurants and bars* often ranked second, except for March of 2014 and

1. Given the restrictions in layoffs, the size of layoffs and quits seems bigger than expected. Maybe these are triggered by firms whose activity was not hurt by the restrictions, received no support by the state and, therefore, are not subject to any restrictions. However, it is an issue worth exploring.

TABLE 1.5.1 Paid employment flows

		January	February	March	April	Jan.-Apr.
Hires	2019	157,141	165,110	202,157	282,181	806,589
	2020	177,632	183,602	103,002	48,555	512,791
	Diff.	20,491	18,492	-99,155	-233,626	-293,798
Layoffs and quits	2019	179,474	137,270	158,784	171,286	646,814
	2020	194,950	158,735	144,905	41,350	539,940
	Diff.	15,476	21,465	-13,879	-129,936	-106,874
Balance	2019	-22,333	27,840	43,373	110,895	159,775
	2020	-17,318	24,867	-41,903	7,205	-27,149
	Diff.	5,015	-2,973	-85,276	-103,69	-186,924

Source: Informational System ERGANI, Ministry of Labour and Social Affairs, KEPE processing.

2017, while the industry *wholesale and retail trade* followed next. The first two industries are closely associated with tourism activities. Unsurprisingly, this March, the balance of paid employment flows was negative in the industry *accommodation facilities* and the fifth biggest in size, while the balance of paid employment flows in the industry *restaurants and bars* was also negative and ranked first. In April, these two industries were not reported in ERGANI, since they were not included amongst those with the biggest balances (positive or negative). It seems obvious, then, that the two industries that are usually considered top performers in hires in March and April, not only performed poorly this year in terms of paid employment, but they recorded significant job losses in March. This is not good news.

Similar conclusions are drawn when exploring the occupations with the biggest positive balance of paid employment flows (Table 1.5.3). The occupations that ranked at the top of the list in previous years were directly associated with tourism. It is no surprise and, at the same time, it is also very disturbing, that none of these occupations is included in the March and April 2020 list, except for the occupation group *cleaners and cleaning ladies*.[2] On the contrary, there are occupations on the list such as *nurses and doctors* (3rd place with 729 new jobs) and *parcel and mail distributors* (10th place with 99 new jobs). The biggest positive balance in April is reported for salespersons and cashiers in shops (1,642 new jobs) followed by nurses and staff supporting nurses (1,614 new jobs), package distributors and clerks in special posts (6th position with 1,092 new jobs).

The mix of hires in the first two months of 2020 was no different than the mix in previous years. Approximately 42% of new hires involved part-time jobs, almost 13% involved work-in-shift job contracts and around 45% were new full-time jobs. There was a big change in the composition of hires in March, though: the share of full-time job hires increased to 56%. Part-time job hires decreased to 36.8% of the total number of hires and work-in-shift job contracts dropped to 7.2%. This trend was further reinforced in April. Full-time job hires reached 67%, while part-time job hires decreased even further, marginally below 30%, and work-in-shift hires dropped to a mere 4%.

As already discussed, the reduction in the number of hires is the main force driving developments in the labour market in March and April. A plausible explanation for the increase in the share of full-time job hires is the sharp decrease in the number of hires by industries and occupations that employ mainly under flexible types of job contracts, due to uncertainty and the associated restrictions imposed. These industries include *accommodation facilities* and *restaurants*

2. Perhaps this is a different group than the past, since the full title is *cleaners and cleaning ladies in hotels, offices, shops, etc.;* or maybe it is simply a change in the title.

TABLE 1.5.2 Balance of paid employment in selected industries in March

	2020	2019	2018	2017	2016	2015	2014
March							
Accommodation facilities	-1,878	13,313	16,352	11,898	8,422	8,361	4,573
Restaurants and bars	-21,919	6,010	10,973	-	3,075	1,212	-
Retail trade	-	2,726	4,703	3,458	2,788	2,409	1,028
Wholesale trade	-	2,302	2,044	2,041	1,526	1,338	-
April							
Accommodation facilities	-	61,270	52,609	45,763	46,086	39,347	35,581
Restaurants and bars	-	23,482	23,218	19,671	18,891	18,532	8,361
Retail trade	1,929	8,087	4,879	5,379	8,484	4,877	4,010
Travel agencies and organized travel services	-	2,952	2,997	2,369	2,284	1,977	2,077
Wholesale trade	-307	-	-	-	2,503	-	-

Source: Informational System ERGANI, Ministry of Labour and Social Affairs, KEPE processing.

Note: The bars represent non-available data, i.e., the industry does not belong to the five industries with the biggest positive or the biggest negative balance of paid employment flows.

and bars, which, as already discussed, sharply decreased their hires. On the other hand, firms that had planned for full-time hires, having a medium or long-term horizon, were probably less affected by the developments. Alternatively, they could have made all full-time hires in the first half of the month and, then, they slowed down the pace.[3] Should the restrictions be prolonged, more such firms may be forced to stop hiring or, even worse, to lay off personnel in the following months.

Last but not least, firms reacted to emergency circumstances by converting full-time job contracts to part-time or work-in-shift job contracts, with or without the consent of the employee. The number of conversions in January 2020 was approximately the same with the number of conversions in January 2019. On the other hand, in February 2020, there were 11.6% more conversions compared to the same month in 2019 (approximately 440 more conversions). On the contrary, in March, the increase in the number of conversions was spectacular; it has more than doubled compared to March 2019 (7,990 conversions vs. 3,340). In April, 8,497 more full-time contracts were converted to flexible job contracts. Half of those were converted to work-in-shift job contracts with the consent of the employee, which is a very high share that should be treated with caution.

Another interesting fact is that, during the past few years, conversions to part-time job contracts prevailed and their share amongst flexible jobs had been increasing. This seems to have stopped this March, since most conversions involved work-in-shift job contracts (approximately 57% in March and 65.6% in April). The picture gets even gloomier when one considers that the number of conversions to work-in-shift job contracts with the consent of the employee quintupled in March and increased eight times in April on a year-on-year basis, while those without the consent of the employee nearly sextupled in March and increased twenty times in April. It is likely that some of these conversions would have been layoffs, if the legal framework were less flexible. On the other hand, they may soon turn to layoffs, in case the restrictions in economic activity are prolonged more than the firms can sustain. What strikes as odd, though, is that all this is happening despite the support of the state to both firms and employment.

3. This is consistent with the observation that full-time hires are almost equally divided in the two halves of the month in 2019, while in March 2020 almost 2/3 of full-time hires were realised in the first half of the month.

TABLE 1.5.3 Occupations with the biggest positive balance of paid employment flows[4]

	2019	2018	2017	2016	2015	2014
March						
Waiters and bar tenders	4,503	7,411	1,894	2,514	1,831	-
Maids in hotels and houses	3,917	4,029	3,649	2,091	2,310	1,275
Cooks in hotels and restaurants	3,186	4,689	2,052	2,147	1,307	363
Receptionists in hotels, restaurants, shops, etc.	2,239	2,520	1,607	1,183	1,067	-
Cleaners and cleaning ladies in hotels, offices, shops, etc.	1,943	2,501	1,302	1,487	-	-
Scullions/dishwashers	1,665	2,125	-	-	-	-
April						
Waiters and bar tenders	27,224	24,029	21,043	21,116	18,475	11,058
Cooks in hotels and restaurants	17,027	15,052	12,702	11,940	10,868	7,778
Maids in hotels and houses	12,094	11,226	9,225	9,824	8,778	7,331
Salespersons	9,783	5,440	6,023	8,571	5,443	4,009
Receptionists in hotels, restaurants, shops, etc.	8,620	7,664	6,262	6,190	5,447	3,811
Cleaners and cleaning ladies in hotels, offices, shops, etc.	7,406	6,675	5,592	5,358	4,850	3,265
Scullions/dishwashers	3,901	3,371	2,820	2,526	2,471	1,637

Source: Informational System ERGANI, Ministry of Labour and Social Affairs, KEPE processing.

Note: The bars represent non-available data, i.e., the industry does not belong to the five industries with the biggest positive balance of paid employment flows.

1.5.3. Measures to support economic activity and employment

The first attempt to support employment and firms that were strongly and adversely impacted by the coronavirus and the restrictions imposed was an Act of Legislative Content (PNP) issued in 11.3.2020/2020 entitled, "Urgent measures to cope with the negative consequences of COVID-19 and the need to restrict its spread". More PNPs followed, attempting to expand the safety net mainly by expanding the list of beneficiaries. The measures can be divided into those mostly aiming at supporting firms, and thus indirectly supporting employment, and those aiming directly at supporting employment.

The main measures to support firms, amongst others,[5] involved suspending payments of the Value Added Tax (VAT) under requirements, suspending the collection of arrears, a 25% discount in arrears paid in monthly instalments (and settlements), extending the due date for social security contributions, suspending the due date for securities (e.g., checks, bills of exchange, notes, etc.) by 75 days and reducing rents by 40% for buildings hosting business activities. Moreover, to support small

4. There are no available data on these occupations for 2020, since they were not included in the top five occupations with the biggest balances of paid employment flows.

5. The support measures implemented in March are listed in the press releases of the Ministry of Finance on March 31, 2020 entitled, "*Protection framework for businesses, employed individuals and self-employed, free-lancers in March*". Similarly, in April the press release was issued on the March 31, 2020 and was entitled, "*Protection framework for businesses, employed individuals and self-employed, free-lancers in April*". The main difference is that the second set of provisions includes two more types of firms, i.e., three in total.

and medium-size firms (employing up to 500 workers), the Ministry of Finance implemented a finance scheme termed "Reimbursable Down Payment" amounting to €1 billion in total. The money will be used to finance firms directly and will be repaid to the state, in full or partially, according to the performance of the firm. One last measure to support firms and, indirectly, employment is the option given to firms to convert existing job contracts to job contracts that involve work supplied remotely, i.e., work from home.

To accommodate the shutting down of schools on March 10th, PNP 11.3.2020/2020 introduced a new special-use leave of absence for working parents under specific requirements: three days leave for one day of regular leave. However, it was soon made clear that there was a need to impose even stricter restrictions, such as social distancing, in order to stop the spread of the virus. Therefore, a new PNP was issued (14.3.2020/2020) that introduced a special mechanism to support paid employees in firms whose operations were temporarily halted or were severely hurt due to the emergency restrictions imposed by the state to fight the coronavirus. The mechanism involved financial support measures, such as a special purpose allowance, the settlement of social security contributions by the state, a special benefit to the self-employed and vouchers for training.

In particular, according to the Joint Ministerial Decision (JMD) no.12998/232, firms that were hurt by the restrictions in economic activity were not allowed to lay off workers, while layoffs that were announced before the JMD was issued were considered invalid. The special purpose allowance for paid employees working in such firms was set to €800 for 45 days, hence approximately €533 on a monthly basis,[6] and was uniform, i.e., independent from the wage received.[7] The allowance cannot be confiscated or taxed and it cannot be offset against arrears. Moreover, firms severely hurt (but not shut down by the state) are expected to preserve jobs for 45 days once operations begin, under the same terms of employment. Workers whose job contract was suspended (even if it was a temporary contract) are entitled to the special purpose allowance. A job contract may be suspended because the firm is forced by the state to stop its operations or because the employer decided to, on the grounds that the firm's activities are severely hurt (i.e., included in the respective list of KADs) by the restrictions imposed to stop the spread of the virus. Small individual firms are also eligible. During the suspension of the job contract, social security contributions will be paid in full by the state. Moreover, suspended employees are allowed to postpone the settlement of their tax debts or are entitled to a 25% discount in case of early settlement. They are also entitled to a 40% discount in the rent paid for their main residence.

The self-employed with or without employees were also eligible for the special allowance of €800. Small firms (of every legal form except for anonymous firms) employing up to 5 workers (given they have not submitted zero VAT declarations over the past six months)[8] were eligible too. Scientists working as self-employed were initially urged to participate in a 30-day training programme conducted through distance learning with a subsidy of €600. However, the minister of labour later abolished the programme and decided that the self-employed would collect the subsidy with no requirements.[9] At the same time, payments to tax services were postponed or got a discount if paid on time. April's social security contributions could be paid in four instalments or get a 25% discount in case of an early payoff, while the Easter bonus can be paid until the June 30, 2020.

By the end of March, the Ministry of Finance estimated that about 1.7 million persons were entitled to the support measures, which represented 81% of the employed in the private sector of the economy, and 800 thousand firms, i.e., 76% of the total number of legal entities, since support measures involve 86% of KAD, and 700 thousand self-employed with or without employees and small business owners, thus approximately 75% of the total.[10] According to more recent estimates of the Ministry of Labour and Social Affairs, which were made public at the end of April, the number of the employed to be compensated with the special allowance is expected to surpass 800 thousand.[11] Moreover, the

6. The amount is smaller than the minimum wage, but bigger than the unemployment benefit.

7. FEK B΄ 1078/28-3-2020 lists the support measures for the employed in firms run by self-employed with employees and the relevant procedure.

8. See FEK B΄ 1457/16-4-2020.

9. See the relevant press release here: <https://www.ypakp.gr/uploads/docs/12345.pdf>.

10. See the press release on March 30, 2020, titled *«The position of the Minister of Finance mr. Christos Staikouras on the Complete Plan/ Strategy to deal with the economic consequences of the coronavirus in April"* at the Ministry of Finance website.

11. <https://www.kathimerini.gr/1073574/article/oikonomia/ellhnikh-oikonomia/to-xronodiagramma-gia-ta-800-eyrw---panw-apo-800000-oi-aithseis>.

number of beneficiaries increased further, by approximately 160 thousand, by a decision that also included employed individuals who suffered the consequences of the restrictions, but whose activity was not listed in the relevant KAD list, and the employed who offer their services to more than one employer, under specific requirements. [12]

There are three points that need to be carefully considered: (a) whether firms, even if they are listed among those that are more likely to see their activities suffer the consequences of the restrictions (see KAD list), are truly suffering (e.g., by comparing the contemporary business cycle with that of past years), (b) whether the employed whose job contracts have been suspended are truly in suspension (as opposed to working from home, for example), and (c) whether the terms of employment, e.g., the agreed working hours, of those who work from home are honoured. This way the waste of resources could be avoided, since firms that were not truly suffering the consequences of the reduced economic activity would not be eligible and, thus, the available resources could be targeted to those firms that truly need the support. At the same time, the employed would be protected, since they would be fully compensated, as long as they were working as usual, while they could be compensated for the full amount of hours they supplied should they wish to work longer hours.

Except for the employed, support measures were also implemented for the unemployed. In particular, the government announced an emergency allowance of €400 for the long-term unemployed; the beneficiaries were estimated to reach 155 thousand individuals.[13] In a press release by the Labour Force Employment Service (OAED), the number was estimated at 168 thousand individuals.[14] Moreover, approximately 8.5 thousand new subsidised jobs for the long-term unemployed aged 55-67 are expected to be created,[15] while new community service programmes are expected to start in May for more than 140 thousand unemployed. Similarly, the unemployment benefits that expired in January/February/March were prolonged for two more months, affecting about 70/80/43 thousand unemployed, respectively. The same extension is given to the unemployment benefits that expired in April.[16]

1.5.4. Conclusions

The negative consequences of the pandemic and the restrictions imposed on economic activity are expected to be important. Estimates of the expected impact of the coronavirus on GDP announced early in March by the Centre of Planning and Economic Research (KEPE)[17] and the Hellenic Fiscal Council (EDS)[18] did not point to a contraction. On the contrary, more recent estimates by the Bank of Greece (BoG) suggest a contraction of economic activity; in the worst-case scenario, the contraction could reach 8%, but a more modest approach of 4% is more likely.[19] The Ministry of Finance estimates[20] a recession of 4.7% at best, which could reach 8% under a worst-case scenario. However, the Spring Economic Forecasts prepared by the European Commission[21] are closer to those of the BoG. The estimated contraction of the Greek economy is expected to be 9.7% in 2020, although it is expected to turn positive in 2021 (7.9%). Under these circumstances, it is not realistic to assume that employment will remain intact. The course of paid employment has already been overturned, while –as expected due to uncertainty– flexible types of employment that followed a decreasing trend until February 2020, such as part-time and work-in-shifts, have been revived.

12. See FEK B΄ 1547/22-4-2020.

13. See relevant press release at: <https://www.ypakp.gr/uploads/docs/12342.pdf>.

14. See OAED's press release in 21.4.2020.

15. See relevant press release at: <https://www.ypakp.gr/uploads/docs/12337.pdf>.

16. <https://www.kathimerini.gr/1073710/article/oikonomia/ellhnikh-oikonomia/ektakth-enisxysh-400-eyrw-kai-nea-programmata-gia-makroxronia-anergoys>.

17. See <https://www.kepe.gr/images/Αναλύσεις_Επικαιρότητας_1-2020.pdf>.

18. See <https://www.hfisc.gr/sites/default/files/epiptoseis_sto_ell._aep_0.pdf>.

19. <https://www.fortunegreece.com/article/stournaras-to-vasiko-senario-tis-tte-provlepi-ifesi-peripou-4-to-2020/>.

20. The estimates are reported at the Stability Programme 2020 filed to the European Commission in April 2020. It is available at: <https://ec.europa.eu/info/sites/info/files/2020-european-semester-stability-programme-greece_en.pdf>.

21. The statistical annex is available at: <https://ec.europa.eu/info/sites/info/files/economy-finance/ecfin_forecast_spring_2020_statist_annex_en.pdf>.

The available room for manoeuvring is limited for the Greek government due to the country's fiscal weaknesses. Therefore, it is important to find the right mix between public spending and maximum efficiency, always considering that spending has to be financed by more debt the country will likely have to repay in the future.[22] The key policy axes should aim at preserving existing jobs and restoring the increasing trend in employment demonstrated before the pandemic. This means that firms need to be supported in order to survive the difficulties they face if they are to be able to recover as soon as possible once the restrictions are lifted. This is probably the best way to keep unemployment under control. At the same time, both the employed and the unemployed also need to be supported and protected against unfair practices in the workplace, in order to avoid impoverishment. Moreover, undeclared work should not be ignored. It has suffered a strong blow over the past two months, since the support measures devised involve only formally employed individuals. Naturally, all the interventions should not neglect the need for the country to preserve its fiscal stability, which was so hard and costly to achieve. In this context, Greece should utilise all the support offered by European initiatives. The new instrument SURE[23] (Support to mitigate Unemployment Risks in an Emergency) is such an example; it can be used by member states to preserve employment by protecting the employees and the self-employed against the risk of unemployment.

Therefore, the interventions need to be targeted and accompanied by strict supervision. It is the only way to avoid phenomena like the exploitation of the employed and the waste of the limited resources available. Last but not least, given that the situation is unprecedented, it is important to assess the effectiveness and the results of the interventions and, when necessary, to expand or mitigate them.

22. At least some part of this cost could be paid by European funds through ESPA.

23. More information is available at: <https://ec.europa.eu/info/business-economy-euro/economic-and-fiscal-policy-coordination/eu-financial-assistance/loan-programmes/sure_en>.

KEPE, *Greek Economic Outlook,* issue 42, 2020, pp. 33-36

1.6. Expected losses in the stock market due to the pandemic

Fotini Economou

1.6.1. Introduction

The unprecedented conditions witnessed during the last months due to the coronavirus pandemic depict the impact of unexpected factors that can simultaneously affect global stock markets. Under the new conditions of general uncertainty, it is difficult for a stock market to remain unaffected.

In contrast to macroeconomic indicators, stock market indices may reflect the current developments and the related uncertainty for the global and domestic economy and provide information in real time. So, after a year of impressive stock market returns and particularly positive prospects for the year 2020, the Greek stock market experienced the coronavirus pandemic with significant losses for all market categories, in line with the course of international markets. Although the stock market in April 2020 showed signs of recovery, the following months remain crucial for the course of the domestic and global economy, which will inevitably affect international stock markets as well.

This article attempts a brief overview of recent developments in the Greek stock market, focusing on key indices and stock market uncertainty in the domestic market. The last section of the article summarizes and provides conclusions.

1.6.2. Developments in the stock market during the first four months of 2020

Generalized liquidations due to the increased uncertainty about the course of markets and economies in the presence of the coronavirus pandemic could not leave the Athens Stock Exchange (ATHEX) unaffected. According to ATHEX data (Table 1.6.1), during the first four months of 2020, all stock market indices recorded significant losses, following the course of international stock markets. More specifically, the Athex Composite Share Price Index recorded losses of -31.46% since the beginning of the year, reaching -48.78% within the year (i.e., at 469.55 points, February 2016 levels). The Athex Composite Share Price Index reached 628.25 points (i.e., January 2019 levels) at the end of April 2020, from 916.67 points at the end of 2019. Moreover, there were losses of -39.09% in the first quarter of 2020, with the sharply declining trend beginning with the first coronavirus cases in Greece at the end of February 2020. Note that the Athex Composite Share Price Index recorded a monthly return of 12.53% in April 2020, reflecting the effective management of the coronavirus pandemic in Greece.

The rest of the indices also followed a similar course with a reversal of their downward trend in April 2020. The FTSE/Athex Large Cap index recorded significant losses of -33.63% from the beginning of the year, reaching -50.58% within the year. The course of the individual industry indices also declined, with the FTSE/Athex Health Care index recording the smallest losses (-10.08%) and the FTSE/Athex Banks index the highest losses (-61.49%) since the beginning of the year.

According to ATHEX data (2020),[1] there was a significant reduction of the ATHEX capitalization during the first four months of 2020, at €36.92 billion on 30/4/2020 from €50.35 billion on 31/12/2019 (-26.8%) (see Figure 1.6.1). In April 2020, there was an increase in capitalization of 9.3% compared to the previous month, due to the upward trend of the market, and a decrease of -13.2% compared to April 2019. In addition, in April 2020 the value of transactions fell by -43.9% compared to the previous month, reaching €1,022.76 million with a change of -8.3% compared to April 2019 when the value of transactions was at €1,115.68 million.[2] At the same time, the participation of foreign investors in the capitalization of ATHEX reached 67.39% in April 2020, from 68.86% in December 2019. Taking into account the participation of the Hellenic Financial Stability Fund in total capitalization, the share of foreign investors reached 66.05% in April 2020, from 66.35% in December 2019. Note that there was an increase, for

1. Athens Exchange Group, Monthly Statistics Bulletin AxiaNumbers, Securities Market, April 2020.

2. Note that the Hellenic Capital Market Commission decided to prohibit short sales and other transactions other than short sales, which create or increase the net short positions in shares admitted to trading on the regulated market of the Athens Stock Exchange from 18/3/2020 to 24/4/2020 (see Press Release 17/3/2020). With a second decision of the Hellenic Capital Market Commission, the ban was extended until 18/5/2020 (see Press Release 15/4/2020).

TABLE 1.6.1 Prices and returns for selected indices of the ATHEX in 2020 (up to 30/4/2020)

	30/4/2020	31/12/2019	Year min	Year max	Year change (%)
ATHEX Mid & SmallCap Price Index	4,988.68	5,936.94	3,964.16	6,324.97	-15.97%
FTSE/ATHEX Mid & SmallCap Factor-Weighted Ind	2,456.93	2,975.68	2,028.59	3,205.70	-17.43%
FTSE/X.A. Mid Cap	880.89	1,195.17	659.09	1,298.86	-26.30%
Athex All Share Index	155.01	215.66	122.81	223.49	-28.12%
Athex Composite Share Price Index	628.25	916.67	469.55	949.20	-31.46%
FTSE/Athex Large Cap	1,525.21	2,298.02	1,135.79	2,371.26	-33.63%
FTSE/Athex Health Care	453.94	504.83	402.35	508.96	-10.08%
FTSE/Athex Utilities	2,749.55	3,185.42	1,865.80	3,447.76	-13.68%
FTSE/Athex Chemicals	7,575.47	8,864.83	5,513.26	9,442.19	-14.54%
FTSE/Athex Telecommunications	3,330.61	3,925.16	2,480.07	3,960.95	-15.15%
FTSE/Athex Technology	748.06	900.44	537.98	1,029.21	-16.92%
FTSE/Athex Insurance	1,646.32	2,025.02	1,076.29	2,088.80	-18.70%
FTSE/Athex Personal & Household Goods	7,584.26	9,810.13	5,596.91	10,280.00	-22.69%
FTSE/Athex Food & Beverage	8,700.52	11,264.09	5,768.28	13,004.12	-22.76%
FTSE/ATHEX Real Estate	4,053.24	5,465.04	2,945.19	5,826.74	-25.83%
FTSE/Athex Financial Services	735.70	996.89	548.44	1,123.81	-26.20%
FTSE/Athex Industrial Goods & Services	1,800.53	2,561.57	1,302.84	2,712.84	-29.71%
FTSE/Athex Travel & Leisure	1,356.53	1,939.68	904.20	2,084.49	-30.06%
FTSE/Athex Construction & Materials	2,125.38	3,083.14	1,403.78	3,344.96	-31.06%
FTSE/Athex Retail	46.64	69.64	38.18	75.77	-33.03%
FTSE/Athex Basic Resources	4,322.20	6,458.00	2,713.19	7,435.44	-33.07%
FTSE/Athex Oil & Gas	3,346.15	5,048.57	2,268.39	5,154.35	-33.72%
FTSE/Athex Banks	340.90	885.16	266.18	889.92	-61.49%

Source: Daily official list of trading activity of the ATHEX (30/4/2020 and 31/12/2019).

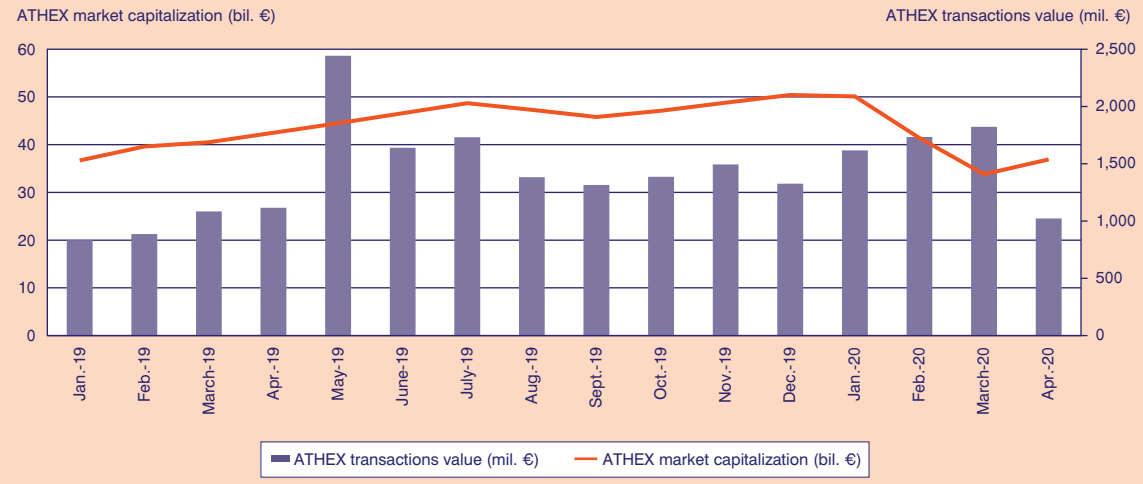
five consecutive months, in the participation of Greek retail investors in the total value of transactions, making 29.5% of transactions, from 24.8% last month and 21.4% in April 2019. Finally, the share of foreign investors fell to 46.6% from 52.5% last month and 51.3% in April 2019.

Finally, the course of the Hellenic Corporate Bond Price Index[3] also declined, recording losses of -8.75%, as did the Hellenic Corporate Bond Index[4] with losses of -7.68% during the first four months of 2020. In addition, according to ATHEX data (2020), there was a decrease in the capitalization of corporate bonds to €1.21 billion, from €1.42 billion on 31/12/2019 (-15.31%). At the same time, the cash value of settled transactions in April 2020 amounted to €10.04 million from €16.85 million, in April 2019 (-40.40%).

3. Based on the net price of each bond.

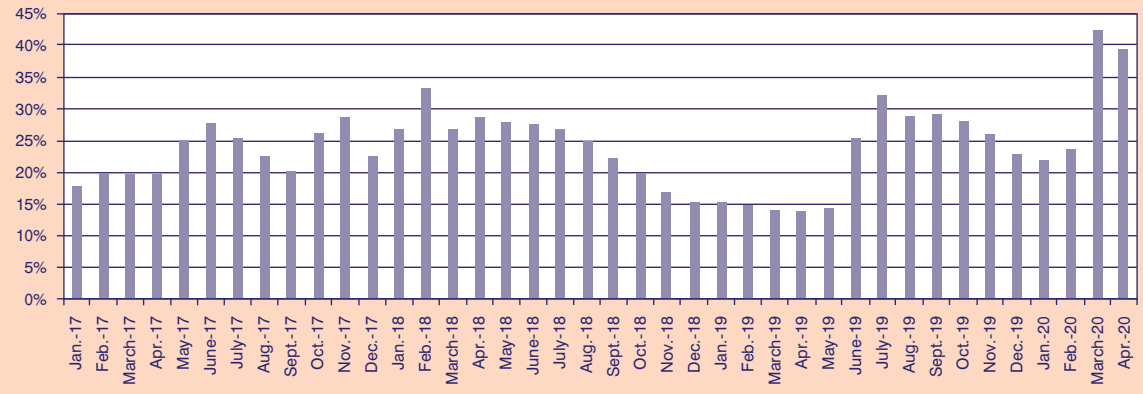
4. Based on the net price, accrued interest and the value of the payments of each bond.

FIGURE 1.6.1
ATHEX market capitalization and transactions value in 2020 (up to 30/4/2020)



Source: Athens Exchange Group, Monthly Statistics Bulletin AxiaNumbers, Securities Market, April 2020.

FIGURE 1.6.2
Average daily value of the KEPE GRIV index per month from Jan. 2017 to Apr. 2020



Source: Centre of Planning and Economic Research.

1.6.3. Stock market and uncertainty

The negative performance of the stock market is also reflected in the evolution of the KEPE GRIV implied volatility index, which reflects the uncertainty of the derivatives market participants about the expected short-term course of the Greek market and is calculated on the basis of the FTSE/ATHEX Large Cap options prices.

More specifically, the upward trend of the KEPE GRIV index began at the end of February 2020 in parallel with the first coronavirus cases in Greece, reaching 32.37% on 28/2/2020 from 22.77% on 31/1/2020. The index reached a peak in March 2020 of 61.55% on 13/3/2020, its highest value for the year 2020, while on 31/3/2020 the index reached 48.94%. Note that the index had not exceeded 60% since September 2015. In addition, during this period, the index exceeded, for the first time since July 2019, its historical average (since January 2004) for the Greek market, which stands at 33.30%. Then, following the upward trend of the market in April 2020, the KEPE GRIV index decreased significantly, reaching 32.66% on 30/4/2020,

capturing the reduction of uncertainty in the Greek market based on the effective management of the coronavirus pandemic in Greece. Finally, Figure 1.6.2 above shows the average daily price of the index per month from January 2017 to April 2020. Although the average daily price of the index gradually decreased for several months, it rose in February 2020, increased sharply in March 2020 and then fell to 39.42% in April, from 42.57% in the previous month.

1.6.4. Conclusions

The following months will be crucial for the course of the economy and financial markets, both internationally and domestically. At a time when uncertainty about the consequences of the coronavirus pandemic remains, the Greek stock market needs to continue its smooth operation and promote growth as well. According to the Federation of European Securities Exchanges (FESE),[5] organized stock markets have an important social and economic role and need to perform it even under difficult conditions of uncertainty in order to facilitate pricing as well as to ensure liquidity and transparency.

The course of the stock market in 2019 created positive expectations for the strengthening of financing through the ATHEX. According to the Annual Report of the Hellenic Capital Market Commission for 2019, in addition to the impressive returns of the stock market indices, €976.18 million were raised through share capital offers in 2019 (from €298.88 million in 2018) and €525 million through the issuance of corporate bonds (from €235 million in 2018). Therefore, actions should be taken to promote and facilitate financing through the capital market, utilizing both existing and new financing tools, while providing incentives (tax and other) to encourage business participation. Further shielding of the Greek capital market as well as the promotion of corporate governance, through a relevant bill[6] on the capital market that is expected to be voted on in the near future, can contribute to this purpose by strengthening investor confidence in the Greek market.

Also note that at the beginning of March 2020, the ATHEX announced the creation of three new indices from March 23, 2020 and changes or decommissioning of some of the existing indices effective from 22/6/2020.[7] The purpose of these changes is to enhance their representativeness and meet the needs of investors and other users to create new products and additional investment options.

Finally, even though the impact of the pandemic is evident in the course of stock market indices and the increase of uncertainty, some positive signs observed in the market in April 2020 regarding the upward trend of the stock market indices and the significant decrease of the KEPE GRIV index, which reflects reduced uncertainty for the Greek market as a result of the effective management of the coronavirus pandemic in Greece, should not be overlooked. Also note the successful issuance of a seven-year Greek government bond in April 2020 that raised €2 billion with an interest rate (coupon) of 2%, being very close to the levels of the previous issuance of the seven-year bond in July 2019.

It is evident that the following months will be critical for the course of the economy, and the Greek stock market needs to promote growth in times of difficulty and uncertainty due to the coronavirus pandemic. The country's return to investment grade remains a key objective, while the challenge for the ATHEX is to promote business financing in order to boost the real economy.

5. Press Release FESE 17/3/2020.

6. The public consultation on the bill was completed on 2/4/2020 and the final text of the bill is expected to be finalized.

7. Creation of the FTSE/ATHEX High Dividend Yield Index, the ATHEX Select Plus Index and the ATHEX Select Index. Introduction of capping (10% weight) in the FTSE/ATHEX Large Cap Index. Decommissioning of the FTSE/ATHEX Global Traders Index, the FTSE/ATHEX Net Total Return Index, and the ATHEX Mid & Small Cap Price Index. More information is provided in the ATHEX announcement of March 5, 2020.

KEPE, *Greek Economic Outlook,* issue 42, 2020, pp. 37-41

1.7. Recent developments and prospects of the global economic activity

Aristotelis Koutroulis

The global community is undergoing an unexpectedly large public health crisis due to the rapid spread of the COVID-19 diseace worldwide. The loss of thousands of lives, the large number of patients in critical condition, the feelings of insecurity and sympathy for those suffering dominate the mind and the soul of every human being. Beyond human tragedy, both the virus and the measures being implemented to limit its spread are expected to have a huge impact on global economic growth.

1.7.1. Trends and developments in the global economy

Twelve years after the outbreak of the 2008 global financial crisis, the world economy is challenged by a new crisis. This time around, the turmoil in global economic activity is not the result of a malfunction or a failure of an economic sector. Today's crisis is health-related and linked to the spread of the COVID-19 diseace, which has taken the form of a pandemic.

COVID-19, commonly known as coronavirus, first appeared in the Chinese city of Wunan in December 2019. Despite the initial rapid spread of the disease among the people of that city and the high number of deaths, the unprecedented measures of the Chinese authorities in combination with the gradual decline in the rate of new cases led to the impression that the phenomenon would be limited to China. From this perspective, the initial forecasts of international organizations regarding the global economy were quite optimistic, suggesting that global GDP growth would

TABLE 1.7.1 Real Gross Domestic Product[1,2]
(annual percentage changes)

	2019		2020*		2021*	
	IMF	EC	IMF	EC	IMF	EC
World economy	2.9	2.9	-3.0	-3.5	5.8	5.2
Advanced economies	1.7	:	-6.1	:	4.5	:
USA	2.3	2.3	-5.9	-6.5	4.7	4.9
Eurozone	1.2	1.2	-7.5	-7.7	4.4	6.3
Japan	0.7	0.7	-5.2	-5.0	3.0	2.7
United Kingdom	1.4	1.4	-6.5	-8.3	4.0	6.0
Developing economies	3.7	:	-1	:	6.6	:
Brazil	1.1	1.1	-5.3	-5.2	2.9	1.9
Russia	1.3	1.3	-5.5	-5.0	3.5	1.6
India	4.2	5.3	1.9	1.1	7.4	6.7
China	6.1	6.1	1.2	1.0	9.2	7.8

Sources: IMF, *World Economic Outlook,* (Chapter 1), April 2020, European Commission, *European Economic Forecast, Spring 2020.*

* Projections.

Notes: 1. The observed differences between the available macroeconomic projections partly reflect the differences between the macro-econometric models and the data used by each international organization.
2. The sub-group of emerging economies is included in the group of developing economies.

range between 2 and 3% (EC, 2020a; OECD, 2020a; and ECB, 2020).

The central scenario of the above predictions was refuted very quickly with the virus spreading to all continents and taking, according to the estimates of the World Health Organization, the form of a global pandemic. Despite the chronologically and geographically asymmetric spread of the disease, the vast majority of developed countries –including a significant number of developing and emerging economies– adopted and implemented a series of administrative measures to limit its spread (e.g., suspension of business operations, travel restrictions and international border closures).

Despite the gradual return to normality since May, the aforementioned measures have caused dramatic reductions in household demand for services that require transportation and direct contact with the provider (e.g., accommodation & catering services, rail/sea/air passenger transportation, personal service activities, creative activities related to art and entertainment, etc.). On the supply side, the retail and tourism sectors have experienced the largest losses.

Regarding tourism, OECD analysts estimate that the global tourism industry will suffer an annual decline of 45 to 70 percentage points (OECD, 2020b). Given the growing dependence of the global economy on the tourism industry, the collapse of the latter is expected to have a large negative impact on global GDP. At a country-level, the effects will be proportional to the shares of the tourism industry in national production.

According to the latest reports of the International Monetary Fund (IMF) and the European Commission, the gradual normalization of economic activity over the second half of 2020 is the most likely scenario (IMF, 2020; EC, 2020b). Under this scenario, the annual rate of change in world GDP for 2020 is estimated to be close to -3% (see Table 1.7.1 above).

1.7.2. Inflation and Unemployment

The annual inflation rate in advanced economies is expected to decline from 1.4% in 2019 to 0.5% in 2020. With the exception of a certain number of oil-producers and sub-Saharan low-income countries, inflation will moderate in developing countries as well. The relatively low inflation rates worldwide reflect weakened economic activity, declining demand, and downward pressures on energy and commodity prices. The average annual inflation is projected to return to 2019 levels in 2021.

Unlike inflation, recent developments on the employment front are a cause for concern. Indeed, compared to the 4th quarter of 2019, working hours at a global level decreased by 4.5% in the 1st quarter of 2020 which, assuming a 48-hour work week, amounts to 130 million full-time jobs (ILO, 2020). For the 2nd quarter of 2020 it is estimated that the corresponding decrease –always compared to the 4th quarter of 2019– will reach 10.5%, which is equivalent to 305 million full-time jobs (ILO, 2020).

Although the above figures cannot be interpreted as actual job losses, they are indicative of the fact that the downward trend of global unemployment has been reversed. IMF estimations regarding the average annual unemployment rates lead to similar conclusions (see Table 1.7.2).

TABLE 1.7.2 Annual unemployment rates

	2016	2017	2018	2019	2020*	2021*
USA	4.9	4.3	3.9	3.7	10.4	9.1
Eurozone	10.0	9.0	8.2	7.6	10.4	8.9
Japan	3.1	2.8	2.4	2.3	3.0	2.3
United Kingdom	4.9	4.4	4.1	3.8	4.8	4.4
Brazil	11.3	12.8	12.3	11.9	14.7	13.5
Russia	5.5	5.2	4.8	4.6	4.9	4.8
China	4.0	3.9	3.8	3.6	4.3	3.8

Sources: IMF, *World Economic Outlook* (Chapter 1), April 2020.

* Projections.

So far, government interventions in labour markets across the globe (e.g., employment subsidies and other supportive measures) have managed to mitigate the effects of COVID-19 on employment. Nevertheless, most of these measures do not reach workers of the informal sector. This means that almost 1.4 billion workers of the informal sector who live in developing countries may suffer a dramatic deterioration of their living conditions (ILO, 2020). In that respect, the world might experience an increasing migration flow from less developed to developed economies.

1.7.3. Fiscal policy and public debt

The combination of expansionary fiscal policy with negative changes in key macroeconomic variables is expected to add significant pressure on public finances in most countries of the world. Fiscal measures with an impact on the expenditure side of public budgets include enhanced funding of national health systems, direct or indirect subsidies to companies that have been forced to suspend their operations, various forms of employment subsidies and financial assistance to economically vulnerable groups of the society. Measures with an impact on public revenues include various forms of tax relief for businesses.

While it is widely agreed that expansionary fiscal policy is absolutely necessary at the current juncture, it is also true that expenditure overruns related to COVID-19 and shortfalls in revenues will inflate budget deficits (see Table 1.7.3). In turn, inflated budget deficits will increase governments' borrowing requirements, thereby leading to a new wave of public debt with global dimensions.

1.7.4. Global financial markets and monetary policy

The recent developments in the field of public health and the real economy have led to deteriorating financial conditions, creating 'bottlenecks' across international money and capital markets. Stock markets were the first to be affected, with most shares registering significant losses. Pressures on corporate bond markets and freezing of commercial paper markets immediately followed.

The tighter credit conditions are directly linked to the shift of investors to safer investment positions such as government bonds. Specifically, international investors have exhibited a clear preference for safer government bonds (e.g., government bonds issued by the US and Germany). In turn, the weighting of investment portfolios in favor of low-risk government bonds have caused steep rises of bond spreads, thereby deteriorating the financing conditions of countries with high

TABLE 1.7.3 General government overall fiscal balance and debt
(Percent of GDP)

	General government overall fiscal balance (Percent of GDP)		General governmnet debt (Percent of GDP)	
	2019	2020*	2019	2020*
World economy	-3.7	-9.9	83.3	96.4
USA	-5.8	-15.4	109.0	131.1
Eurozone	-0.7	-7.5	84.1	97.4
Japan	-2.8	-7.1	237.4	251.9
United Kingdom	-2.1	-8.3	85.4	95.7
Brazil	-6.0	-9.3	89.5	98.2
Russia	1.9	-4.8	14.0	17.9
India	-7.4	-7.4	71.9	74.3
China	-6.4	-11.2	54.4	64.9

Source: IMF, *Fiscal Monitor,* April 2020.

* Projections.

public debts. The very same willingness of international investors to reduce the risk level of their portfolios has led to a massive capital flight from developing to developed economies (IMF, 2020c).

Owning to the experience gained after the global financial crisis and thanks to the new regulations regarding capital adequacy ratios, systemic banks in advanced economies have showed remarkable resilience so far (IMF, 2020c). Nevertheless, banks, financial markets and the real economy are communicating vessels. A combination of lower profitability rates with higher ratios of non-performing loans may reduce the capacity of banks to extend credit to small and medium-sized enterprises and households.

To avoid a vicious circle caused by a lack of liquidity and to alleviate market concerns, most central banks have adopted an extremely loose monetary policy. However, with key interest rates marginally higher than zero, monetary authorities have exhausted their conventional tools. Under these circumstances, resorting to incompatible instruments and supplying the economy with sufficient liquidity seems the only way to restore financial stability.

1.7.5. World trade and commodity prices

After a year of sluggish expansion, international trade (goods and services) is set to contract sharply in 2020. Disruptions in global supply and demand are expected to have a stronger impact on international trade during the first half of 2020. Though a small rebound of economic activity is forecast for the next months, the prospects of international trade remain negative for the second half of 2020. Overall, the annual rate of change of international trade volume is expected to fall by 11 percentage points (see Table 1.7.4).

The substantial declines in global economic activity and trade have inevitably led to a fall in international fuel and commodity prices. Due to traffic and passenger restrictions, the downward pressure was particularly strong in the case of oil, which reached a record low of $ 23 per barrel in April 2020. On the contrary, gas and coal prices fell slightly due to limited changes in household demand for heating. The reductions in the international prices of basic metals were mild, while the prices of food products have remained relatively stable.

Against the backdrop of weak economic activity, the average annual prices of fuel and commodities during 2020 are expected to decline by -40% and -5%, respectively (World Bank, 2020).

References

European Central Bank (2020), "ECB Staff Macroeconomic Projections for the Euro Area", March 2020. <https://www.ecb.europa.eu/pub/projections/html/index.en.html>.

European Commission (2020a), "European Economic Forecast, Winter 2020 (Interim)", European Economy, Institutional Paper 121.

European Commission (2020b), "European Economic Forecast, Spring 2020", European Economy, Institutional Paper 125.

International Labour Organization (2020), "ILO Monitor: COVID-19 and the world of Work". <https://www.ilo.org/wcmsp5/groups/public/@dgreports/@dcomm/documents/briefingnote/wcms_743146.pdf>.

International Monetary Fund (2020a), *World Economic Outlook* (Chapter 1): "The Great Lockdown", IMF, Washington, DC.

International Monetary Fund (2020b), *Fiscal Monitor* (Chapter 1): "Policies to Support People During the COVID-19 Pandemic", IMF, Washington, DC.

TABLE 1.7.4 World Trade Volume
(annual percentage changes, goods and services)

	2019*		2020**		2021**	
Volume of international trade - goods and services (annual percentage changes)	0.9		-11		8.4	
	Imports	**Exports**	**Imports**	**Exports**	**Imports**	**Exports**
Advanced economies	1.5	1.2	-11.5	-12.8	7.5	7.4
Developing economies	-0.8	0.8	-8.2	-9.6	9.1	11.0

Source: IMF, *World Economic Outlook* (Chapter 1), April 2020.

* Estimations, ** Projections.

International Monetary Fund (2020c), *Global Financial Stability Report* (Chapter 1): "Global Financial Stability Overview: Markets in the Time of Covid-19", IMF, Washington, DC.

OECD (2020a), *OECD Economic Outlook, Interim Report March 2020.* OECD Publishing, Paris. <https://doi.org/10.1787/796989 6b-en>.

OECD (2020b), *OECD Note, Covid-19: Tourism Policy Responses, March 2020.* OECD Publishing, Paris. <https://www.oecd.org/coronavirus/en/>.

World Bank (2020), *Commodity Markets Outlook, April 2020*, Washington, DC: World Bank.

2. Fiscal developments

KEPE, *Greek Economic Outlook,* issue 42, 2020, pp. 42-47

2.1. State Budget, public debt and fiscal figures perspectives

***Elisavet I. Nitsi*[1]**

2.1.1. State Budget execution, first quarter 2020

According to the most recent data retrieved from the General Accounting Office,[2] on a modified base, the execution of the State Budget in the first quarter of 2020 was more deficient compared to the corresponding period of 2019, as well as to the monthly estimates, as they were reflected in the executive summary of the State Budget for the fiscal year 2020. This deficit was expected, as less revenue and higher expenditures were budgeted.

According to the data shown in Table 2.1.1, the State Budget had a deficit in its balance amounting to 1.82 billion euros in the period January-March 2020, against a deficit of 768 million euros in the corresponding period of 2019, and a target deficit of 1.78 billion euros. The State Budget Primary Balance had a surplus of 494 million euros, in comparison to primary surplus of 426 million euros for the same period in 2019, and a primary surplus target of 1.44 billion euros.

The amount of net income of the State Budget reduced compared to the same period last year, as it amounted to 11.1 billion euros, a decrease of 883 million euros or 7.37% compared to the revenue of the first quarter 2019 and by 165 million euros or 1.46% against the target set by the 2020 Budget. Revenue from the Public Investment Program (PIP) amounted to 906 million euros, increased compared to the corresponding period of 2019 (24 million euros or 2.72%), but reduced relatively with the budget target (92 million euros or 9.22%). More specifically, this reduction in spending is mainly due to a significant reduction in Sales of Goods and Services, amounting to just 115 million euros, down by 909 million euros or 88.77% compared to the same period last year. This decline was foreseen in the 2020 Budget, as it falls short of its target by just 45 million euros or 28.13%. It should also be noted that the collection of VAT, amounting to 3.97 billion euros, is reduced compared to the first quarter of 2019, by 540 million euros or 11.98%, as well as compared to the target, by 313 million euros or 7.31%. On the contrary, transfers, amounting 1.18 billion euros, show a significant rise compared both to the corresponding period of 2019 (260 million euros or 28.23%) and to the budget's target (226 million euros or 23.66%), which can be attributed to revenue collection from ANFAs & SMPs of 251 million euros, which was initially estimated to be collected in April 2020, and from the Other Taxes on Production category by 528 million euros. In addition, revenues from income tax, amounting to 2.75 billion euros, increased by 79 million euros or 1.96%, but lag behind the target by 137 million euros or 4.75%.

On the expenditure side, which amounted to 12.93 billion euros, the State Budget's expenditure in the first quarter of 2020 increased by 172 million euros or 1.35% compared to the corresponding period of 2019, but has reduced compared to the target of 13.05 billion euros, i.e., a shortage of 124 million or 0.95%. The main reasons for this restriction compared to the same period last year are the reduced Compensation to Employees by 226 million euros or 6.46% and the significant reduction of Social Benefits by 207 million euros or 85.89%, while compared to the 2020 budget target are the execution of both Fixed Assets Acquisition costs by 99 million euros or 89.19%, as well as Other Expenditures by 18 million euros, which were supplied by consuming part of the reserve. On the other hand, interest payments increased by 106 million euros or 4.79% compared to the previous year and 109 million euros or 1.94% against the 2020 target. Finally, expenditures of the Public Investment Program (PIP), amounting to 809 million euros, increased by 267 million euros or 49.26% compared to the last year's corresponding period and by 59 million euros or 7.87% compared to target set by the 2020 Budget.

1. Data and commentary reflect the time that this article was written (15/6/2020).

2. Based on preliminary data published in the State Budget Execution Monthly Bulletin: April 2020.

TABLE 2.1.1 State Budget Execution first quarter 2020 (million euros)

	Jan.-Mar. 2019	Jan.-Mar. 2020		2019	2020
	Outcome	Outcome	Budget Estimates 2020[1]	Outcome[2]	Budget 2020[3]
State Budget					
Net Revenue	**11,986**	**11,103**	**11,268**	**55,097**	**53,751**
Taxes					
from which:	10,500	10,419	10,428	51,415	51,997
V.A.T.	4,508	3,968	4,281	17,792	18,217
Consumption Taxes	1,621	1,556	1,639	7,125	7,213
Real Estate Taxes	450	369	402	2,786	2,813
Income Taxes	2,671	2,750	2,887	16,716	16,577
Social Contributions	14	14	14	55	55
Transfers	921	1,181	955	44,407	3,880
Sales of Goods & Services	1,024	115	160	1,728	700
Other Current Revenue	488	431	382	2,527	1,713
Sales of Fixed Assets	1	2	310	10	332
Sales of Valuables	0	0	0	0	0
Tax Refunds	962	1,058	984	5,044	4,926
Expenditures	**12,754**	**12,926**	**13,050**	**55,265**	**56,037**
Compensation of Employees	3,501	3,275	3,298	13,247	13,403
Social Benefits	241	34	19	653	134
Transfers	6,047	6,321	6,249	28,205	27,824
Purchases of Goods & Services	101	147	77	1,458	1,145
Subsidies	73	9	26	224	89
Interest Payments (gross basis)	2,211	2,317	2,208	5,225	4,500
Other current Expenditures	20	2	28	50	71
Non Allocated Expenditures	0	0	284	0	1,495
Purchase of Fixed Assets	14	12	111	562	623
Purchase of Valuables	0	0	0	0	0
Public Investment Program (P.I.P.)					
Revenue[4]	882	906	998	2,857	3,679
Expenditures	542	809	750	5,642	6,750
State Budget Primary Balance	**1,443**	**495**	**426**	**5,057**	**2,214**
State Budget Balance[5,6,7]	**-768**	**-1,822**	**-1,782**	**-168**	**-2,286**

Source: General Accounting Office, Greek Ministry of Finance.

Notes:

1. Budget targets, according to the total estimates as depicted in the 2020 Budget introductory report
2. The total revenue and expenditure outcome is preliminary and will be finalized after the vote of the 2019 annual Budget report (for both revenue and expenditure).
3. Annual estimates as depicted in the executive summary of the 2020 Budget introductory report.
4. Revenues from the Public Investment Program (PIP) fall into the categories of “Transfers” and “Other Current Revenues”.
5. + surplus, - deficit.
6. Outcome includes the settlement program of previous years’ arrears and pending pension applications.
7. Data is presented according to the new economic classification (Presidential Decree 54/2018).

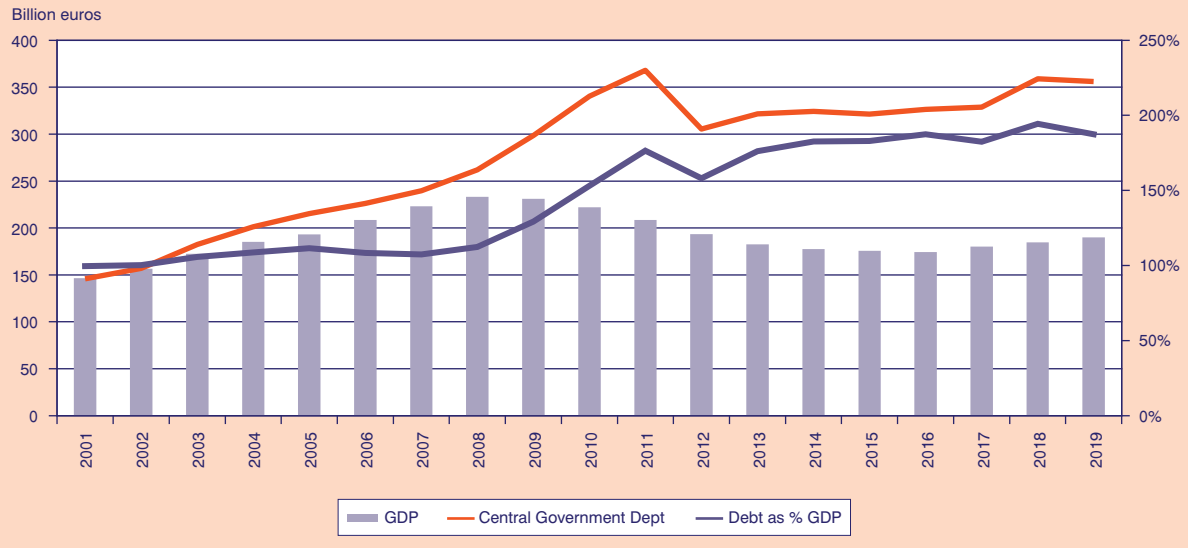
Overall, the Budget implementation in the first quarter of 2020 has a small deviation from the targets set by the Ministry of Finance with the 2020 Budget. The deviation from the corresponding period of 2019 is due to the government's decision to terminate the policy of overachieving surpluses, but instead to invest in growth by reducing taxes and social contributions, starting in 2020. A significant development is also that the primary surplus is higher than expected. Finally, it should be noted that the impact of the coronavirus pandemic has not yet affected the development of the State Budget, as measures to reduce the health crisis leading to extreme economic turmoil began in the second half of March –a crisis that will significantly affect the execution of the Budget.

2.1.2. The evolution of Greek public debt

After the country's public debt climbed to very high levels, both in absolute terms, reaching 368 billion euros in 2011, and especially as a percentage of GDP, exceeding 176% (Graph 2.1.1), the country's GDP steadily decreased up to 2016, due to the high recession of the Greek economy. Although Greek debt dropped by more than 62.4 billion euros in 2012 due to the Private Sector Involvement (PSI), it remained particularly high, 158% of GDP, mainly owed to new loans for the recapitalization of Greek banks that were automatically enrolled in the country's debt. In the subsequent years and until 2016, although the country's debt in absolute terms was around 320-325 billion euros, as a percentage of GDP it continued to increase, mainly due to the continuing decline in GDP. Since 2017, although the Greek economy has entered a growth path, debt has increased by 30 billion euros, mainly due to the difference between new loans and the repayments made the previous year. Finally, 2019 is the first year that the debt has dropped both in absolute terms, by 1 billion euros, and as a percentage of GDP, by 7%.

More specifically, as shown in Table 2.1.2, the composition of the Central Government's debt has changed significantly. In the period after the country's accession to the Support Mechanism, the composition of the Central Government's debt, based on the type of interest, displayed a significant change in favor of floating versus fixed rate, while in the last two years, the debt composition has changed again toward fixed rate. The ratio of fixed to floating interest rates changed from 1:2.41 in 2010 to 1:0.5 in the years of the memoranda, while from 2016 it increased rapidly, reaching in 2019 to 1:17.5. Similarly, but not to such an extent, was the change in the Central Government's debt composition in its way of trading, where the ratio of negotiable to non-negotiable debt from 1:5.25 in 2010 became 1:0.4 in 2013, while, since then, it has

GRAPH 2.1.1
Public Debt and Gross Domestic Product (billion €), 2000-2019



Source: Ministry of Finance – Public Debt Bulletin, 2000-2019. Annual Budgets 2000-2020. Data manipulation and calculations of the author. The GDP data for 2018 concern estimates and not outcomes, while for 2019 are forecasts.

TABLE 2.1.2 Central Government Debt (in million €)

Period	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019*
Outstanding Central Government Debt	**340,286.20**	**367,978.00**	**305,537.33**	**321,477.97**	**324,127.88**	**321,332.16**	**326,358.14**	**328,703.84**	**358,948.65**	**356,014.92**
Debt by type of interest rate										
Fixed rate	240,582.34	228,146.36	99,910.71	91,621.22	107,610.46	99,291.64	97,907.44	158,106.55	320,182.20	336,790.11
Floating rate	99,703.86	139,831.64	205,626.62	229,856.75	216,517.42	222,040.52	228,450.70	170,597.29	38,766.45	19,224.81
Debt by way of trading										
Tradable	285,840.41	274,879.57	104,799.30	91,299.74	81,031.97	74,549.06	71,472.43	65,410.06	66,764.45	68,354.86
Non-tradable	54,445.79	93,098.43	200,738.26	230,178.23	243,095.91	246,783.10	254,885.71	263,291.78	292,184.20	287,662.48
Debt by currency										
Euro	334,273.25	358,792.98	295,550.18	308,228.42	310,190.38	310,085.53	316,567.40	320,157.54	351,410.73	352,098.76
Non-Eurozone currencies	6,012.95	9,185.02	9,987.15	13,249.55	13,937.50	11,246.63	9,790.74	8,546.30	7,537.92	3,916.16
Debt guaranteed by the Central Government	**25,894.50**	**20,632.50**	**19,670.52**	**17,888.07**	**16,633.19**	**14,552.08**	**12,833.23**	**12,017.38**	**10,448.30**	**9,972.02**
Central Government Debt by residual maturity**										
Short-term (up to 1 year)	40,493.90	50,521.70	31,121.60	39,896.00	39,273.92	32,094.10	36,137.90	34,414.50	51,549.21	44,329.04
Medium-term (1to 5 years)	144,904.66	175,261.00	55,265.83	34,942.60	34,908.10	32,993.80	28,233.40	31,681.30	32,224.29	36,244.63
Long-term (more than 5 years)	154,887.64	142,195.30	219,149.90	246,639.37	249,945.86	256,244.26	261,987.20	262,608.04	275,175.15	275,441.25

Source: Public Debt Bulletin, General Accounting Office, Ministry of Finance, various issues.

Notes:
Central Government Debt differs from General Government Debt (Maastricht definition) by the amount of intra-sectoral debt holdings and other ESA '95 adjustments.

* Temporary data.
** Concerns the volume of bonds, treasury bills and short-term securities and not the total Central Government debt.

been constantly declining, reaching in 2019 a ratio of 1:0.24. Regarding the guarantees of the Greek state, these declined throughout the period under review, reaching 9.97 billion euros in 2019. The total amount of guarantees decreased by about 60% in the period under consideration.

Finally, debt distribution over the remaining physical duration has, also, changed significantly. The short-term Greek Government securities (with maturity less than one year) represent a relatively stable percentage of the total (from 9.9% to 14.4%), in the period under consideration. On the contrary, there is an extensive replacement of medium-term securities (with maturities of one to five years) with long-term securities (maturity after five years). The ratio of medium-term to short-term loans, which in 2010 was 1:0.94, i.e., loans were almost divided among the two categories, in 2016 reached 1:0.1, and began to increase slightly since then, reaching a ratio of 1:0.13 in 2019.

As a consequence, the continuing increase in the average residual maturity of the total debt of the Central Government reached 20.53 years on 31/12/2019. It is clear that the average residual maturity of the total debt of the Central Government has almost tripled since the country's accession to the Support Mechanism, which amounted to 7.65 years in the second quarter of 2010.

2.1.3. Fiscal figures perspectives

The expected global economic crisis due to the health crisis is inevitably affecting our country and requires ambitious, coordinated and urgent policy action at all levels to support people and businesses at risk. There are many predictions regarding the upcoming recession that the Greek economy will suffer, the Greek State's debt, as well as unemployment not only for the current year, but also for the following years. In this context, significant discrepancies are expected in the implementation of the 2020 Budget, due to the increased costs of dealing with the health crisis and the costs of strengthening the public health system, as well as the support of the economy and the costs of compensating employees and businesses affected by this crisis.

Macroeconomic forecasts, as depicted by the Greek government in the stability program, foresee a recession of 4.7% (basic scenario) to 7.9% (unfavorable scenario), while there are forecasts for recession of around 10% (European Commission, IMF) or even more (OECD). Respectively, the forecast for the primary deficit ranges from 1.9% of GDP in the first and 2.8% of GDP in the second scenario of the Ministry of Finance (the IMF forecasts 5.1% of GDP). These forecasts foretell that the country will face serious problems, as there will be a great need to finance the necessary interventions so as to stimulate liquidity in the real economy, reduce unemployment and strengthen social cohesion through innovative financial instruments as well as the use of European funds.

The forecasts for the gross debt of the General Government for 2020 are correspondingly ominous. The Greek government's stability plan foresees an increase of 6.1 billion euros (up to 337 billion), but with the parallel decline in GDP, it will increase by 12.2 points as a percentage of GDP, reaching 188.8%. The European Commission expects an increase of 20 percentage points, reaching 196.4% of GDP, while the IMF believes that the debt will exceed 200% of GDP.

The government, according to the Stability Program, has approved 17.35 billion euro of successive expansion packages to deal with the COVID-19 pandemic, amounting to 10% of GDP, while their total cash base cost is 11.5 billion euros (6.5% of GDP) for the year and 12.35 billion euros for the months up to June, given that tax and insurance refunds will be issued from August onwards. The corresponding fiscal costs of the interventions amount to 10.35 billion euros (5.8% of GDP) by June and 9.5 billion euros (5.4% of GDP) at the annual level. The cash basis cost, which is directly related to cash reserves, is higher, reaching 12.35 billion euros by June. These amounts do not include the enhancement through ESPA and other European programs. Part of the expenditures will be covered by the reserve created in previous years and the rest by the State Budget. An additional budget has already been passed to increase credits by 5 billion euros. It is also clear that other measures to support the economy will follow, as the way out of the crisis will be long.

The decisions that will be taken at the level of the European Union will also play an important role; if there is no significant assistance in financing the interventions required by the EU, the Greek economy will probably face the most difficult scenarios. The European Central Bank's (ECB) stance on maintaining liquidity in the financial sector and ensuring supportive financing conditions for all sectors of the economy due to the pandemic is encouraging, as a new EU-wide program of buying assets of 870 billion euros up to the end of the year has been announced, amounting to 7.3% of the Eurozone's GDP. In addition, it provides a liquidity of up to 3 trillion euros, through the ECB's refinancing operations, among others, with the lowest interest rate set to date (-0.75%). The ECB further reduced interest rates on long-term loans (TLRTIII), which will be provided to banks for 12 months from June 2020, and, at

the same time, granted new loans (PELTRO). Finally, the ECB's Board announced that the ECB is fully prepared to increase the size of its pandemic purchasing bond (PEPP) program and to adjust its composition to the extent and time needed. Greece is participating in a quantitative easing program for the first time since the country joined the economic consolidation programs –a measure that will bring significant liquidity to Greek banks to assist Greek companies in this crisis. The ECB's measures are tools that can be used by the Greek government to deal with the crisis.

To the contrary, first reaction of the European Union, and especially of the Eurozone was not up to the circumstances. In a Europe that is experiencing such an enormous health crisis, with tens of thousands dead, the northern countries have refused to issue a European bond (coronavirus bond) to finance all needs stemming from the pandemic and the extreme economic recession that will follow the lockdown in all countries, and instead demanded that the southern countries finance their badly hurt economies from the European Stability Mechanism and its processes, which will lead them to new consolidation programs.

In this context, the European Commission has announced its proposal for the "Next Generation EU" program, amounting to 750 billion euros. The program will be financed by EU borrowing, and is added to the package of 540 billion euros that has already been announced (the combination between the SURE program for subsidizing employment, the ESM emergency credit line for the pandemic and the guarantees for borrowing from the European Investment Bank) and the 1.1 trillion euros of the Multiannual Fiscal Framework 2020-2027. This proposal, however, will have to be approved by the Member States and the European Council.

The main obstacle to the adoption of this proposal comes from the northern countries (Finland, the Netherlands, Austria, Denmark, Sweden, Hungary, the Czech Republic and Belgium), who raise three major issues: (a) the loan-subsidy ratio, (b) the total amount of the 750-billion-euro package and (c) the system of managing and disbursing of resources. The latter is what will determine both the terms and conditions of the disbursement of funds. The Commission's proposal is already quite specific, so that concerns are expressed as to whether it will be easy to disburse the funds, which will not be forward-looking, but will be available over a period of 7 years.

The development of the economic crisis and the final level of the recession in the country will be affected, initially, by the duration of the health crisis, which is primarily a factor that cannot be controlled by the Greek state, as it depends on global medical research for finding vaccines and drugs to treat COVID-19 and the socially responsible behavior of citizens by adhering to the measures of social distancing, which will have a catalytic effect on the final fiscal result.

As mentioned above, a very important factor that will help restrict the recession is the stance of European Partners in tackling this health/economic/social crisis. If the EU responds to this global problem and the economic downturn is addressed with EU subsidies, then the Greek economy will overcome the economic crisis, most likely in 2021 at a much lower budgetary cost to the country. Otherwise, if the Northern countries' opinion prevails or if they veto, Greece will be called upon to finance these expenditures by borrowing, either from the ESM with fiscal constraints or from the market, resulting in a deviation from its Budget forecasts for both the budget figures as well as the public debt. Furthermore, the nature and size of the fiscal and monetary support measures that the government will take to address the economic problems that arise as the crisis deepens, as well as the behavior of consumers and investors after the crisis, will prove to be the determinants that will allow the country's economy to recover at a faster pace. Particular attention should be paid to the return of the economy and especially tourism to operation, even with preventive measures in favor of public health, as it is a key parameter for limiting recession and collecting revenue. Finally, the reform program should continue, and in this context, reforms should not be stopped, but instead continued and strengthened, such as those related to the digitization of services, which have been adopted by both the public and private sectors and were established during the COVID-19 crisis.

3. Human resources and social policies

KEPE, *Greek Economic Outlook,* issue 42, 2020, pp. 48-51

3.1. In-work poverty and income inequality in the EU15

Vlassis Missos

3.1.1. Introduction

According to mainstream economic theory, the rate of unemployment is closely related to poverty.[1] On these grounds, it is suggested that policies enhancing the purchasing power of the minimum wage may be proved detrimental in advancing social welfare, due to their negative impact on the general level of employment. Hence, as the idea that the low-income brackets are comprised of households whose members are mostly unemployed becomes pervasive, wage devaluation policies are bolstered. Conversely, taken for granted that in high-income countries the poverty issue is not related to employment, it follows that policies seeking to augment the purchasing power of the minimum wages may not succeed to mitigate poverty.

From an alternative point of view, a growing number of researchers concentrating on the issue of in-work poverty have underlined the importance of that aspect, bringing in new policy insights to the current debate. In addition, after the 2008/09 crisis, new literature focusing on the empirical justification between employment and poverty made its appearance.[2] In most cases, the dominant view that employment is a sufficient condition for securing oneself against the risk of poverty is called into question. The gradual increase of the level of in-work poverty has challenged the validity of conventional wisdom concerning how the economy operates. Hence, these opposing views have also led to different mixtures of economic policies, measures and recommendations.

In the present essay, the term "income" stands for the overall value of the total household income, irrespective of the source from which it comes. Household income is comprised of pensions, other social transfers (all types of cash-benefits), wages, dividends, rents, etc. As a consequence, individual income has several qualitative parts and amounts to a varying composition of all different types of earnings. In addition, the essay focuses on salaried workers (excluding those working in the agricultural sector), considering the changing level of income inequality between 2009 and 2016 in countries of the EU15.[3] Moreover, it examines the poverty rates of salaried workers, the relation between the average incomes within each country and the relative income position between all countries with the EU average. Furthermore, it considers the working poor to be those individuals whose income falls below the official poverty line.[4]

All data depicted in the following tables have been extracted from the European Surveys of Income and Living Conditions (EUSILC). Results are based on original statistical processing and are used for presenting the basic measures that allow for an introductory examination of income inequality *between* as well as *within* the countries of the EU15. EUSILCs are

1. Neumark D. (2018), "Employment effects of minimum wages: when minimum wages are introduced or raised, are there fewer jobs?" IZA World of Labor.

2. Hanzl-Weiβ D. & Vidovic H. (2010), *Working poor in Europe,* European Foundation for the Improvement of Living and Working Conditions; Dafermos Y. & Papatheodorou C. (2012), "Working poor, labour market and social protection in EU: a comparative perspective", *International Journal of Management Concepts and Philosophy*, Vol. 6 (1/2), 71-88; Eurofound (2017), *In-work poverty in the EU*, European Foundation for the Improvement of Living and Working Conditions.

3. The group of the EU15 corresponds to a statistical sub-category containing all countries that were members of the European Union before the 1st of May 2004. More specifically, the category of the EU15 refers to the following: Austria (AU), Belgium (BE), France (FR), Germany (DE), Denmark (DK), Greece (EL), Ireland (IE), Spain (ES), Italy (IT), the Netherlands (NL), Portugal (PT), Sweden (SE), Finland (FL), the United Kingdom (UK) and Luxembourg (LU). The UK is included since, in 2016, it was still a member of the EU.

4. The poverty line is defined as 60% of the median disposable income of the total population. <https://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:At-risk-of-poverty_rate>.

sample surveys and the method following statistical processes has been presented in a previous issue.[5] It should, however, be noted here that in what follows below, the term "income" refers exclusively to *disposable* income, meaning what is left for consumption or saving after all direct taxes and social contributions have been deducted. Lastly, all table-depicting results express income in terms of Purchase Power Standard (PPS), so that the overall level of income inequality in the EU15 is estimated.

3.1.2. Basic income inequality and poverty measures in the EU15

Table 3.1.1 shows the results of two frequently used inequality indices, regarding salaried workers (employees working in the agricultural sector are excluded), for all countries of the EU15. *Gini* has been a widely known index used in numerous policy papers and reports. It is one of the most easily captured indices, calculating the overall distance of the observed distribution of income to complete equality –in which case *Gini* equals zero. The higher the value of the *Gini* index the more the current income distribution diverges from the implied state of absolute equality. Moreover, Table 3.1.1 depicts the relation between each country's average income of salaried workers to the total EU15 average, which is indicated as "100". More specifically, as the value of each country's index is calculated to be nearer to "100", its average income is closer to that of the EU15. Added to that, all measures have been calculated for the period 2009-2016, to capture the manner in which poverty and inequality changed over the years.

TABLE 3.1.1 *Gini* inequality index and average income as a percentage of the EU15 mean (100), 2009 and 2016

	Gini			**Average income as a percentage of the EU15**		
	2009	**2016**	**Change**	**2009**	**2016**	**Change**
Denmark	20.4	22.7	2.3	94.9	104.7	9.9
Sweden	21.6	22.1	0.6	88.2	89.7	1.5
Finland	20.6	21.0	0.4	123.9	128.5	4.6
Netherlands	21.6	22.6	1.0	102.1	112.7	10.6
Austria	25.8	24.3	-1.6	109.5	115.9	6.4
Belgium	20.7	21.5	0.8	106.2	110.4	4.2
Germany	25.2	25.4	0.2	94.9	96.1	1.2
France	25.2	24.1	-1.1	101.7	95.4	-6.4
Luxembourg	26.1	29.4	3.2	191.8	206.0	14.2
United Kingdom	28.0	28.6	0.5	86.9	102.4	15.5
Ireland	24.2	25.0	0.8	147.3	141.2	-6.1
Italy	26.2	27.9	1.7	80.9	73.8	-7.1
Spain	28.5	29.7	1.2	74.7	60.0	-14.8
Greece	27.6	28.3	0.7	57.9	29.0	-28.9
Portugal	29.7	29.0	-0.8	39.0	34.2	-4.8
EU15	**27.4**	**29.2**	**1.7**	**100**	**100**	**-**

Source: Eurostat, EUSILC, author's calculations.

5. Missos V. (2019), "Income inequality indices in the European Union (EU15)", *Greek Economic Outlook*, 39, 38-41.

As far as the *Gini* index of the EU15 is concerned, for 2009 it is estimated at 27.4 and for 2016 at 29.2. Hence, as a general trend, income inequality among salaried workers in the EU15 increased. Greece, together with Portugal and Spain, are among the countries with the highest *Gini* values –excluding the case of Luxembourg, whose incomes and dispersion among them is consistently found to be extremely high. Moreover, between 2009 and 2016, income inequality moved upwards for the majority of EU15 countries, except for Austria, France and Portugal. Of importance also is the relation designated between each country's average income over that of the EU15, reflecting each country's general trend of its relative position. For example, the broadening of inequality in Denmark differs to that of Greece, in that average income in Denmark increased in comparison to the EU15 (from 94.6 it went to 104.7), whereas in the case of Greece, the trend significantly decreased –it fell from 57.9 to 29. One of the main peculiarities of all countries of southern Europe is that their average income deviates substantially to that of the EU15. Inequalities between the north and south have become very acute.

In general, changes in the relative position of incomes vary, showing the extent to which they deviate from the total average. An intense deviating trend, which is documented for Greece, signifies an additional change of the order of magnitude. Countries like Portugal, Greece and Spain were characterized by a considerable reformation of the general framework in doing business, as the distance among the incomes of workers was increasing. Smaller within-country income differences are documented for Italy, France and Ireland, which were also hit by the 2008/09 economic recession.

Table 3.1.2 shows the rate of in-work poverty for each country of the EU15, for the years 2009 and 2016. The in-work poverty rate is defined as the ratio of salaried employees, whose individual income is less than that of the poverty line, over the total number of respective

TABLE 3.1.2 Salaried employees at risk of poverty and the ratio of average incomes, 2009 and 2016, EU15

	At risk of poverty			Average income of the working poor, over the average of all workers		
	2009	**2016**	**Change**	**2009**	**2016**	**Change**
Denmark	4.7	4.9	0.2	30.1%	31.4%	1.3
Sweden	7.7	6.1	-1.6	31.9%	33.3%	1.4
Finland	3.2	2.8	-0.4	38.3%	38.1%	-0.2
Netherlands	4.3	5.8	1.5	38.0%	36.3%	-1.7
Austria	7.3	7.1	-0.2	30.5%	33.1%	2.5
Belgium	4.0	5.6	1.5	35.0%	36.6%	1.6
Germany	7.0	8.0	1.0	34.6%	35.0%	0.4
France	6.6	6.5	0.0	37.0%	39.0%	2.1
Luxembourg	10.2	14.2	4.0	37.5%	35.0%	-2.5
United Kingdom	6.1	7.0	1.0	30.9%	31.6%	0.7
Ireland	2.4	3.8	1.4	33.5%	34.3%	0.8
Italy	8.6	10.5	2.0	31.3%	29.4%	-1.9
Spain	8.9	12.4	3.4	28.0%	27.4%	-0.7
Greece	8.7	9.7	0.9	31.5%	29.2%	-2.4
Portugal	7.3	8.8	1.5	30.0%	30.2%	0.2
EU15	**6.5**	**7.6**	**1.1**	**-**	**-**	**-**

Source: Eurostat, EUSILC, author's calculations.

employees. The general increasing trend of the EU15 risk of poverty indicates that workers' incomes grew at a slower pace than that of the other population groups (for example, pensioners, self-employed, etc.). In Sweden, Finland and Austria, poverty rates decreased, whereas in France and Denmark, no change was documented. Besides Luxembourg, the most significant increase of in-work poverty was observed in countries of southern Europe –especially in Spain, Italy and Greece. In the latter, the rate increased by 0.9 percentage points.

Another crucial aspect of the poverty rate is given by calculating the ratio between the average income of the poor over the average income of the total population of employees. This index shows the distance between the two averages, evaluating the relative income position of the former group. Between 2009 and 2016, poor workers' incomes in Greece severely devalued, falling by 2.4 percentage points more than the total average, indicating that poor Greek salaried workers became relatively poorer. Moreover, the average income of the working poor in Greece, Italy and Spain was estimated to be less than 30% of the overall national average – a clear indication that, in these countries, the living conditions of the poor relatively deteriorated during the years of the European crisis.

3.1.3. Conclusions

The European population living in poverty is not exclusively comprised of unemployed workers, but also of salaried employees. According to the dominant economic thought, the assumption of *a priori* matching between poverty and unemployment is not plausible. Hence, policy measures should not directly infer from this hypothesis. Between 2009 and 2016, income inequality among EU15 employees increased. The distance between the average income of the workers of southern Europe and that of central Europe broadened and the population at risk of poverty grew. Lastly, in each country of the EU15, the relative income position of those workers living in poverty varied. In Greece, poor workers' incomes were suppressed not only in relative, but also in absolute terms.

4. Reforms-Economic development

KEPE, *Greek Economic Outlook,* issue 42, 2020, pp. 52-56

4.1. Prospects for Greece's energy transition to a low-carbon economy

Vassilis Lychnaras

4.1.1. Introduction

Today, Greece is at a critical point for its energy transition towards a lower-carbon economy. This transition is going to significantly restructure the energy market over the next decade, but it will also affect the whole economy of the country. However, the achievement of the ambitious environmental and energy targets set for 2030 is a complex process affected by multiple parameters. This article aims at summarizing and presenting the basic parameters, the risks, the prospects and the potential for the development of our country via the energy transition of its economy.

4.1.2. Recent European framework for energy and climate

As known, the latest EU policy for energy and climate was recorded in the **European Green Deal (EGD)**, published on 11 December 2019 (COM(2019) 640 final).[1] As mentioned in the document, the EGD resets the Commission's commitment to tackle climate and environmental challenges. This is considered as a new EU growth strategy that aims at transforming the Union into a fair and prosperous society, with a modern, resource-efficient and competitive economy. According to this, by 2050 the net emissions of greenhouse gases (GHG) would be zero and economic growth would be decoupled from resource use. At the same time, the EGD defines that this transition should be fair, without any exclusions, focusing on the regions, sectors and employees that will face the biggest challenges. However, this document presents only an initial roadmap of the key policies and measures that will help to achieve its targets and will be updated along with its progress. However, it is noted that from now on, all EU actions and policies should contribute to the achievement of the objectives of the EGD. Essentially, this sets energy and environment as the key parameters of the EU's development and social policies for the next 30 years.

In order to support the Green Deal, on 14 January 2020, the European Commission presented the **European Green Deal Investment Plan (EGDIP)**, also known as the **Sustainable Europe Investment Plan (SEIP)** (COM(2020) 21 final)[2] that also sets the **Just Transition Mechanism (JTM)**[3]. The transition to a sustainable Europe requires significant investment efforts in all sectors of the economy. In fact, in order to achieve the climate and energy targets, it has been estimated that EUR 260 billion per year of additional investments will be required by 2030. In this context, the SEIP is the investment pillar of the EGD and aims at enabling the transition to a climate-neutral, green economy via three dimensions:

1. Increase funding for the transition and mobilize at least EUR 1 trillion to support sustainable investments over the next decade through the EU budget and associated instruments, especially InvestEU.
2. Create a supporting framework for private investors and the public sector to facilitate sustainable investments.
3. Provide support to public administrations and project promoters in identifying, structuring and executing sustainable projects.

1. COM(2019) 640 final στις 11.12.2019, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM%3A2019%3A640%3AFIN>.

2. COM(2020) 21 final on 14.1.2020, <https://eur-lex.europa.eu/legal-content/EN/TXT/?uri=COM:2020:21:FIN>.

3. The European Green Deal Investment Plan and Just Transition Mechanism explained, <https://ec.europa.eu/commission/presscorner/detail/en/qanda_20_24>.

4.1.3. National framework for energy and climate

In order to align with the EU strategy, in December 2019, the Greek government adopted an updated **National Energy and Climate Plan (NECP)**[4] for the period 2020-2030. The NECP is the strategic plan that records the analytical roadmap for energy and climate targets to be achieved by 2030. Additionally, in the context of the country's participation in the common EU objective of a successful and sustainable transition to a climate neutral economy by the year 2050, the Greek government also published the **2050 Long-term Strategy** for Greece[5] that sets the roadmap for climate and energy issues. As regards the NECP, it is important to note that it sets more ambitious targets, both in relation to the primary NECP submitted in the beginning of 2019, as well as in relation to the targets set by the EU for 2030.

More specifically, the main objectives of the NECP are the following: a) For climate change, the plan sets targets for reducing GHG emissions by more than 42% compared to the emissions of 1990 and more than 56% compared to emissions in 2005.[6] b) For Renewable Energy Sources (RES), there is an objective for a minimum share of 35% in gross final energy consumption.[7] Additionally, in order to achieve the above target, it is projected that the RES share in electricity consumption will exceed 60%. c) For energy efficiency improvement, there is a quantitative objective for final energy consumption by 2030 to be lower than that recorded in 2017. According to this, a 38% energy efficiency improvement in final energy consumption will be achieved. In comparison, it is mentioned that the corresponding EU targets for 2030, for all Member States, are the reduction of at least 40% of GHG emissions compared to the emissions of 1990, a 32% minimum share of RES in gross final energy consumption and an improvement in energy efficiency of at least 32.5%.

One of the most important and ambitious objectives of the energy transition of Greece for the next decade has to do with the government's strategy for definitely reducing the share of lignite in power generation, i.e., the so-called lignite phase-out, by implementing a front-loaded program that intends to end the use of lignite for power generation in Greece by 2028. In this context, this NECP sets out the time schedule for shutting down the lignite-fired power plants that are currently in operation. More particularly, by the end of 2023, the 14 existing lignite plants, of which 12 are in operation, with a total capacity of approximately 3.4GW, are projected to be withdrawn from electricity production. Finally, Ptolemaida V, the latest lignite power unit of the PPC with 0.61GW capacity, is expected to start its operation in 2022 and will work until 2028 with lignite. However, afterwards, it is planned to be converted in order to use a different fuel mix, and probably natural gas.

In addition to the lignite phase-out, the NECP presents a holistic approach of the state planning for climate and energy policies and, according to this, sets relative measures for strategic policy priorities, such as speeding up the electrical interconnection of the islands and strengthening energy interconnections, developing strategic storage projects, digitizing the energy networks and coupling the final sectors, launching the new electricity market model, promoting electromobility, new technologies and research and innovation, enhancing competitiveness and new financial instruments.

4.1.4. Transition of lignite areas

As known, lignite energy production in Greece is highly concentrated in certain regions. Thus, out of the 12 power units in operation today, of approximately 3.35GW that will be withdrawn by 2023, two units with a capacity of approximately 0.51GW are installed in Megalopolis, while the remaining 10 are located in Western Macedonia, and more specifically, 7 units of 2GW are in the prefecture of Kozani and 3 power units of approximately 0.84GW are in Florina. It is known that for many decades, lignite mining and electricity production were the main economic activities of the **Municipality of Megalopolis (MM)** and the **Region of Western Macedonia (RWM)**. Therefore, it is the prefectures of Arcadia, Kozani and Florina that are expected to be most exposed to the cost of the energy transition, due to the economic and social con-

4. National energy and climate plans (NECPs), <https://ec.europa.eu/energy/topics/energy-strategy/national-energy-climate-plans_en>.

5. The 2050 long-term strategy: <https://ec.europa.eu/clima/policies/strategies/2050_en>.

6. In 2017, the GHG emissions in our country amounted to 93.64% compared to 1990 emissions, while the EU28 average was 78.34% <https://ec.europa.eu/eurostat/databrowser/view/t2020_30/default/table?lang=en>.

7. In 2018, the share of RES in gross final energy consumption in Greece was 18%, similar to the EU28 average for the same year, <https://ec.europa.eu/eurostat/databrowser/view/t2020_31/default/table?lang=en>.

sequences of the lignite phase-out, and at the same time, their neighboring regions will also be affected. The strong dependence of the above areas on this activity is recorded in the ELSTAT National Regional Accounts data.[8] In 2017, The Gross Value Added (GVA) for the sector of "Mining and quarrying, manufacturing, electricity, gas, steam, air conditioning and water supply, sewerage, waste management and remediation activities", as a percentage of the total GVA for each prefecture, was 36.8% for Arcadia, 52.1% for Kozani and 42% for Florina. This confirms the great importance of lignite mining and electricity production for the economy of these regions. Moreover, the employment data show that in 2017 in the RWM, the share of employees in this sector was over 17%, while the corresponding figure for the **Region of the Peloponnese (RP)** was more than 7%, which is particularly high if one considers that lignite activity is only concentrated in the MM.

Therefore, the economic conditions of the so-called energy region are expected to change dramatically, as some thousands of jobs from the PPC will be lost and many more indirect jobs will be at risk. Additionally, the danger for the regions is increased due to the current economic and social conditions, as recorded by the relative EL.STAT. data. More particularly, in 2017, the GDP per capita in the RWM was about 87% of the country's average GDP per capita, while in the RP it was 83%. Also, a very important fact is the high unemployment rates recorded in the RWM (about 24.5% on average in 2019, according to EL.STAT.'s Labour Force Survey). It is therefore important that the withdrawal of the lignite units by 2028 must be performed in a structural manner, setting as a priority the maintenance of jobs and the exploitation of the considerable know-how of the human resources of these regions.

4.1.5. Just Transition Mechanism (JTM)

In the process of the energy transition of EU countries towards climate neutrality, the starting point is not the same for all member states and all regions. Therefore, different degrees of effort are required for the achievement of the objectives. Additionally, some regions are expected to be more exposed to the effects of the transition. This concerns mainly regions with a large number of jobs dependent on fossil fuel production, as well as regions where carbon-intensive industries, with increased greenhouse gas emissions, are established.

In order to ensure that the green transition will be fair and equal for everyone and that all communities, workers and enterprises of the regions most affected will be protected, the Commission has proposed the establishment of a **Just Transition Mechanism (JTM)**, as part of the European Green Deal Investment Plan. The JTM aims to provide targeted support and mobilize at least EUR 100 billion of investments over 2021-2027. In particular, while the Investment Plan aims at supporting the EGD in total, the JTM specifically targets the regions mostly affected by the transition, in order to ensure that this transition will be effective for everyone. The JTM is structured based on three pillars of financing:

1. The Just Transition Fund (JTF) that will be financed from the EU budget.[9] The fund will mainly provide grants to the specific regions, in order to support, for example, workers to develop new skills and abilities, and SMEs and new economic opportunities that will create jobs in these regions. It will also support investments in clean energy transition, for example in energy efficiency.
2. A dedicated Just Transition framework under InvestEU that aims at mobilizing up to EUR 45 billion of investments. This scheme is expected to attract private investments that will benefit those regions and help their economies to find new growth sources.
3. A public sector loan facility with the cooperation of the European Investment Bank (EIB) and the support of the EU budget that will be used for concessional loans to the public sector (for example for investments in energy and transport infrastructure, district heating networks, and building renovation or insulation). This facility is expected to mobilize about EUR 25 to 30 billion of investments.

In order for Member States to be able to get support from the JTM, they should prepare relevant Territorial Just Transition Plans (TJTP) that will identify the areas most affected and in need of support. The projects should be in line with the NECP and provide a concise description of the transition process by 2030. Additionally, for each region, they must define the social, economic and environmental challenges and provide detailed information about the needs and measures for economic diversification, retraining and environmental rehabilitation.

8. ELSTAT, <https://www.statistics.gr/en/statistics/eco>.

9. The Commission proposes the JTF budget to amount to €7.5 billion on top of its long-term budget proposal.

4.1.6. Prospects and characteristics of the transition of the economy

For many decades, Greece has been strongly dependent on fossil fuels. This dependence also had relevant effects on emissions. In 2017, the country had 9.2 tonnes per capita of GHG emissions, while the EU28 average was 8.8 tonnes.[10] The energy transition of our country towards decarbonization and the adjustment of the economy to a new production and development model with a lower carbon footprint is a complex process, but it could drive new investments and the creation of jobs. The NECP is a roadmap for the development of the country, but at the same time, the achievement of its ambitious objectives can be affected by multifaceted parameters. The emphasis of the plan for strategic investments on RES units, energy interconnections, energy storage projects, etc. is indicative. According to the NECP estimations, about EUR 43 billion of new green investments will be required until 2030, and this is a very important figure for the national economy.

Apart from the obvious environmental reasons to increase penetration of RES to 35% of gross final energy consumption by 2030, the withdrawal of lignite plants is also necessary due to their increased cost of production and the significant economic losses of their operation in recent years, especially due to the increase of the CO_2 emission allowance prices. It is important to notice that the energy mix in our country has changed in recent years. The share of RES and natural gas increased, while the use of lignite decreased. For example, in 2019, the monthly average share of natural gas in electricity production exceeded 40% and the RES share exceeded 25%, while the lignite share reduced, on average, by 25%.[11] At the same time, the reformation of the Greek RES market is expected to reduce the cost of renewable energy and the adoption of the EU Target Model for the electricity market will increase the competition in its operation.

In order to achieve the objectives of the transition process, boost economic growth and, at the same time, minimize the negative consequences, there are many key parameters that need to be considered. A main element is to ensure the energy security of the electricity system, after the lignite phase-out. As known, the increase of the penetration of RES creates restrictions on the supply of energy, while the withdrawal of the use of oil for electricity production on the islands will also create energy shortages during high demand periods (e.g., tourist seasons). For this reason, investments in interconnections, energy saving, demand management, energy storage technologies, natural gas plants, etc. are important. However, an issue that should also be considered is the increase in the use of natural gas as a "bridge" fuel for the lignite phase-out of electricity generation and the increase of RES. We should not omit that the national target refers to decarbonization. Even though natural gas has lower GHG emissions compared to lignite, it remains a fossil fuel. At the same time, the increase in the use of natural gas will probably boost the energy dependence of the country. In this context, it appears appropriate to analyze the possibilities of using biomethane as a substitute gas fuel. Another very important aspect is to protect consumers from the possible increase of energy product and service prices. Increasing energy costs will have a negative impact on main economic sectors of the country, such as manufacturing, trade, tourism, etc., and thus affect the country's economic development. At the same time, household budgets will be burdened, while energy poverty will grow. In order to avoid these risks for the country's energy security and energy costs, it is of critical importance to foresee the risks as soon as possible, assess the potential impact on the sectors of the economy and properly design the energy sector.

At the same time, an overall plan is needed to deal with the economic and social consequences that will arise in the regions that, for many decades, lignite mining and electricity production have been the main economic activities. The RWM and the MM, as well as the areas geographically and economically related to them, are more likely to be exposed to the cost of the transition. For this reason, the plan for the transition of the domestic power market to the post-lignite period, should also adopt integrated programmes to support these energy regions. For the gentle transition to the post-lignite era, it is of great importance to compose an integrated, multifaceted and forward-looking general plan for just development, which will set as a priority to maintain jobs and exploit the considerable know-how of the human resources of these regions. Additionally, emphasis should be placed on utilizing regional characteristics and local potential and promoting solutions with multiplicative benefits to local communities.

10. Eurostat, <https://ec.europa.eu/eurostat/databrowser/view/t2020_rd300/default/table?lang=en>.

11. Hellenic Energy Exchange S.A. (HEnEx S.A.), DAS Monthly Reports, <http://www.enexgroup.gr/en/markets/market-analysis/das-monthly-reports/>.

The potential for the development of energy regions is important and should be exploited in the best possible way. For example, actions need to be taken for supporting employment and entrepreneurship, retraining and improving workers' skills, restoring open mines and appropriate use of the land, installing RES and energy storage units, redesigning agricultural production with emphasis on energy crops, preparing needed infrastructures, developing electrical interconnections and expanding gas networks, etc. An important issue is to secure heating services for the communities of energy regions after the withdrawal of the lignite plants. The current district heating networks rely mainly on the thermal power produced from these units. In this context, both for the existing district heating networks (in Amyntaio, Ptolemaida, Kozani and Megalopolis), and for the new scheduled plans (in Ptolemaida, Kozani, Florina and Megalopolis), there is provision for the use of natural gas as fuel, while the use of bioenergy (e.g., solid biomass, biogas, etc.) can be considered. With regard to the latter, it should be noted that the exploitation of local biomass could bring multiplicative benefits for local communities, as it could offer more direct and indirect jobs than other renewables.

Regarding the overall plan for the energy transition of the country, investments and actions in new RES installations, energy infrastructure, interconnections and networks, energy saving, as well as the electrification of the economy, energy saving in transport and promotion of electromobility, circular economy and waste management, etc., are considered key development parameters for Greece for the next decade. Emphasis should also be placed on the ambitious targets of RES and GHG emissions for 2030. Except for the most common RES technologies, the options for the installation of offshore wind farms should also be explored, as well as the support of smaller technologies, such as geothermal energy, bioenergy, small hydroelectric plants, etc. Additionally, energy storage units will also be needed to limit the indeterminacy of the long-term RES energy production, strengthen interconnections to address local saturation of networks and organize capacity markets. At the same time, it is important to strengthen the role of the consumers in the RES and the electricity market (prosumers) via Net Metering and their involvement in energy communities and energy cooperatives, in order to gain increased benefits.

As the RES target refers to their share in final energy consumption, apart from increasing their production, the reduction of energy demand will also contribute to the achievement of the objective. Therefore, improving energy efficiency and managing energy demand are key parameters that can equally contribute to the 2030 targets. At this time, the energy saving potential of the Greek market is high. A priority could be given to the energy efficiency improvement of buildings, as it is estimated that about 80% of the approximately 4 million houses in total are characterized by increased energy losses, which also increase energy poverty for many families. Additionally, it is important to pay attention to the opportunities for energy upgrades for the approximately 130 thousand buildings of the public sector, 60% of which were constructed before 1990.

In conclusion, it is important to deal with the cost of decarbonization by emphasizing green investments, exploiting of domestic potential and high added value actions for the Greek economy. In this context, it is necessary to study and analyze any possible impacts and draw appropriate policy measures for the transition of Greece to a low polluting economy, with the highest possible benefits for the national economy and society. Finally, with regard to the possible negative effects of the COVID-19 pandemic to the energy transition plan, it is believed that the green economy may be less affected than other sectors. The EGD is a long-term development plan that is less likely to be affected significantly by short-term crises. On the contrary, the actions mentioned above could be used as drivers to exit the crisis and boost economic growth, both in our country and in Europe overall.

KEPE, *Greek Economic Outlook,* issue 42, 2020, pp. 57-65

4.2. The regional specialisation and geographic concentration of economic activities in the light of the COVID-19 pandemic

Ersi Athanassiou

4.2.1. Introduction

The regional specialisation and geographic concentration of economic activity are a frequent subject of study in the field of regional economics*. Regional specialisation* refers to the sectoral distribution of economic activity at the regional level, usually compared to the rest of the country. *Geographic concentration* refers to the distribution of the regional shares of a specific sector. When a small number of sectors account for a large share of the economy of a region, then this region is considered to be highly specialised. Respectively, when a large part of the activity of a sector is located in a small number of regions, then this sector is said to be highly concentrated geographically.

The presence of a high degree of specialisation of certain regions in specific productive activities or the high concentration of important activities in a small number of regions may be conducive to productivity gains through the achievement of economies of scale. Nevertheless, such forms of specialisation and concentration, and the resulting significant heterogeneity in the sectoral structure of economic activity across the regions of a country, may lead to asymmetric regional effects in the case of important negative shocks to the economy. Regions which specialise in activities that prove more vulnerable to a particular major shock at the national or international level, may suffer a stronger or more prolonged impact on production and employment as compared to regions where the main productive activities are more resilient to the effects of this shock.

The potential consequences of regional specialisation and geographical concentration for the resilience of an economy in difficult times assume particular importance in the current conjuncture, which is dominated by the unprecedented conditions and effects of the COVID-19 pandemic. The pandemic has inflicted a heavy blow to the European and international economies, affecting almost the entire spectrum of economic activity. However, some sectors of production, such as tourism, food and beverage service activities, transportation, retail trade and leisure services, are affected more directly and severely than others. Thus, countries and individual regions for which these sectors represent a relatively high share of their economic activity find themselves to be more vulnerable to the effects of the pandemic.

In this context, the present article examines the regional specialisation and geographic concentration of economic activities in Greece, in the light of the different weight that the economic impact of the pandemic may have across the country's regions, depending on differences in their activity mix.

4.2.2. Data and indices

Depending on data availability at the regional and sectoral level, specialisation and concentration are usually examined on the basis of key economic figures by sector of production (value added, employment, investment, etc.) or indicators reflecting the activity of the business sector (number of units, number of employees, etc.). In this article, the analysis is based on two sources of data for Greece: the Regional Accounts, which provide published annual data on key economic figures per region and county at the 10 main industry level (A10), and the Structural Business Statistics (SBS) database, which provides information per region on the number of local units, employees and wages and salaries in the business sector, which comprises businesses in industry, construction and services.[1] Although SBS statistics cover a subset of economic activity, they are useful for exploring specialisation and concentration as they are available at more detailed sectoral levels, i.e., at the two-digit or three-digit classification level, depending on the sector.

It is noted that due to the complexity of their calculation, economic data at the regional level are published with a time lag, and therefore the most recently

1. According to the relevant definition by Eurostat, Structural Business Statistics do not cover sectors such as agriculture, forestry, fishing, the financial sector, the public sector, education, health and other personal services.

published data of the Regional Accounts (ELSTAT, January 2020) and SBS statistics (ELSTAT, September 2019) refer to the year 2017. Given that the sectoral and regional structure of economic activity does not exhibit large changes from year to year, at least under relatively normal conditions, the data of year 2017 allow for a satisfactory mapping of regional specialisation and geographic concentration of activities in Greece before the outbreak of the COVID-19 pandemic.

The statistical tools used in the literature to capture specialisation and concentration include appropriate indicators that summarise the complex information provided by the data sources available. In the present analysis, we calculate the Herfindahl-Hirschman index, which is the most commonly used indicator of specialisation and concentration. The index is defined for specialisation (S) and concentration (C), respectively, as:

$$H_i^S = \sum_{j=1}^{m} \left(g_{ij}^S\right)^2 \text{ and } H_j^C = \sum_{i=1}^{n} \left(g_{ij}^C\right)^2$$

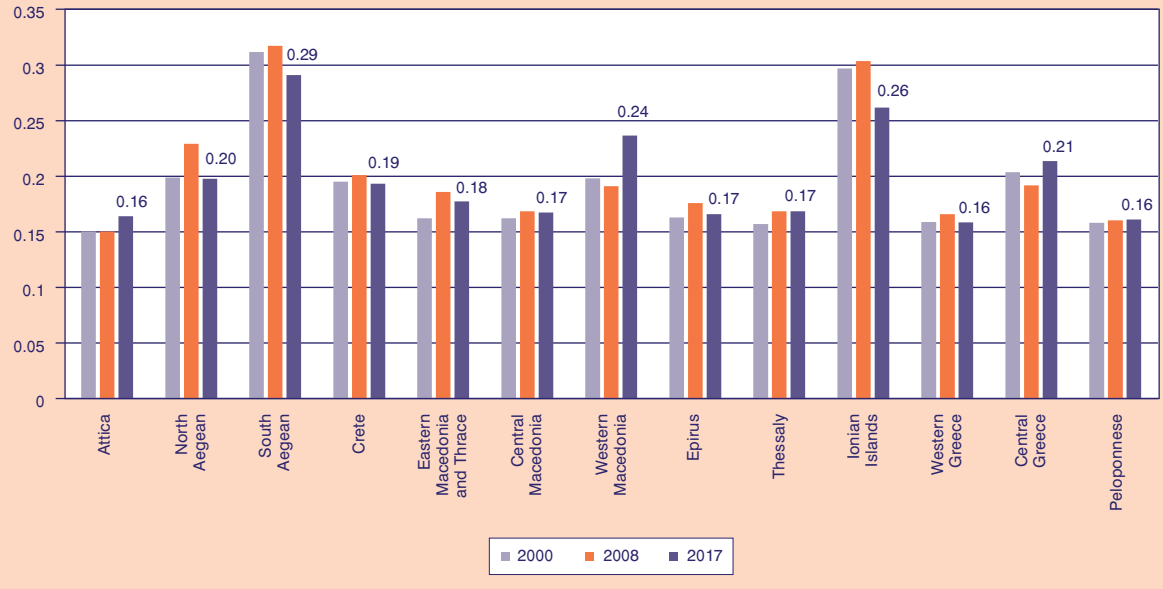
where i stands for the region, j stands for the sector, g_{ij}^S is the share of sector j in total gross value added or employment etc. in region i and g_{ij}^C is the share of region i in the total national gross value added or employment etc. of sector j. The Herfindahl index increases with the degree of specialisation/concentration, reaching an upper limit of one (1) when a region specialises in only one sector/when a sector is concentrated in only one region.

4.2.3. Regional specialisation

Greece is divided into thirteen (13) administrative regions, out of which nine (9) are on the country's mainland and four (4) consist of islands and island groups. The mainland regions of Greece are *Attica* (the region encompassing the metropolitan area of Athens, the country's capital and largest city), *Eastern Macedonia and Thrace, Central Macedonia* (the capital of which is the country's second largest city, Thessaloniki), *Western Macedonia*, *Epirus*, *Thessaly*, *Western Greece*, *Central Greece* and the *Peloponnese*. Greece's island regions are *Crete* and the island complexes of the *North Aegean,* the *South Aegean* and the *Ionian Islands*.

Figure 4.2.1 reflects the specialisation of Greek regions according to the Herfindahl index, as calculated on the basis of Regional Account figures for gross value added by main industry. The index values are displayed in

FIGURE 4.2.1
Herfindahl index for regional specialisation based on gross value added data (years 2000, 2008, 2017)



Source: Regional Accounts (ELSTAT), own calculations.

Note: Index value labels are shown for the most recent year of reference.

the figure for the most recent year of reference, while for the purpose of comparison with the past, they are also presented for years 2000 and 2008. As indicated, the regions of the South Aegean, the Ionian Islands and Western Macedonia clearly stand out as exhibiting a relatively high degree of specialisation, while relatively strong specialisation is also recorded in the regions of Central Greece and the North Aegean. Regarding the evolution of the degree of regional specialisation over time, index values on the basis of gross value added data do not seem to indicate significant changes during the period examined.

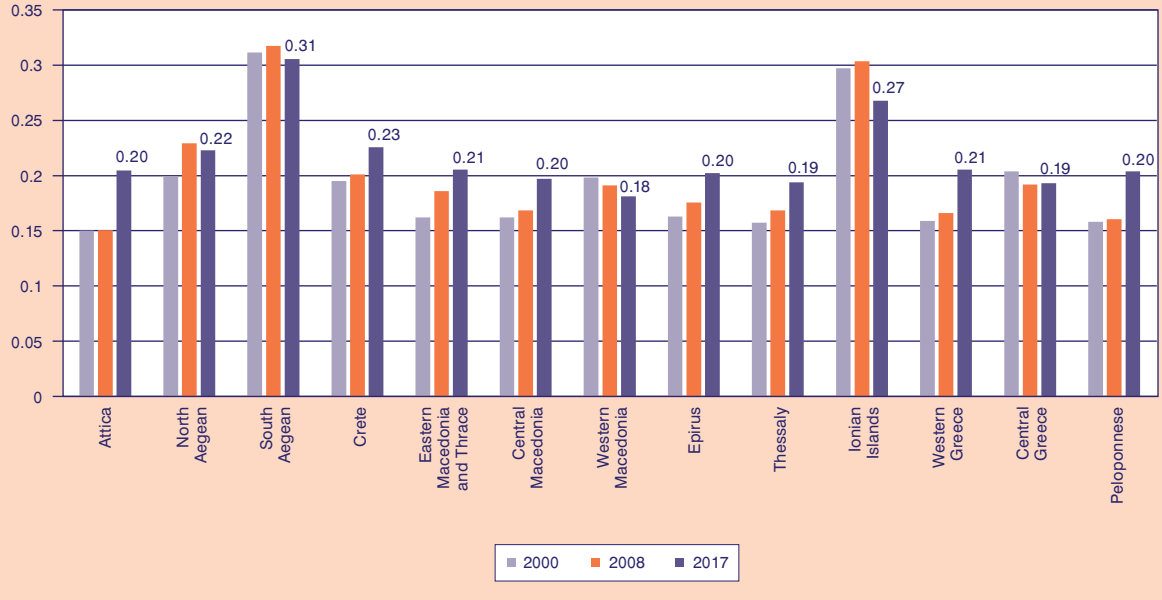
Figure 4.2.2 presents the specialisation of Greek regions according to the Herfindahl index, as calculated on the basis of Regional Account figures for employment. Comparing Figure 4.2.2 with Figure 4.2.1, it seems that index values on the basis of employment data indicate a higher degree of specialisation in most regions compared to index values on the basis of gross value added data. In addition, index values seem to be on the rise in most regions over time, suggesting that more and more employees are turning to sectors of regional specialisation. With regard to the regions exhibiting a higher degree of specialisation, the South Aegean and the Ionian Islands come in the first positions, followed by Crete and the North Aegean.

In the case of the South Aegean and the Ionian Islands, the comparatively high degree of specialisation reflects the high share of the sector of *wholesale and retail trade*, *transport, accommodation and food service activities*, both in total gross value added of these regions (49.5% and 45.4%, respectively) and in their total employment (50.6% and 46.2%, respectively). The same sector accounts for a high share of employment in Crete (39.2%) and a significant share of gross value added in the North Aegean (23.7%). In the case of Western Macedonia, there is a high degree of specialisation in *industry* (a share of 41.3% in gross value added and 17.1% in employment), while *industry* is also the sector of specialisation in the region of Central Greece, as it contributes 37.0% of the region's total gross value added.

More detailed information on the individual sub-sectors of specialisation of the country's regions is provided by SBS statistics, which, as mentioned above, refer to the business sector of the economy.

Regarding the activities included in the sector of *wholesale and retail trade*, *transport, accommodation* and

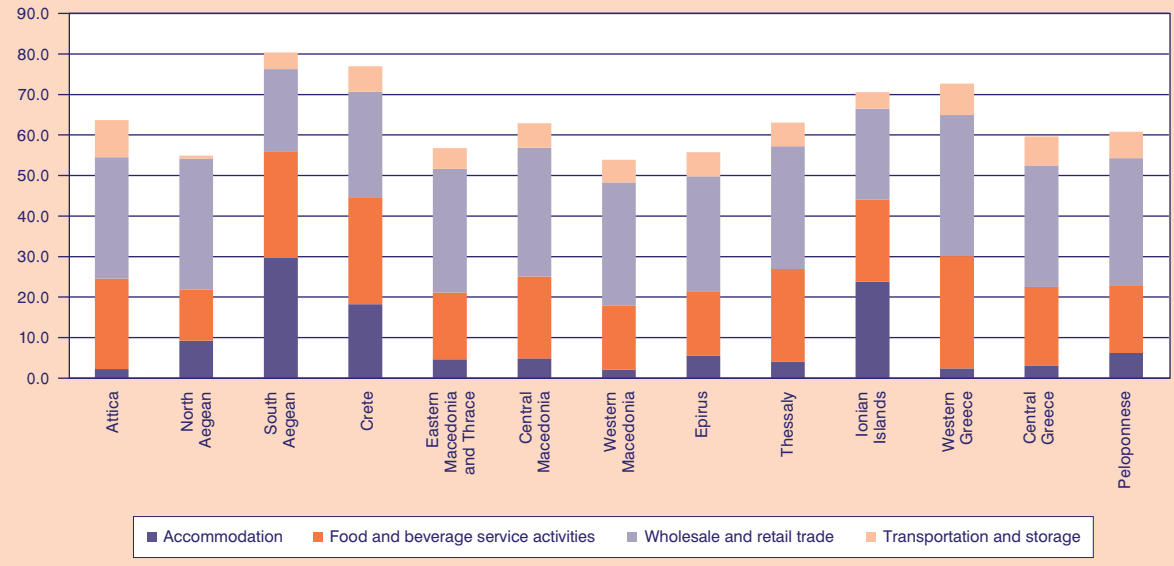
FIGURE 4.2.2
Herfindahl index for regional specialisation based on employment data (years 2000, 2008, 2017)



Source: Regional Accounts (ELSTAT), own calculations.

Note: Index value labels are shown for the most recent year of reference.

FIGURE 4.2.3
Persons employed in *wholesale and retail trade, transportation and storage, accommodation* and *food and beverage services,* as a share of those employed in the business sector of each region (%) (year 2017)



Source: Structural Business Statistics (ELSTAT), own calculations.

food service activities, Figure 4.2.3 presents the shares of the main branches of this sector in the total number of persons employed in the businesses of each region. As it seems, the sector gathers a large share of business employment in all regions of the country, with the highest participation being recorded in the cases of the South Aegean (80.4%), Crete (77.0%), Western Greece (72.7%) and the Ionian Islands (70.6%). A key role in the differences of the sector's share among regions is played by their heterogeneity in terms of the proportion of tourism in their economic activity. As shown in the figure, the share of *accommodation* in employment shows the highest degree of differentiation between regions, ranging from just 2.1% in the case of Western Macedonia to 18.2% in Crete, 23.8 % in the Ionian Islands and 29.7% in the South Aegean region. It is, of course, clear that in the last three regions, tourism is additionally responsible for a large percentage of jobs in *wholesale and retail trade*, *food and beverage services* and *transportation and storage*, but also for a significant share of employment in other sectors of their local economies.

With respect to activities included in the industrial sector, Table 4.2.1 records the shares of the main manufacturing sectors in the total number of persons employed in the business sector of each region. As it seems, the participation of manufacturing in employment varies significantly among regions, with the relevant share ranging from 4.1% in the South Aegean and 4.5% in the Ionian Islands to 17.2% in Eastern Macedonia and Thrace, 18.4% in Western Macedonia, 18.5% in Thessaly and 23.9% in Central Greece. With the exception of Western Macedonia, in the case of which the most important manufacturing sector is wearing apparel mainly fur manufacturing, in the other regions the highest share of employment among the manufacturing sectors is held by the food industry.

It is noted that a similar picture in relation to the regional specialisation in the activities mentioned above is obtained on the basis of SBS data on the number of business units and the respective wages and salaries. It is indicative that in the South Aegean, the Ionian Islands and Crete, the share of *accommodation* in the total wages and salaries of the business sector reaches 43.4%, 31.1% and 24.9%, respectively, while in Central Greece, the corresponding share of the manufacturing sector amounts to 53.6%.

Overall, based on the above information, it appears that among the regions with a relatively high degree of specialisation according to the Herfindahl index, the South Aegean and the Ionian Islands regions specialise, as expected, in the tourism sector. In addition,

TABLE 4.2.1 Employment in manufacturing sectors as a share of persons employed in the business sector of each region (%)

	Sector	AT	NA	SA	CR	EMT	CM	WM	EP	TH	II	WG	CG	PE
10	Manufacture of food products	3.2	4.4	1.9	4.3	6.0	7.3	5.1	10.0	8.7	2.0	6.0	7.1	7.2
11	Manufacture of beverages	0.2	1.0	0.3	0.3	0.8	0.5	0.4	1.2	0.4	0.1	0.7	1.2	0.6
12	Manufacture of tobacco products	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
13	Manufacture of textiles	0.3	0.2	0.0	0.3	1.0	0.7	0.0	0.1	0.4	0.1	0.2	0.3	0.1
14	Manufacture of wearing apparel	0.6	0.0	0.1	0.1	0.4	1.3	7.2	0.1	0.4	0.0	0.3	0.1	0.1
15	Manufacture of leather and related products	0.2	0.0	0.0	0.1	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0
16	Manufacture of wood and of products of wood and cork, except furniture	0.1	0.4	0.3	0.2	0.8	0.3	0.8	0.7	0.6	0.2	0.2	0.4	0.6
17	Manufacture of paper and paper products	0.3	0.1	0.0	0.1	0.3	0.6	0.2	0.0	0.2	0.0	0.0	1.1	0.0
18	Printing and reproduction of recorded media	0.5	0.2	0.1	0.2	0.2	0.4	0.2	0.2	0.3	0.1	0.3	0.4	0.2
19	Manufacture of coke and refined petroleum products	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.2
20	Manufacture of chemicals and chemical products	0.7	0.1	0.0	0.1	0.2	0.5	0.1	0.1	0.4	0.0	0.2	1.0	0.2
21	Manufacture of pharmaceutical products and preparations	0.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.0	0.0	0.0	0.0
22	Manufacture of rubber and plastic products	0.4	0.0	0.2	0.6	1.0	0.7	0.2	0.6	0.3	0.0	0.3	1.9	0.3
23	Manufacture of other non-metallic mineral products	0.6	0.6	0.4	0.6	2.2	0.8	0.9	0.7	0.8	0.5	0.6	1.1	0.8

TABLE 4.2.1 (continued)

	Sector	AT	NA	SA	CR	EMT	CM	WM	EP	TH	II	WG	CG	PE
24	Manufacture of basic metals	0.4	0.0	0.0	0.0	0.1	0.2	0.0	0.0	1.6	0.0	0.1	3.4	0.0
25	Manufacture of fabricated metal products	1.1	0.7	0.3	0.8	1.3	1.7	1.3	1.0	1.7	0.5	1.5	2.9	1.2
26	Manufacture of computer, electronic and optical products	0.2	0.0	0.0	0.0	0.0	0.1	0.0	0.0	0.0	0.0	0.1	0.0	0.5
27	Manufacture of electrical equipment	0.3	0.0	0.0	0.1	1.1	0.4	0.0	0.0	0.1	0.0	0.1	0.9	0.2
28	Manufacture of machinery and equipment n.e.c.	0.3	0.1	0.0	0.2	0.3	1.1	0.4	0.1	0.5	0.0	0.4	0.8	0.3
29	Manufacture of motor vehicles, trailers and semi-trailers	0.1	0.0	0.0	0.0	0.1	0.2	0.0	0.0	0.1	0.0	0.0	0.0	0.1
30	Manufacture of other transport equipment	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.1	0.1	0.2	0.0
31	Manufacture of furniture	0.4	0.2	0.1	0.4	0.6	0.9	0.4	0.3	0.6	0.2	0.3	0.6	0.2
32	Other manufacturing	0.5	0.2	0.2	0.3	0.3	0.5	0.2	0.3	0.3	0.1	0.2	0.2	0.3
33	Repair and installation of machinery and equipment	0.9	0.4	0.2	0.2	0.4	0.4	0.8	0.2	0.7	0.4	0.4	0.5	0.3
	MANUFACTURING TOTAL	**12.5**	**8.7**	**4.1**	**8.9**	**17.2**	**18.6**	**18.4**	**15.8**	**18.5**	**4.5**	**12.1**	**23.9**	**14.3**

Source: Structural Business Statistics (ELSTAT), own calculations.

Note: AT: Attica, NA: North Aegean, SA: South Aegean, CR: Crete, EMT: Eastern Macedonia and Thrace, CM: Central Macedonia, WM: Western Macedonia, EP: Epirus, TH: Thessaly, II: Ionian Islands, WG: Western Greece, CG: Central Greece, PE: Peloponnese.

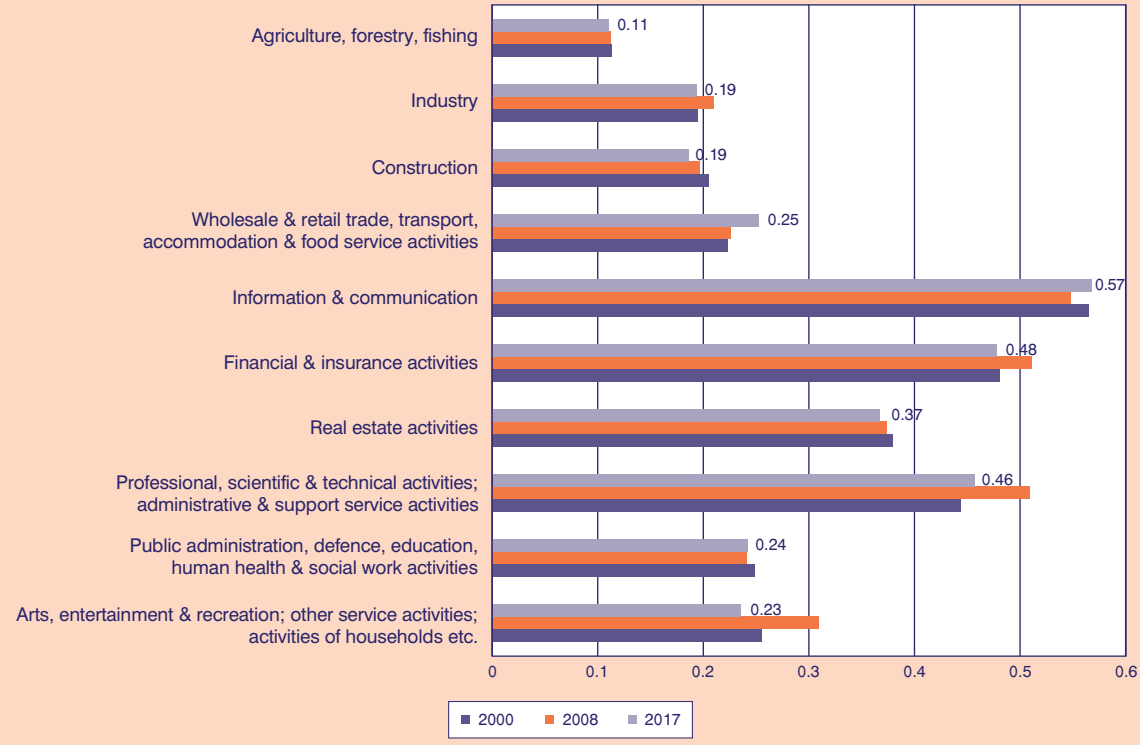
Crete, and to a lesser extent the North Aegean region, also exhibits a significant degree of specialisation in tourism. In the other regions with a relatively high level of specialisation according to the Herfindahl index, i.e., in Central Greece and Western Macedonia, this specialisation reflects the significant participation of the manufacturing sector in their economic activity.

4.2.4. Geographical concentration

Figure 4.2.4 presents the geographical concentration of the main sectors of production in Greece, according to the Herfindhal index, as calculated based on the data of the Regional Accounts for the gross value added. As can be seen from the values of the index, a low degree of geographical concentration is observed in *agriculture, forestry and fishing*, while a particularly high degree of concentration is recorded in the sectors of *information and communication*, *financial and insurance activities*, and *professional, scientific and technical activities*, *administrative and support activities* and *real estate activities*. The same picture in terms of geographical concentration is presented by the corresponding values of the Herfindahl index based on the data of the Regional Accounts for employment, while in relation to the course of geographical concentration over time, no particular changes have seemed to occur.

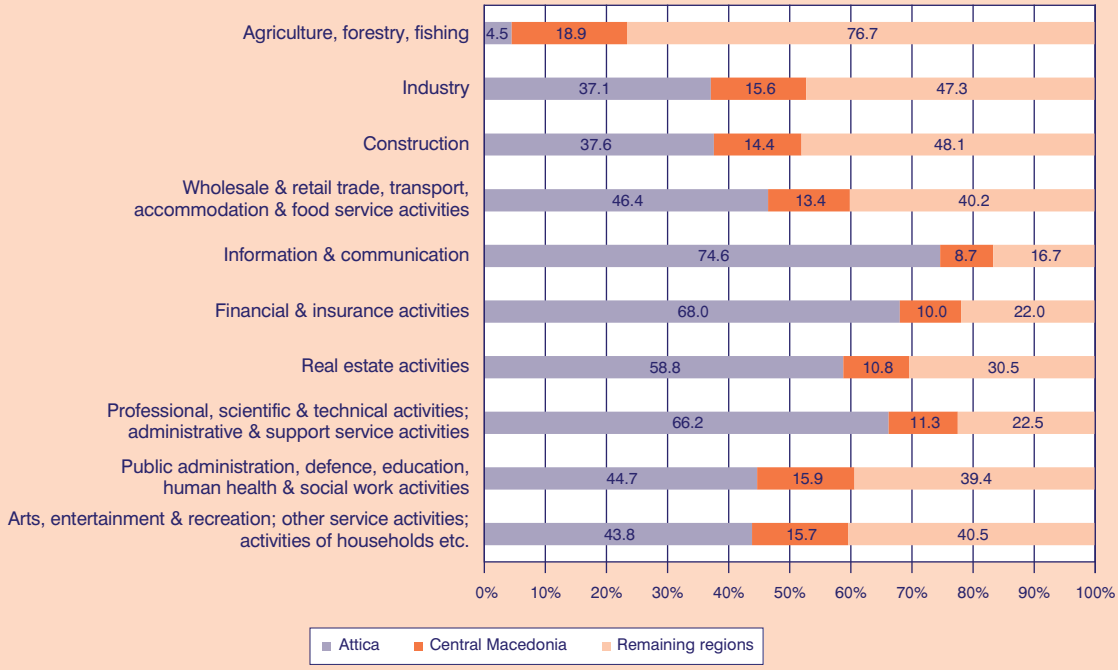
The above picture, based on the Herfindahl index, reflects a high degree of concentration of the country's productive activities in the region of Attica, and a significant degree of concentration of activities in the region of Central Macedonia. In the four sectors where the index exhibits the highest values, the share of gross value added corresponding to the region of Attica ranges from 58.8% for the *real estate activities* sector to 74.6% for the *information and communication* sector. In the remaining productive sectors, with the exception of *agriculture, forestry, fishing*, Attica also accounts for a significant proportion of production, with its share in gross value added ranging from 37.1% in the case of *industry* to 46.4 % in the case of *wholesale and retail trade*, *transport, accommodation* and *food service activities*. Regarding the respective shares of the region of Central Macedonia in the gross value added of the main sectors of the economy, they range between

FIGURE 4.2.4
Herfindahl index for geographical concentration based on gross value added data (years 2000, 2008, 2017)



Source: Regional Accounts (ELSTAT), own calculations.

FIGURE 4.2.5
Regional distribution of gross value added in the main sectors of economic activity: share of Attica, Central Macedonia and the sum of the remaining regions (%) (year 2017)



Source: Regional Accounts (ELSTAT), own calculations.

8.7% (*information and communication* sector) and 18.7% (*agriculture, forestry, fishing*).

Regional Accounts data on employment provide a similar picture of the geographical concentration of economic activities, with the concentration of employees in the Attica region appearing, however, in most sectors a little lower than the corresponding concentration in terms of gross value added. Indicatively, the shares of the Attica and Central Macedonia regions in employment amount to 39.0% and 17.8% in *industry*, respectively, 39.1% and 16.3% in the *wholesale and retail trade*, *transport, accommodation* and *food service activities*, respectively, and 54.4% and 15.4% in the *professional, scientific, technical, administrative and support service activities*, respectively.

At a more detailed sectoral level, SBS data point to major differences in geographical concentration between individual branches of economic activity, even when comparing activities belonging to the same sector.

More particularly, in *manufacturing*, the total share of the regions of Attica and Central Macedonia in employment ranges from 36.4% in the *manufacture of wood and of products of wood and cork, except furniture* to 88.3% in the *manufacture of pharmaceutical products and preparations*, while in the important sector of *food products manufacturing* this share reaches 54.2%.

In the sector of *wholesale and retail trade*, *transport, accommodation* and *food service activities*, the *accommodation* sub-sector presents a relatively low degree of geographical concentration, with the respective total share of the regions of Attica and Central Macedonia in employment amounting to 28.0%, while the sub-sectors of *food and beverage services* and *wholesale and retail trade* show a fairly high degree of concentration, with the corresponding share of the two regions amounting to 49.1% and 62.6%, respectively. At the same time, in the same sector, a high degree of concentration is observed in the sub-sector of *transportation and storage*, with the ratio of the two regions amounting to 58.6%, 76.2% and 86.6%, in the case of the *land*, *water* and *air transport* branches, respectively, and in 84.7% and 66.9% in the case of the *storage* and *postal and courier* branches, respectively.

The high share of Attica and secondarily of Central Macedonia in economic activity is observed in most other sectors of the economy, including those related to professional, scientific, and technical activities, but also to

entertainment and recreation activities. Indicatively, the total share of the regions of Attica and Central Macedonia in employment amounts to 66.3% for *legal and accounting activities*, 62.0% for *architectural and engineering activities*, 87.0% for *publishing activities* and to 91.3% for *motion picture, video and television programme production, sound recording and music publishing activities*.

It is noted that a similar picture in relation to the geographical concentration of business sector activities is reflected in the SBS data on the number of enterprises and wages and salaries.

4.2.5. Discussion

As mentioned above, the COVID-19 pandemic affects almost the entire range of productive activities, but exerts a heavier and more direct impact on certain economic sectors, such as accommodation, food and beverage service activities, transportation, retail trade and leisure services. According to the above analysis, these sectors account for a significant share of economic activity in all regions of Greece, but much more so in the regions specialising in tourism, i.e., the South Aegean, the Ionian Islands, Crete, and, to a lesser extent, the North Aegean. The high share of the accommodation sector in business activity, together with the direct connection of many other local productive activities with tourism, tend to render these regions more vulnerable to the effects of the pandemic, as compared e.g., to areas specialising in manufacturing.

Of importance, of course, for the extent of the impact of the pandemic at the regional level is not only the proportion of the most vulnerable sectors to a region's economic activity, but also the extent to which the sectors most affected concentrate a large share of their activities in individual regions. In the accommodation sector, economic activity presents a fairly low degree of geographical concentration, and therefore the effects of the pandemic on this sector spread across the country. In the majority of other sectors of business, including trade and transportation, a large share of economic activity is concentrated in the Attica region, with an additional significant share being concentrated in the region of Central Macedonia. This suggests that the capital city of Greece and, to a lesser extent, the country's second largest city and their surrounding areas will bear a significant share of the burden of the effects of the pandemic.

As much as the above conclusions are to be expected, especially in terms of the importance of tourism for the island economies of the country, the quantitative analysis of specialisation and concentration at the regional level helps to form a better assessment of the degree of heterogeneity in the economic activity of regions. This assessment can be useful both in the short term, as in the current context in which economic policy focuses on measures to address the effects of the pandemic, and in the long term, in the framework of regional development planning. In general, even if the specific characteristics and advantages of each region push local companies to engage in specific sectors of specialisation, an effort for a parallel development of other economic activities can contribute to a more balanced sectoral structure of production, initially at the regional and, ultimately, at the national level. According to the data on geographical concentration, the primary sector, tourism, but also of many other industries, are already showing significant dispersion throughout the country, a fact which demonstrates their ability to grow in parallel with other activities. The development of a range of such industries in highly specialised regions (e.g., the development of agricultural or mild manufacturing activities in areas that currently rely mainly on tourism) can contribute to the resilience of the economy in times of crisis.

KEPE, *Greek Economic Outlook,* issue 42, 2020, pp. 66-69

4.3. External trade of agro-food products

Athanasios Chymis

4.3.1. Greece's overall external trade

In 2019, total imports (including petroleum products) grew by 0.9%, reaching €55.68 billion (Table 4.3.1). Given that imports of petroleum products decreased by 6.1%, to €15.01 billion, imports of all other products (except petroleum products) grew by 3%, to 40.67 billion. Total exports increased by 1.2%, to € 33.85 billion. Excluding exports of petroleum products, which declined by 7.1% (to €10.68 billion), all other exports increased by 5.5%, to €23.17 billion.

Table 4.3.1 shows that during the last decade, exports of petroleum products have increased dramatically, thus contributing to the considerable growth of total exports to levels above €25 billion. This is good news for the petroleum refining industry, which has strongly developed. However, all other Greek industries should follow if the Greek economy is to increase its production and its GDP which, in turn, is going to further increase exports. It should be noted that other European economies with a similar structure to Greece (i.e., Portugal) have significantly increased their exports to levels above 35% of their GDP. Greek exports do not exceed 20% of the Greek economy's GDP.

Following the above developments, the external trade deficit increased by 0.5%, to €21.84 billion in 2019, while the deficit without oil products increased by 1.6%, to €17.5 billion. The reasons oil products are commonly taken out of the total trade is that a) oil has significant price variations from year-to-year and b) oil trade counts for almost 30% of total Greek trade and can obscure the picture for the other sectors of trade.

TABLE 4.3.1 Total goods exports and agro-food products exports (in billion €)

	2008	2009	2012	2015	2016	2017	2018	2019	% change 2018-2019
Imports									
Total imports	60.72	48.09	48.45	42.60	44.09	50.26	55.19	55.68	0.9
Petroleum products imports	12.12	7.19	18.24	11.36	9.74	12.21	15.99	15.01	-6.1
Total except petroleum products	48.60	40.90	30.21	31.24	34.34	38.05	39.20	40.67	3.0
Agro-food products	7.05	6.40	6.34	6.31	6.62	7.00	7.05	7.31	**3.8**
Agro-food %	*14.5*	*15.6*	*21.0*	*20.2*	*19.3*	*18.3*	*18.0*	*18.0*	
Exports									
Total exports	17.36	14.39	27.38	25.50	25.44	28.83	33.46	33.85	1.2
Petroleum products exports	1.90	1.36	10.65	7.60	6.91	8.97	11.48	10.68	-7.1
Total except petroleum products	15.46	13.03	16.73	17.90	18.53	19.86	21.97	23.17	5.5
Agro-food products	4.01	4.00	5.24	5.72	6.14	6.10	6.49	6.56	**1.0**
Agro-food %	*25.9*	*30.7*	*31.3*	*31.9*	*33.1*	*30.7*	*29.6*	*28.3*	
Deficit									
Total deficit	43.36	33.69	21.07	17.10	18.65	21.43	21.73	21.84	0.5
Excluding petroleum products	33.14	27.87	13.48	13.34	15.81	18.18	17.23	17.50	1.6
Agro-food	3.04	2.40	1.09	0.60	0.49	0.90	0.55	0.76	**36.8**

Source: Hellenic Statistical Authority (ELSTAT), own calculations.

4.3.2. Agro-food products trade

Table 4.3.1 shows that agro-food imports grew by 3.8%, reaching €7.31 billion, a new historical record exceeding for the first time the level of 2008 (€7.05 billion). Agro-food exports increased by 1.0%, to €6.56 billion, which is also a new record. Consequently, the agro-food trade deficit increased by 36.8%, to €758 million. Despite this significant increase, the agro-food deficit remains far below the historical high of €3 billion in 2008. Still, the Greek agro-food sector has significant potential for further development so that it could eliminate the deficit.

This column has repeatedly mentioned the special characteristic of agro-food products which makes them behave differently during a crisis. Specifically, agro-food products are 'necessity goods', contrary to all other industries' products (i.e., vehicles, etc.), most of which could be categorized as 'luxury goods.' This means that while all other products' imports decline significantly during an economic downturn, agro-food imports keep their level. During 2008-2012, the cumulative decrease of all other products' imports reached 37.8% (from €48.60 to €30.21 billion) whereas agro-food imports declined by 10% (from €7.05 to €6.34 billion).

The agro-food sector also proved to be resilient during the economic crisis by increasing its exports by more than 50% during 2009-2017, contributing significantly to the dramatic decrease of its deficit. Table 4.3.1 shows that between 2009-2015 agro-food exports grew by 43%. All other products' exports (except oil products) grew by 37% during the same period. After 2015, all other products' exports seem to grow faster than agro-food exports.

As Greece leaves the economic crisis behind and achieves positive GDP change, the trade deficit is expected to grow because imports of products that had a significant decline during the crisis will now pick up. This is a good reason for all Greek industries, including the agro-food industry, to increase their production and export orientation in order to keep the trade deficit from growing too fast. Table 4.3.1 shows that the total deficit has been rising since 2015. It is important that it has not been rising fast.

4.3.3. Structure of agro-food products trade

As mentioned above, last year, agro-food imports increased by 3.8%, hitting a new record for the first time since 2008. Meat and dairy products comprised almost 30% of imports (€2.18 billion out of a total €7.31 billion). The year 2019 was marked by an interesting change in the structure of agro-food imports. Fruits and vegetables are now in second place, behind meat products, regarding the value of imports. Since 2005, the year this column began collecting data on agro-food trade, meat products were followed by dairy, fruits and vegetables have been in third place (Table 4.3.2).

Fruits and vegetables as well as beverages are the two product categories that had the biggest import growth. Most other categories increased slightly in 2019, except tobacco, oils/fats and, hides/skins. It should be noted that, in many cases, the increase of the import value is a result of the increase of the per unit prices of the products of a category rather than an increase in the volume imported. Specifically, meat products, sugars, coffee, oil seeds and raw materials are product categories where, despite the decrease of the imported volume, the import value increased due to per unit price increases. A decrease in the per unit price was observed for fish, feeding stuff, beverages and oils/fats.

Regarding exports (Table 4.3.3), fruits and vegetables continued to grow, reaching €2.18 billion, or 33.2% of total exports. Dairy (primarily feta cheese and, secondarily, yogurt) also keep growing and have reached a share of 10.8%. Dairy moved up to second place, leaving fish, which slightly decreased in export value, behind. Cotton had the largest increase (55%) in export value despite the decrease of the per unit price, and oils/fats (mainly olive oil) significantly decreased due to the decrease in production after two consecutive years of high production. This was expected for olive oil exports due to the considerable year-to-year variation in the production of olive trees.

Taking into consideration the per unit prices, it should be noted that fish, dairy, cotton, oils/fats, coffee, oil seeds, raw materials and hides/skins had a decrease in the per unit prices whereas cereals, fruits and vegetables, feeding stuff, various foodstuff, tobacco, meat products and wood had an increase. The above changes in the per unit prices can partly or even wholly offset the change in export volumes when this change is in the opposite direction of the per unit price change.

4.3.4. Concluding remarks

This year 2019 was relatively good for Greek external trade in general. However, it was not so good for agro-food trade. The reason is that imports run at a

TABLE 4.3.2 Imports of agro-food products categories in million € (M €)

	2008		2010		2012		2014		2016		2018		2019	
	M €	%	M €	%	M €	%	M €	%	M €	%	M €	%	M €	%
Meat products[a]	1,211	17.2	1,160	18.4	1,199	18.9	1,162	17.9	1,150	17.4	1,242	17.6	**1,322**	**18.1**
Fruits-Vegetables	786	11.1	672	10.7	635	10.0	663	10.2	748	11.3	827	11.7	**900**	**12.3**
Dairy	808	11.5	770	12.2	772	12.2	842	13.0	749	11.3	829	11.8	**857**	**11.7**
Cereals	681	9.7	541	8.6	560	8.8	532	8.2	615	9.3	682	9.7	**707**	**9.7**
Fish	428	6.1	384	6.1	373	5.9	378	5.8	432	6.5	521	7.4	**540**	**7.4**
Feeding stuff	406	5.8	371	5.9	345	5.4	403	6.2	423	6.4	462	6.6	**487**	**6.7**
Coffee, tea, etc.	365	5.2	376	6.0	411	6.5	442	6.8	547	8.3	453	6.4	**470**	**6.4**
Various foodstuff	344	4.9	356	5.7	333	5.3	367	5.7	354	5.3	358	5.1	**374**	**5.1**
Beverages	436	6.2	370	5.9	267	4.2	248	3.8	281	4.2	309	4.4	**328**	**4.5**
Tobacco	335	4.7	310	4.9	234	3.7	236	3.6	323	4.9	347	4.9	**327**	**4.5**
Oils and fats	290	4.1	232	3.7	286	4.5	274	4.2	244	3.7	256	3.6	**226**	**3.1**
Oil seeds	224	3.2	173	2.7	219	3.5	220	3.4	193	2.9	202	2.9	**204**	**2.8**
Sugars	225	3.2	220	3.5	295	4.7	227	3.5	231	3.5	196	2.8	**203**	**2.8**
Wood	262	3.7	148	2.3	128	2.0	118	1.8	135	2.0	140	2.0	**147**	**2.0**
Raw materials	130	1.8	111	1.8	111	1.8	121	1.9	132	2.0	140	2.0	**140**	**1.9**
Hides-skins	93	1.3	76	1.2	146	2.3	116	1.8	46	0.7	62	0.9	**56**	**0.8**
Total	**7,054**[b]		**6,299**		**6,335**		**6,488**		**6,621**		**7,047**		**7,313**	

Source: Hellenic Statistical Authority (ELSTAT), own calculations.

a. Includes live animals and meat products.
b. The sum of values for each product may not equal to 'Total' because some categories with insignificant values such as cotton, natural rubber, other natural textile fibers, wool and jute are not included.

rate of 3.8% whereas exports run at just 1.0%. The result is a 36.8% expansion of the agro-food trade deficit. When the deficit decreased to around half a billion euros a few years ago, this column noted that it would be interesting to see if the deficit could become zero or even if it could switch to a surplus, as is the case in many developed countries with a strong agro-food sector.

For the moment, it seems that the threshold of a €0.5 billion agro-food trade deficit has not been easy to cross below since 2016 when it reached this level. Specifically, it oscillates between €0.5 and €1 billion. To some degree this oscillation is due to the variable level of olive oil exports which, as mentioned earlier, depends on the highly variable production of olive trees. As it has been argued repeatedly in the past, if the value chain of olive oil and, particularly, its processing and marketing becomes better organized, the export in bulk could be substituted by the export of a more standardized and processed form of much higher value added. Consequently, this change could a) mitigate the large year-to-year variation of olive oil exports and b) significantly increase the current export value of olive oil through a much higher per unit export price.

Another pillar for the further decrease of the agro-food trade deficit has been recognized to be the livestock sector. Meat and dairy products account for almost 30% of agro-food imports. While dairy exports are significant and comparable to their imports level (€705 and €857 million respectively), meat product exports (€145 million) are a tiny fraction of imports (€1,322

TABLE 4.3.3 Exports of agro-food products categories in million € (M €)

	2008		2010		2012		2014		2016		2018		2019	
	M €	%	M €	%	M €	%	M €	%	M €	%	M €	%	M €	%
Fruits-Vegetables	1,346	33.6	1,485	33.7	1,771	33.8	1,826	35.3	1,966	32.0	2,086	32.1	**2,175**	**33.2**
Dairy	275	6.9	301	6.8	372	7.1	483	9.3	593	9.7	672	10.3	**705**	**10.8**
Fish	449	11.2	541	12.3	613	11.7	556	10.7	661	10.8	689	10.6	**684**	**10.4**
Cotton	236	5.9	391	8.9	442	8.4	310	6.0	316	5.1	342	5.3	**530**	**8.1**
Tobacco	416	10.4	374	8.5	428	8.2	386	7.5	524	8.5	489	7.5	**508**	**7.7**
Cereals	315	7.9	292	6.6	330	6.3	338	6.5	421	6.9	402	6.2	**422**	**6.4**
Oils and fats	333	8.3	287	6.5	393	7.5	322	6.2	674	11.0	704	10.8	**421**	**6.4**
Various foodstuff	124	3.1	161	3.7	191	3.6	221	4.3	253	4.1	307	4.7	**338**	**5.2**
Beverages	163	4.1	166	3.8	202	3.9	198	3.8	205	3.3	223	3.4	**229**	**3.5**
Meat products[a]	76	1.9	67	1.5	78	1.5	84	1.6	95	1.5	125	1.9	**145**	**2.2**
Feeding stuff	51	1.3	41	0.9	47	0.9	58	1.1	58	0.9	80	1.2	**88**	**1.3**
Coffee, tea, etc.	30	0.7	34	0.8	54	1.0	60	1.2	86	1.4	80	1.2	**86**	**1.3**
Oil seeds	76	1.9	64	1.5	78	1.5	86	1.7	81	1.3	76	1.2	**76**	**1.2**
Sugars	54	1.3	129	2.9	119	2.3	71	1.4	91	1.5	91	1.4	**76**	**1.2**
Hides-skins	38	0.9	40	0.9	80	1.5	64	1.2	69	1.1	63	1.0	**56**	**0.9**
Raw materials	18	0.4	20	0.5	30	0.6	34	0.7	35	0.6	51	0.8	**54**	**0.8**
Wood	9	0.2	7	0.2	8	0.2	10	0.2	6	0.1	11	0.2	**13**	**0.2**
Total	**4,011**[β]		**4,406**		**5,415**		**5,176**		**6,136**		**6,493**		**6,555**	

Source: Hellenic Statistical Authority (ELSTAT), own calculations.

a. Includes live animals and meat products.
b. The sum of values for each product may not equal to 'Total' because some categories with insignificant values such as wool, natural rubber, other natural textile fibers and jute are not included.

million). Meat products trade contributes to the agro-food trade deficit by almost €1.2 billion. An increase in the domestic production of meat, which either satisfies domestic demand by substituting imports or increases exports, would be an important step towards the elimination of the deficit within a few years.

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Patterns and shifts in EU business numbers, size and performance in the manufacturing and energy sectors during 2007-2016

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Abstract

The article looks into the evolution of four business measures (number of enterprises, employment, productivity, profitability) observed annually in all 25 economic activities of the manufacturing and energy supply sectors, from 2007 to 2016, across the EU. It econometrically isolates the long-run trends and engages in subsectoral and spatial comparisons that provide potentially useful insights.

Keywords: *time trend, manufacturing & energy sectors, number of enterprises, employment, productivity & profitability*

JEL classification: *C23, J21, J24, L60, L94, M20*

1. Introduction

The article studies the evolution of four business measures across 25 secondary sector activities (see Table 1) in the 28 EU member-states (EU-28), from 2007 to 2016. That is, from the time of the international financial and economic crisis to the end of a long unemployment spell of over 8.5% in the EU-28. Thus, the article provides a broad, unified view of business life and performance that complements the individual sectoral and subsectoral analyses on such matters carried out in each member-state (e.g., O'Sullivan, 2000; Handrinos et al., 2005; Manolas, 2007; Zeli and Mariani, 2009; Anastassakou et al., 2011; Voulgaris et al., 2015; Koutroulis et al., 2018; the sources sited therein).

The four measures consist of: (a) the number of enterprises (N); (b) the number of persons employed (L); (c) the average value added per person employed, to capture labor productivity (Q/L); and (d) the ratio of gross operating surplus over turnover, as a proxy of profitability (Π), all of which jointly sketch the sectoral structure, competitiveness and performance features of businesses. These are analyzed over time via econometrics in order to: (i) Identify and isolate the long-run trends from the autonomous components and the principal medium-term deviations in each activity and member-state. (ii) Examine whether the long-run trends observed in recession-hit Greece varied from (or were similar to) the trends observed in the other member-states and –at a broader level– whether the long-run trends varied from one *common market* country to the other. (iii) Facilitate further research into the features and performance of businesses in the said sectors across the EU member-states.

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

TABLE 1 Economic activities ordered by NACE code

10	Food products
11	Beverages
12	Tobacco products
13	Textiles
14	Wearing apparel
15	Leather etc.
16	Wood, cork, straw products
17	Paper, paper products
18	Printing, reproduction of recorded media
19	Coke, refined petroleum products
20	Chemicals
21	Pharmaceutical products and preparation
22	Rubber, plastic
23	Other non-metallic mineral products
24	Basic metals
25	Fabricated metal products
26	Computers, electronic-optical products
27	Electrical equipment
28	Machinery, equipment not classified elsewhere
29	Motor vehicles, trailers
30	Other transport equipment
31	Furniture
32	Other manufacturing
33	Repair/installation of machinery & equipment
35	Electricity, gas, steam, air conditioning

The NACE (Nomenclature statistique des Activités économiques dans la Communauté Européenne) is the EU statistical classification of economic activities.

The 25 activities are defined in a uniform manner across the EU (Eurostat, 2008) and comprise the manufacturing and energy sectors. The data used hereinafter are collected annually in the context of EU Council Regulation 58/97 (Eurostat, 2015) and were drawn from the Eurostat site (https://ec.europa.eu/eurostat/data/database, under the heading "Industry, trade and services", and sub-headings "Structural business statistics", and "Main indicators") in the summer of 2018.

The analysis is carried out on the basis of the most recent data. However, since the data are regularly updated and, consequently, change, in the following pages the conclusions are formulated based on the frequency of the findings rather than on individual findings.

The article is structured as follows: Section 2 describes the empirical approach. Section 3 looks into the findings by engaging in a number of subsectoral and spatial comparisons. Section 4 provides the conclusions.

2. The empirical time-series approach

The patterns of each measure are econometrically analyzed via Stata on the basis of a close variant of the well-established functional form described by Smith

and Duncan (1944), Fox (1968), Franzini and Harvey (1983), Tzortzopoulos (1985), Black (1992), Cameron (2005), Lee et al. (2019) and others:

$$y_{tc} = \beta_{0c} + \beta_{1c} t_i + \beta_{2c} t_i^2 + \sum_{i=0}^{3} \beta_{3ic} m_{itc}, \quad (1)$$

where 'y' stands for the regressand, i.e., for each of the four measures considered in each and every activity. (As each activity is studied in terms of four measures, we run 25 × 4 = 100 regressions.) Each equation is regressed separately, i.e., not as a system, and each regression involves annual data from most (usually from all) 28 EU member-states. 't' stands for time (t=1, ..., 10) and enters the expression both as an index and as the long-run trend variable in each member-state. The trend may be linear; however, the inclusion of its square allows for the consideration of non-linear features (including a peak or a trough). 'c' stands for the number of member-states; 'm' is in binary form and stands for an exceptionally high medium-term deviation or fluctuation from the trend observed in a member-state. (The *short term* is usually taken to denote an interval *smaller than or up to a year*, so the *medium term* is viewed as a somewhat broader interval of time. In this case, it turns out to span two to five years as suggested by Begg et al. (2008), Carnot et al. (2011), and others. Its algorithmic identification/derivation process is outlined below and, hence, the overall number of 'm's depends on the regressors-to-observations ratio.) The 'i's denote the number of these medium-term deviations in a member-state (i ϵ [0, 3] in the sense that in the end, the maximum number of such fluctuations in any one state is three (this happens occasionally); however, in most states it is equal to 0). The 'β's stand for the regressors' coefficients.

To produce a short expression with a high level of fitness, the estimation procedure runs as follows: (a) A preliminary OLS regression is performed using the autonomous components and the trends. As a rule, Germany is set as the reference, and in order to deal with heteroscedastic residuals, both the preliminary regression and all subsequent regressions (iterations) are conducted with robust standard errors. (b) The β_2s associated with *p-values* in excess of 10% and/or with β_1s featuring *p-values* in excess of 10% (i.e., *t*'s for which the rate of change in many analyses might be seen as trivial) are removed so as to preserve degrees of freedom. (It turns out that the impact on the model's fitness is negligible, if any.) (c) The expression is simplified further via successive regressions and post-estimation analyses through which pairs of β_0s, β_1s, and β_2s with similar values are grouped together. In particular, after each regression: (i) the recovered autonomous effects are grouped with the reference if their *p-values* exceed a certain threshold, and (ii) all recovered coefficients –ordered by type– are tested in pairs of successive size *for equality* and grouped together if the probability of error exceeds the aforementioned threshold. This threshold is initially set at 99%, falls in each iteration, and eventually reaches 10%. If the regressors-to-observations ratio is over 8.5%, the procedure continues until the ratio is reached. (In these cases, the threshold decreases from 10% to 5% or less.) (d) An additional regression is carried out, on the basis of which residual values are estimated for each and every observation. The top 5% highest positive (HP) and highest negative (HN) residual values are identified, and all successive HP (or all successive HN) observations in any one EU member-state are taken to denote a possibly exceptional (medium term) deviation. Other successions of HP observations or successions of HN observations in the same or in another member-state are taken to denote additional such deviations. Binary variables are constructed for each such succession, and a regression, akin to expression (1), is estimated. Each and every *one* in each and every such binary variable is experimentally replaced with a *zero*, and a regression is run for each modification. If the R^2 improves, the modification is kept; otherwise, it is replaced with the original value. More or longer such binary variables, involving observations with immediately lower HP or HN residual values, are considered until the regressors-to-observations ratio reaches 10%. An example of one such final expression is provided in Table 2. In both this and the other 99 analyses, the achievement of high goodness-of-fitness results cannot be overlooked.

To illustrate via this example, Table 2 provides the findings about the number of enterprises that engaged in the manufacture of textiles. We read it as follows: At the outset, Italy and Spain featured the most enterprises (lines 9-10), while Luxembourg and Slovakia had the least (line 2). Over time, the number of enterprises:

- increased in Germany, Latvia, the Netherlands, Luxembourg, the Rep. of Ireland (line 17), France, Poland (line 18);
- first decreased then increased in Greece and Spain (lines 12 and 22), Belgium, Portugal, Romania (lines 13 and 21), Croatia, Hungary, the United Kingdom of Great Britain and Northern Ireland (United Kingdom, hereinafter) (lines 14 and 21), Bulgaria and Lithuania (lines 15 and 21), as per the twice differentiable function with respect to time;
- first increased then decreased in the Czech Republic and Slovakia (lines 18-20);
- decreased in Italy (lines 11 and 23);

TABLE 2 The evolution of the number of enterprises (N) in the manufacture of textiles across EU member-states, 2007-2016

	Regressors	coefficients	p-values
	Autonomous effects		
1	Constant (DE, GR, FR, PL reference)	3,611	0.000
2	LU , SK	-3,735	0.000
3	CY, DK, EE, IE, LV, SI	-3,324	0.000
4	AT, BG, HR, FI, LT	-2,833	0.000
5	HU, NL	-2,183	0.000
6	BE, CZ, RO	-1,651	0.000
7	SE	-1,339	0.000
8	PT, UK	660	0.000
9	ES	4,245	0.000
10	IT	16,769	0.000
	Time trend		
11	IT	-1,150	0.000
12	GR, ES	-502	0.000
13	BE, PT, RO	-173	0.000
14	HR, HU, UK	-113	0.000
15	BG, LT	-85	0.000
16	AT, CY, DK, EE, FI, SI, SE	-8	0.037
17	DE, IE, LU, LV, NL	27	0.000
18	CZ, FR, PL	274	0.000
19	SK	368	0.000
	Time trend squared (to capture the rate of change)		
20	CZ, SK	-23	0.000
21	BE, BG, HR, FI, HU, IE, LT, LU, PT, RO, UK	9	0.000
22	GR, ES	31	0.000
23	IT	49	0.000
	Notable biennial or longer fluctuations		
24	SK 2008-2009	-481	0.000
25	PL 2012-2016	-992	0.000
26	NL 2013-2016	442	0.000
	Observations	266	
	Model fitness (R^2)	99.78%	

Source: Eurostat, own calculations.

Notes: No data on MT. Regressions are estimated with robust standard errors so as to address issues of heterogeneity and lack of normality. Four observations regarding a first or last year are missing. When their (missing) residuals are replaced by the residual of the nearest observation, a unit-root test for the residuals can be performed. It turns out that the residuals are stationary at the 1% level.

featured large positive fluctuations in the Netherlands during 2013-16 (line 26) and large negative fluctuations in Slovakia during 2008-09, and in Poland during 2012-16 (lines 24-25).

In the interest of brevity, we skip the presentation and analysis of each and every individual finding regarding the autonomous (initial) components and the medium-term fluctuations *apropos* the number of firms, employment, productivity, and profitability[1], and turn to the collective treatment of the respective long-run trend components across the manufacturing and energy sectors in the EU member-states.

3. The long-run patterns

According to the long-run trends recovered via regressions carried out in the way discussed above, it seems that there existed considerable heterogeneity in the evolution of:

N: In ten activities (namely, #17, 18, 20-21, 23, 25-29) the dominant pattern across the EU member-states was a decrease.[2] In five activities (#12, 14, 24, 33, 35) the dominant pattern was an increase. In three activities (#11, 13, 31) the dominant pattern was a trough followed by recovery: a V-shaped pattern.[3] (The extrema often occurred in different years.) In four activities (#10, 15, 30, 32) the dominant pattern may have been an increase.[4] (These results are associated with *p-values* in excess of 1%.) Likewise, in activity #22 the dominant pattern (involving 15 counties) may have been a decrease. In activity #16 about 30% of the countries (eight countries) exhibited an increase, while an equal number exhibited a V-shaped pattern; in activity #19 about 40% of the countries (eleven countries) exhibited an increase, while an equal number exhibited a decrease. Switching focus, in eight countries (Belgium, Bulgaria, Croatia, Cyprus, Finland, Italy, Spain, Sweden) the dominant pattern across activities was a decrease.[5] In seven countries (Czech Republic, Germany, Lithuania, the Netherlands, the Rep. of Ireland, Slovakia, Slovenia) the dominant pattern was an increase.[6] In six countries (France, Greece, Poland, Portugal, Romania, the United Kingdom) the dominant pattern was V-shaped.[7] In four countries (Austria, Denmark, Luxembourg, Malta) the dominant pattern may have been a decrease.[8] Hungary exhibited a decreasing pattern in 1/3 of all activities (ten activities) and a V-shaped pattern in an equal number of activities; Estonia exhibited an increasing pattern in 1/4 of all activities (i.e., seven activities) and may have exhibited an increase in an equal number of activities. (See Table 3.)

L: In twelve activities (#10, 13-14, 16-17, 20, 22-23, 25, 29, 30, 35) the dominant pattern across the EU member-states was V-shaped;[9] in the case of activities #13-14 (production of textiles, manufacture of clothing) there was probably no solid upward employment trend anywhere in the EU. In seven activities (#11, 15, 18, 26-28, 31) the dominant pattern was a decrease.[10] In three activities (#24, 32-33) the dominant pattern

1. The autonomous components offer insights on how a country or subsector of the economy performed at the outset. For instance, did it feature a large or small number of enterprises or people employed, a high or low level of productivity and profitability? The exceptional medium-term (say, two to three years) elements provide additional insights regarding the special circumstances or developments behind the favorable or unfavorable deviation from the long-run trend in a particular country or sector.

2. In the case of: activity #17 in seventeen countries; activities #23 and 26 in twelve countries (each); activities #18, 20, 21, 25 and 27 in ten countries (each); activity #28 in nine countries; activity #29 in eight countries.

3. In the case of: activity #11 in eleven countries; activity #13 in ten countries; activity #31 in eight countries.

4. In the case of: activity #10 in twenty-three countries; activity #32 in eighteen countries; activity #30 in ten countries; activity #15 in seven countries.

5. In the case of: Italy 16 activities; Croatia 14 activities; Spain 12 activities; Finland 11 activities; Belgium 10 activities; Sweden 9 activities; Cyprus 7 activities; Bulgaria 6 activities.

6. In the case of: the Netherlands 16 activities; Lithuania 14 activities; Germany and Slovakia 12 activities (each); the Rep. of Ireland 11 activities; Slovenia 9 activities; the Czech Republic 8 activities.

7. In the case of: Romania and the United Kingdom 13 activities (each); Greece and Poland 11 activities (each); Portugal 10 activities; France 7 activities.

8. In the case of: Denmark 10 activities; Malta 8 activities; Luxembourg 7 activities; Austria 6 activities.

9. In the case of: activity #13 in twenty countries; activity #14 in nineteen countries; activity #16 in sixteen countries; activity #25 in fifteen countries; activities #17 and 23 in thirteen countries (each); activities #10, 20 and 30 in twelve countries (each); activities #29 and 35 in eleven countries (each); activity #22 ten countries.

10. In the case of: activity #18 in twenty-three countries; activities #11 and 15 in fifteen countries (each); activities #28 and 31 in fourteen countries (each); activity #26 in thirteen countries; activity #27 in twelve countries.

TABLE 3 The evolution of the number of enterprises (N) in the manufacturing and energy supply activities across EU member-states, 2007-2016: The trend

NACE	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK
10	+	+	+	\	+	+	+	+	+	+	+	+	+	+	+	+	+	\	+	+	+	+	+	\	+	V	+	+
11	/	V	/	–	/	V	–	V	V	V	V	V	–	\	/	/	–	–	/	–	V	V	/	V	/	/	V	V
12	–	–	\	/	/	/	–	/	/	/	/	V	\	\	/	/	–	/	/	/	/	V	–	\	\	–	/	/
13	–	V	V	–	Λ	/	–	–	V	–	/	V	V	V	/	\	V	/	/		/	/	V	V	–	–	V	V
14	–	–	V	/	/	/	–	–	V	–	/	\	\	V	/	\	V	–	–	–	/	V	V	V	/	/	V	V
15	+	\	+	+	\	/	+	+	V	\	V	\	\	\	/	V	/		+		/	V	V	V	/	+	/	/
16	V	/	–	/	–	/	–	/	\	\	/	\	V	V	–	\	V	–	/	–	/	V	V	V	\	/	V	V
17	\	\	V	\	Λ	\	\	\	/	\	\	\	\	\	/	\	V	\	/	\	V	Λ	\	V	\	\	V	V
18	\	\	Λ	+	V	\	\	+	\	\	+	V	\	V	Λ	\	/	+	+	+	Λ	V	V	V	\	+	\	\
19	\	\	\		\	\	–	\	/	/	\	/	\	/		\	–	/	/		/	/	/	/	\	/	\	\
20	\	\	/	\	Λ	Λ	\	/	\	\	V	V	V	\	Λ	\	/	\	/	\	/	V	V	V	/	/	V	V
21	–	\	\	\	V	\	/	\	\	Λ	\	Λ	/	\	Λ	\	–	\	+	+	/	/	V	–	–	+	/	/
22	–	\	–	+	–	–	–	–	\	–	V	\	\	V	Λ	\	–	–	–	–	/	V	–	\	–	–	V	V
23	V	+	\	V	Λ	/	\	V	\	\	+	\	\	\	Λ	\	/	/	V	\	/	V	\	V	\	+	\	\
24	–	–	\	/	/	/	–	/	/	/	/	V	\	\	/	/	–	/	/	/	/	V	–	\	\	–	/	/
25	\	–	\	–	/	/	\	–	\	\	–	\	\	V	Λ	\	/	–	–	–	/	/	\	V	\	–	V	V
26	V	V	V	\	\	\	\	\	\	V	V	V	\	V	Λ	\	\	\	+	\	Λ	/	\	V	V	V	V	V
27	+	\	–	–	Λ	Λ	–	+	\	–	\	\	\	\	Λ	\	–	–	+	–	Λ	\	V	\	–	\	V	V
28	V	\	V	–	\	–	–	V	V	\	V	\	\	V	Λ	\	/	–	/	–	Λ	/	\	\	\	V	V	V
29	Λ	V	+	\	Λ	\	\	+	\	\	V	V	/	\	Λ	\	V	+	/		Λ	\	+	V	Λ	/	V	V
30	+	\	+	+	/	/	V	+	\	\	+	V	\	V	/	\	+	+	/	+	Λ	/	V	Λ	+	+	/	/
31	V	–	–	\	Λ	–	V	/	\	\	\	\	Λ	V	V	V	/	/	V	–	/	/	\	V	/	/	V	V
32	+	+	+	/	+	/	+	/	+	+	Λ	+	+	+	/	+	+	Λ	/	\	/	+	+	+	+	+	/	/
33	Λ	/	/	+	/	/	+	/	V	/	+	V	/	Λ	/	/	/	+	/	+	/	V	V	/	/	/	/	/
35	/	/	/	+	/	/	Λ	+	Λ	+	/	V	/	Λ	/	/	/	+	/	\	/	/	/	/	V	/	/	/

Source: See Table 2.

Key for symbols:

Results associated with p-value ≤ 1 %
Peak followed by recession: Λ
Trough followed by recovery: V
No data: (blank)

Upward trend: /
Downward trend: \

Results associated with p-value > 1%
Upward trend: +
Downward trend: –

was an increase.[11] In one activity (#21) the dominant pattern (involving eleven countries) may have been a decrease. In activity #19 about 30% of the countries (eight countries) may have exhibited a decrease, while an equal number supplied very few or no observations; in activity #12 about 45% of the countries (thirteen countries) supplied very few or no observations. Switching focus, in thirteen countries (Bulgaria, Croatia, the Czech Republic, Denmark, Hungary, Latvia, Poland, Portugal, the Rep. of Ireland, Romania, Slovenia, Spain, Sweden) the dominant pattern across activities was V-shaped.[12] In ten countries (Belgium, Cyprus, Estonia, Finland, France, Greece, Italy, Lithuania, the Netherlands, the United Kingdom) the dominant pattern was a decrease.[13] In two countries (Austria, Germany) the dominant pattern was an increase.[14] Slovakia exhibited a V-shaped pattern in about 1/4 of all activities (six activities) and may have exhibited an increase in an equal number of activities; Luxemburg and Malta supplied no information on the matter or no information was published for identification purposes in eleven activities (each). (See Table 4.)

Q/L: In sixteen activities (#11, 13-18, 20-22, 26-28, 30-31, 33) the dominant pattern was an increase.[15] In three activities (#23, 25, 29) the dominant pattern was V-shaped.[16] In two activities (#24, 35) the dominant pattern was a peak followed by recession.[17] In activity #10 the dominant pattern (involving nineteen countries) was a decrease. In activity #32 the dominant pattern (involving seven countries) may have been a decrease; in two activities (#12, 19) most countries supplied very few or no observations.[18] Switching focus, in 22 countries (Austria, Belgium, Bulgaria, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Italy, Latvia, Lithuania, the Netherlands, Poland, Portugal, the Rep. of Ireland, Romania, Slovakia, Slovenia, Spain, Sweden, the United Kingdom) the dominant pattern across activities was an increase.[19] In two countries (Cyprus, Greece) the dominant pattern was a decrease.[20] In two countries (Croatia, Hungary) the dominant pattern was V-shaped.[21] Again, Luxemburg and Malta supplied no information on the matter in twelve activities (each). (See Table 5.)

Π: In seven activities (#16, 20, 23-25, 31-32) the dominant pattern was V-shaped.[22] In eight activities (#13, 17, 22, 26, 28-30, 35) the dominant pattern was an increase.[23] In three activities (#10, 18, 33) the dominant pattern may have been an increase.[24] In activity #14 the dominant pattern (involving nine countries) was a decrease. In activity #15 about 30% of the countries (nine countries) exhibited an increase, while an equal number exhibited a Λ-shaped pattern. In activity #11

11. In the case of: activity #24 in twenty countries; activity #32 in seventeen countries; activity #33 in ten countries.

12. In the case of: Poland 17 activities; Bulgaria and Spain 16 activities (each); Romania 15 activities; the Czech Republic and Portugal 14 activities (each); Hungary 13 activities; the Rep. of Ireland 11 activities; Croatia and Latvia 10 activities (each); Sweden 9 activities; Slovenia 8 activities; Denmark 7 activities.

13. In the case of: Cyprus, Italy and the United Kingdom 12 activities (each); Finland, France and Greece 11 activities (each); Belgium, Lithuania and the Netherlands 10 activities (each); Estonia 8 activities.

14. In the case of: Austria 8 activities; Germany 7 activities.

15. In the case of: activity #22 in twenty-one countries; activities #13 and 28 in twenty countries (each); activity #17 in nineteen countries; activity #27 in eighteen countries; activity #30 in seventeen countries; activity #11 in sixteen countries; activities #15, 26 and 33 in fifteen countries (each); activities #16, 18 and 31 in fourteen countries (each); activity #14 in thirteen countries; activity #20 in twelve countries; activity #21 in nine countries.

16. In the case of: activity #29 in twenty-two countries; activites #23 and 25 in twenty-one countries (each).

17. In the case of activity #24 in fifteen countries; activity #35 in thirteen countries.

18. In the case of: activity in #12 sixteen countries; activity in #19 twelve countries.

19. In the case of: Sweden 17 activities; Estonia and Poland 15 activities (each); Germany and Slovenia 14 activities (each); the Czech Republic, Denmark, France, Latvia, Romania and the United Kingdom 12 activities (each); Italy and Lithuania 11 activities (each); Belgium, Bulgaria, Finland, the Netherlands, Portugal and Spain 10 activities (each); Austria, the Rep. of Ireland and Slovakia 9 activities (each).

20. In the case of: Greece 9 activities; Cyprus 7 activities.

21. In the case of: Croatia 9 activities; Hungary 7 activities.

22. In the case of: activity #23 in twenty-four countries; activity #25 in fifteen countries; activity #31 in fourteen countries; activity #20 in thirteen countries; activity #24 in twelve countries; activity #16 in ten countries; activity #32 in eight countries.

23. In the case of: activity #30 in fifteen countries; activities #22 and 26 in thirteen countries (each); activity #13 in eleven countries; activities #28 and 29 in ten countries (each); activities #17 and 35 in nine countries (each).

24. In each of activities #10 and 33 in nine countries. In activity #18 in eight countries.

TABLE 4 The evolution of employment (L) in the manufacturing and energy supply activities across the EU member-states, 2007-2016: The trend

NACE	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK
10	/	+	V	+	V	/	V	+	V	+	+	V	–	V	+	V	V	/	+	/	+	V	V	V	+	–	+	V
11	–	–	\	\	V	\	–	V	V	\	/	\	\	\	–	V	\	\	\	\	V	V	–	V	\	\	\	\
12		\	\			\	V		\			V	V	/		V			V		\	V	V	V				\
13	V	V	V	\	V	V	V	V	V	\	V	V	V	V	\	\	V		V		V	V	V	V	\	V	V	\
14	\	V	V	V	V	V	V	V	V	\	V	V	\	V	V	V	V		\	V	\	\	V	\	V	V	V	\
15	\	\	\	\	\	\	V	\	V	\	\	V	/	V	\	V	\		\		\	V	V	V	\	\	V	/
16	V	V	V	–	\	–	–	V	\	V	\	\	V	V	V	\	V	–	V	–	\	V	V	V	V	V	+	V
17	V	\	V	\	V	+	\	\	V	V	V	\	V	V	/	\	/		\	V	V	/	\	V	\	V	\	V
18	\	\	–	\	\	\	\	\	\	\	\	\	\	\	\	\	\	\	\	–	\	V	\	\	\	/	V	\
19	–	–	V		\	/		–	/			V	/	\		\		–	–		\	V	–	V	–	–		\
20	/	+	V	+	V	/	/	+	V	V	V	V	\	V	V	\	\	–	–	+	+	V	V	\	V	V	+	\
21	/	/	/	–	–	/	/	\	V	–	V	/	/	/	–	V	–		–		\	\	–	–	V	–	–	–
22	/	\	V	\	V	/	–	\	V	–	V	\	V	–	V	\	V		V		V	–	V	/	\	–	/	–
23	V	V	V	\	V	\	+	V	V	\	\	+	V	V	V	\	V	\	V	\	\	V	\	V	+	\	\	\
24	+	+	+	\	+	+	+	–	\	+	\	+	+	+	+	\	+		+	+	+	+	+	–	+	+	+	\
25	/	\	–	–	V	/	–	V	V	V	\	\	V	V	V	V	V	–	\	–	V	/	V	V	V	V	/	V
26	V	\	V	\	V	V	+	\	V	\	\	\	V	\	V	\	\		+		\	V	V	V	Λ	\	\	\
27	/	Λ	V	\	V	Λ	\	Λ	V	\	\	\	V	V	V	\	/	\	\	\	Λ	V	\	V	\	V	V	\
28	/	\	V	\	V	\	\	\	\	\	\	\	V	/	/	V	\	\	\		V	V	V	V	V	\	V	\
29	V	\	/	+	V	V	+	+	V	+	\	+	+	V	+	\	V		\		V	V	V	/	V	+	/	V
30	V	V	V	+	/	+	V	+	+	\	/	\	\	\	V	V	V		V	+	Λ	V	V	\	V	V	+	+
31	\	\	V	/	\	V	\	\	V	\	\	\	\	V	V	V	V	+	\	/	\	V	\	V	\	\	/	V
32	/	/	+	\	+	Λ	+	/	+	/	Λ	+	+	+	+	V	+	/	/		+	+	+	+	+	+	+	+
33	Λ	/	V	+	/	/	+	+	V	Λ	+	V	+	Λ	/	+	+	+	+	/	/	V	/	V	V	/	/	+
35	Λ	/	V	Λ	V	V	V	V	\	Λ	/	V	\	V	V	/	\	/	V		/	Λ	V	\	/	Λ	\	V

Source: See Table 2.

Key for symbols:

Results associated with p-value ≤ 1 %
Peak followed by recession: Λ
Trough followed by recovery: V
No data: (blank)

Upward trend: /
Downward trend: \

Results associated with p-value > 1%
Upward trend: +
Downward trend: –

TABLE 5 The evolution of productivity (Q/L) in the manufacturing and energy supply activities across the EU member-states, 2007-2016: The trend

NACE	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK
10	\	–	\	\	\	\	–	\	\	\	–	\	\	\	/	–	\	\	\		\	\	\	\	–	\	–	V
11	/	/	–	/	/	/	/	\	/	\	–	/	/	Λ	V	V	V		/	/	/	\	/	/	/	/	–	
12		+	+			Λ	/		/			+	+	+		\						+	/	Λ					
13	/	/	/	\	Λ	/	/	/	/	/	/	\	/	Λ	Λ	/	Λ		/		/	/	/	/	/	/	/	/
14	/	V	/	\	/	/	Λ	/	–	Λ	\	\	V	Λ	Λ	/	/		V	\	\	/	/	/	/	/	/	V
15	Λ	Λ	+	\	/	/	/	/	Λ	/	/	–	+	/	Λ	/	/		Λ		Λ	/	/	/	/	/	Λ	/
16	V	V	–	V	V	/	V	/	V	/	/	\	/	V	/	V	/	\	/	/	/	/	V	Λ	/	/	–	/
17	/	+	/	+	/	+	+	/	/	/	/	+	/	Λ	V	/	/		/	\	/	/	/	/	/	/	/	/
18	+	/	V	\	/	/	+	/	\	+	+	\	/	+	/	V	/	\	/	/	/	/	/	+	/	/	V	V
19	V	/			\	\		/	V			V		\		V			\		V	/	V		/	\		/
20	V	/	/	+	+	/	/	+	/	/	V	V	V	V	/	/	+	/	\	V	V	+	V	/	/	/	+	V
21	\	/	+	/	+	\	/	\	/	/	Λ	V	\	/	Λ	Λ	V		/		/	\	V	+	/	\	Λ	\
22	/	V	/	V	/	/	–	/	/	/	/	–	V	/	/	/	/		/		/	/	/	/	/	/	/	/
23	V	V	V	V	+	/	V	V	V	V	+	V	V	V	V	V	V	V	/	V	V	V	+	+	/	V	V	V
24	Λ	Λ	Λ	Λ	/	Λ	Λ	/	/	Λ	Λ	Λ	+	/	/	Λ	/	V	+	/	Λ	/	/	Λ	Λ	Λ	Λ	/
25	V	V	V	+	/	V	V	V	V	+	V	V	V	V	V	V	V	/	V	V	V	+	+	/	V	V	V	V
26	/	V	/	Λ	/	V	/	Λ	–	V	/	Λ	V	/	\	/	/		/		/	/	V	–	/	/	/	/
27	/	Λ	/	\	Λ	/	/	/	V	/	/	\	V	V	/	/	/	/	/	/	V	/	\	/	/	/	Λ	/
28	/	/	/	Λ	Λ	/	\	/	/	/	/	\	/	Λ	/	/	/	/	Λ		/	\	/	/	/	/	/	/
29	V	V	V	+	V	V	V	V	V	V	V	+	V	V	+	V	V		V		+	V	V	V	V	V	V	V
30	/	/	/	/	/	/	/	/	Λ	/	/	\	\	Λ	\	/	\		\	/	\	/	V	Λ	/	/	/	/
31	V	/	V	\	/	/	/	/	V	V	/	\	V	/	V	V	/	V	V	/	/	/	V	/	/	V	/	V
32	\	V	V	V	–	–	/	\	\	\	–	Λ	/		Λ	/	\	\	/		Λ	–	–	/	V	\	–	–
33	Λ	/	/	Λ	/	/	/	/	–	V	/	Λ	–	V	/	V	/	V	–	/	Λ	/	–	/	Λ	/	/	/
35	+	\	Λ	V	Λ	Λ	Λ	/	/	+	/	/	/	+	Λ	Λ	Λ	V	Λ		–	/	Λ	Λ	Λ	Λ	Λ	+

Source: See Table 2.

Key for symbols:

Results associated with p-value ≤ 1 %
Peak followed by recession: Λ
Trough followed by recovery: V
No data: (blank)

Upward trend: /
Downward trend: \

Results associated with p-value > 1%
Upward trend: +
Downward trend: –

about 20% of the countries (six countries) exhibited an increase, while an equal number may have exhibited an increase. In activity #27 about 20% of the countries exhibited an increase, another 20% exhibited a decrease, and an equal number may have exhibited a decrease; in two activities (#12, 19) most countries supplied very few or no observations.[25] Switching focus, in eight countries (Belgium, Denmark, Italy, Lithuania, the Netherlands, the Rep. of Ireland, Slovakia, Sweden) the dominant pattern across activities was an increase.[26] In five countries (Austria, Greece, Latvia, Poland, Spain) the dominant pattern was a decrease.[27] In eight countries (Bulgaria, Croatia, Cyprus, the Czech Republic, Finland, France, Portugal, Slovenia) the dominant pattern was V-shaped.[28] In two countries (Hungary, Romania) the dominant pattern was a Λ-shaped.[29] In Germany the dominant pattern (involving ten activities) may have been an increase. The United Kingdom exhibited a decrease in 1/5 of all activities (six activities) and an increase in an equal number of activities; Estonia exhibited an increase in 1/4 of all activities (seven activities) and may have exhibited an increase in an equal number of activities. Luxembourg and Malta supplied no information on the matter in fourteen and sixteen activities, respectively. (See Table 6.)

Reorganizing all this information reveals that, by and large:

- In thirteen activities (#10, 14, 16-18, 22, 25-27, 30-33) the number of enterprises and the number of employed people across EU member-states generally moved in the same direction (i.e., both increased or decreased throughout the period or peaked (reached bottom) simultaneously or in successive years) rather than the opposite;[30] in two activities (#12, 24) the said numbers generally moved in opposite directions, and in ten activities (#11, 13, 15, 19-21, 23, 28-29, 35) they moved in an intermediate manner.
- In five activities (#10, 15, 24, 27, 35) the number of enterprises and profitability across EU member-states generally moved in the same direction; in three activities (#26, 30, 33) the two generally moved in opposite directions; and in seventeen activities (#11-14, 16-23, 25, 28-29, 31-32) the two moved in an intermediate manner.
- In six activities (#20, 22, 25, 29-30, 33) the number of employed people and productivity across EU member-states generally moved in the same direction; in twelve activities (#11, 13-15, 17-18, 26-28, 31-32, 35) the two generally moved in opposite directions, and in seven activities (#10, 12, 16, 19, 21, 23-24) the two moved in an intermediate manner. (See Table 7.)
- In fifteen countries (Belgium, Bulgaria, Croatia, Denmark, Estonia, Finland, France, Greece, Italy, Malta, Poland, Portugal, Romania, Spain, the United Kingdom) the sectors in which the numbers of enterprises and of employed people moved in the same direction outnumbered the sectors in which the two moved in opposite directions. In two countries (the Netherlands, Slovakia) the sectors in which the numbers of enterprises and employed people moved in opposite directions outnumbered the sectors in which the two moved in the same direction. In the remaining eleven EU member-states, the number of sectors in which the numbers of enterprises and employed people moved in the same direction was about the same as the number of sectors in which the two moved in opposite directions.
- In ten countries (Austria, Germany, France, Greece, Lithuania, Malta, Poland, Rep. of Ireland, Slovenia, Slovakia) the sectors in which the number of enterprises and profitability moved in the same direction outnumbered the sectors in which the two moved in opposite directions. In four countries (Belgium, Italy, Spain, the United Kingdom) the sectors in which the number of enterprises and profitability moved in opposite directions outnumbered the sectors in which the two moved in the same direction. In the remaining fourteen EU member-states, the number of sectors in which the number of enterprises and profitability moved in the same direction was about

25. In the case of: activity #12 in thirteen countries, activity #19 in eleven countries.

26. In the case of: Italy, Lithuania, and the Rep. of Ireland 11 activities (each); Belgium 9 activities; Denmark and Sweden 8 activities (each); the Netherlands and Slovakia 7 activities (each).

27. In the case of: Greece 11 activities; Austria 10 activities; Poland 9 activities; Spain 8 activities; Latvia 7 activities.

28. In the case of: Cyprus and Portugal 14 activities (each); France 11 activities; Bulgaria and Slovenia 10 activities (each); Finland 9 activities; Croatia and the Czech Republic 8 activities.

29. In the case of: Romania 11 activities; Hungary 7 activities.

30. The former outnumbered the latter by three or more cases.

TABLE 6 The evolution of profitability (Π) in the manufacturing and energy supply activities across the EU member-states, 2007-2016: The trend

NACE	AT	BE	BG	CY	CZ	DE	DK	EE	ES	FI	FR	GR	HR	HU	IE	IT	LT	LU	LV	MT	NL	PL	PT	RO	SE	SI	SK	UK
10	V	V	V	\	+	+	–	+	\	+	+	–	\	+	/	+	+	V	V		–	\	V	Λ	–	/	Λ	+
11	+	/	–	V	–	+	Λ	–	\	Λ	Λ	V	/	V	/	+	/	+	V		/	\	+	\	/	\	+	\
12		/	\			/	\		\		Λ	\	\	\		\					\	\	/	Λ				\
13	–	/	/	V	Λ	/	V	/	/	V	/	/	–	Λ	Λ	/	Λ		–		/	–	V	Λ	/	V	Λ	/
14	\	/	V	\	V	\	Λ	/	\	/	V	\	V	Λ	/	/	/		\	Λ	\	\	V	Λ	/	/	Λ	\
15	Λ	V	+	V	/	+	+	+	Λ	Λ	/	–	–	Λ	Λ	/	+		Λ		Λ	+	+	Λ	–	+	Λ	+
16	V	\	V	V	V	+	/	+	V	+	V	\	/	+	+	V	+	\	+	Λ	+	V	V	Λ	+	V	/	/
17	+	\	/	V	V	\	/	+	+	/	V	\	/	/	/	/	/		\	\	\	\	\		+	+	/	Λ
18	\	+	V	V	/	+	Λ	\	\	V	V	\	\	+	Λ	/	+	\	\	/	V	V	+	+	V	+	+	/
19	V	/			V	\		/	V		\	V		\		V			\		V	V	V		\	\		V
20	V	/	V	V	Λ	Λ	/	V	/	–	V	–	V	V	Λ	/	V	/	\	V	V	V	V	Λ	V	/	/	–
21	\	+		V	V	\	/	\	/	/	+	+	+	\	Λ	/	/		/		+	\	V	Λ	+	V	Λ	\
22	\	V	/	V	–	–	Λ	/	/	V	/	\	V	Λ	/	/	/		–		/	–	/	/	/	V	/	/
23	V	V	V	V	V	V	V	V	V	V	V	\	V	V	V	V	V	V	/	V	V	V	V	\	+	V	V	V
24	V	V	/	Λ	/	V	+	V	V	V	+	V	/	V	/	+	+	+	V	/	/	V	V	V	+	+	+	+
25	V	V	V	V	V	+	+	+	V	V	V	+	V	+	/	V	/	V	V	+	V	+	V	+	/	V	/	/
26	/	/	/	–	Λ	/	Λ	\	/	\	/	Λ	V	/	\	/	/		/		\	–	V	–	/	/	/	Λ
27	\	–	\	–	Λ	–	V	Λ	V	–	V	\	V	V	/	Λ	/	/	/	/	–	\	\	\	–	/	Λ	Λ
28	\	/	V	Λ	/	–	Λ	/	–	\	\	–	/	Λ	/	/	/	–	Λ		/	\	/	Λ	/	V	–	Λ
29	\	–	/	V	/	/	/	–	/	V	V	\	–	\	–	–	/		/		\	Λ	–	V	–	/	/	/
30	\	/	/	/	/	/	/	/	/	/	/	\	\	Λ	\	V	\		\	/	\	/	/	Λ	/	/	V	\
31	V	V	V	V	/	+	/	+	V	V	V	V	V	/	/	V	/	V	+	Λ	/	+	V	Λ	V	V	+	+
32	\	V	V	V	\	+	/	\	\	\	/	Λ	/	/	\	/	V	\	/		Λ	V	V	/	V	V	+	+
33	\	+	\	Λ	\	+	V	+	\	V	V	Λ	\	+	V	+	+	V	\	+	Λ	\	V	+	+	Λ		Λ
35	V	+	/	/	V	+	+	/	\	+	/	\	/	Λ	/	Λ	V	V	V		/	/	+	/	Λ	V	V	\

Source: See Table 2.

Key for symbols:

Results associated with p-value ≤ 1 %
Peak followed by recession: Λ
Trough followed by recovery: V
No data: (blank)

Upward trend: /
Downward trend: \

Results associated with p-value > 1%
Upward trend: +
Downward trend: –

TABLE 7 Trends across the EU countries, 2007-2016

NACE codes	N & L direction		N & Π direction		L & Q/L direction	
	same	opposite	same	opposite	same	opposite
	(1)	(2)	(3)	(4)	(5)	(6)
10	8	1	10	0	1	3
11	3	5	2	1	2	8
12	2	5	4	4	0	2
13	4	3	4	3	1	5
14	6	1	4	6	1	5
15	8	7	5	2	2	8
16	12	2	2	1	1	3
17	12	1	6	7	3	6
18	10	1	6	4	6	11
19	4	4	3	5	3	2
20	3	4	5	7	5	2
21	5	6	5	4	5	5
22	7	2	5	3	6	3
23	7	5	3	2	3	1
24	0	5	5	2	2	2
25	7	2	2	1	6	2
26	7	3	2	5	2	8
27	3	0	6	3	6	10
28	3	2	6	7	4	10
29	5	3	4	3	8	0
30	6	0	4	7	5	1
31	8	5	3	2	4	8
32	16	1	2	2	1	4
33	13	1	1	5	7	3
35	5	6	9	2	2	10
Sum	**164**	**75**	**108**	**88**	**86**	**122**

Same direction: If in Tables 3-6 both variables were associated with the same symbol (/, \, –, +, and in the case of Λ or V the extreme occurred in the same year or ±1 year).

Opposite direction: If in Tables 3-6 both variables were associated with the symbols / and \, or V and Λ and the extreme occurred in the same year or ±1 year.

TABLE 8 Trends across the manufacturing and energy supply activities, 2007-2016

Country	N & L direction		N & Π direction		L & Q/L direction	
	same	opposite	same	opposite	same	opposite
	(1)	(2)	(3)	(4)	(5)	(6)
AT	3	3	3	0	4	4
BE	9	1	1	5	2	5
BG	5	2	4	3	0	1
CY	5	3	3	1	6	3
CZ	5	3	5	4	4	4
DE	3	5	9	4	7	9
DK	8	2	3	3	4	3
EE	7	1	4	2	2	7
ES	7	2	1	7	2	4
FI	8	0	4	2	1	7
FR	6	2	4	0	2	7
GR	11	0	7	2	9	2
HR	6	3	5	5	3	4
HU	5	4	4	5	5	2
IE	4	6	8	3	4	2
IT	13	1	1	10	1	7
LT	6	5	4	1	3	5
LU	3	2	1	1	1	4
LV	3	4	3	5	2	5
MT	4	0	3	0	2	2
NL	4	8	5	3	1	6
PL	7	1	6	2	5	1
PT	7	0	1	1	3	3
RO	8	2	2	4	1	4
SE	4	5	4	3	0	9
SI	3	2	6	3	3	4
SK	3	6	6	2	6	2
UK	7	2	1	7	3	6
Sum	**164**	**75**	**108**	**88**	**86**	**122**

Source: See Tables 3-6.

Same direction: If in Tables 3-6 both variables were associated with the same symbol (/, \, –, +, and in the case of Λ or V the extreme occurred in the same year or ±1 year).

Opposite direction: If in Tables 3-6 both variables were associated with the symbols / and \, or V and Λ and the extreme occurred in the same year or ±1 year.

TABLE 9 Trend increases in employment and productivity, 2007-2016

NACE codes	Countries
15	UK
17	LT, PL
18	SI
20	DE, DK
21	BE, DK, HU
22	AT, DE, RO, SK
25	AT, DE, PL, SK
27	AT, LT
28	AT, IE
30	CZ, FR
31	MT, SK
32	LV
33	BE, CZ, DE, IE, MT, SI, SK
35	FR

Source: See Tables 3-6.

the same as the number of sectors in which the two moved in opposite directions.

- In five member-states (Cyprus, Greece, Hungary, Poland, Slovakia) the sectors in which the number of employed people and productivity moved in the same direction outnumbered the sectors in which the two moved in opposite directions. In eleven countries (Belgium, Estonia, Finland, France, Italy, Latvia, Luxembourg, the Netherlands, Romania, Sweden, the United Kingdom) the sectors in which the number of employed people and productivity moved in opposite directions outnumbered the sectors in which the two moved in the same direction. (See Table 8.) (However, the desirable situation of a simultaneous employment and productivity increase throughout the period in question was rather rare: in about 5.16% of all cases. See Table 9.) In the remaining twelve EU member-states, the number of sectors in which employment figures and productivity moved in the same direction was about the same as the number of sectors in which the two moved in opposite directions.

In recession-hit Greece, despite the dominance of downward or mixed trend patterns, L increased in sector #21 (Table 4), Q/L increased in sectors #11 and 35 (Table 5), Π increased in sector #13 (Table 6), and N increased in sector #19 (Table 3). Though exceptional in the context of the country's long downturn, these rising trend patterns were not unusual in the EU context: indeed, they were observed in the same sectors in several other EU-28 states as well. (Tables 3-6.) Overall, they are very much consistent with broader developments in the said sector. By contrast, the upward trend in Q/L observed in activity #10 in the Republic of Ireland, and in L in activity #11 in France, #12 in Hungary, #18 in Slovenia and #27 in Lithuania may deserve a closer look. It is quite likely that in these instances something was done in a different way, and there may be lessons to be learned from it.

In our view, a closer look at the policies employed and circumstances in such cases, as well as in the cases of simultaneous employment and productivity increases mentioned (see Table 9), may turn out to be quite useful to agents and policy planners looking to identify features and practices that may be applied in other places and industries across the EU. Likewise, the exploration of what transpired at the time of a trend switch or a medium-term fluctuation (M_{ij}) identified via expression (1), may provide valuable insights regarding the replication of the situation or the avoidance of the situation altogether.

4. Conclusions

The article econometrically identifies the long-run trends during 2007-2016 in the 25 activities of the manufacturing and energy sectors across the EU member-states and finds considerable heterogeneity in the evolution of the number of enterprises, and of the employment, labor productivity and profitability patterns across both countries and activities. Interestingly, in sixteen activities (i.e., 64% of all activities), the majority of countries exhibited an increase in productivity; in 22 countries (i.e., 79% of all member-states), the dominant pattern across activities was an increase in productivity. The other long-run patterns regarding the business life and performance measures considered generally involved fewer activities and countries. However, the trends regarding the number of employed people and the number of enterprises (i.e., as industries became more competitive or oligopolistic), by and large, were in the same direction both in terms of activities across countries and in terms of countries across activities.

This lends some weight to the arguments that (a) in the EU more competition affects more output and, hence, the use of more labor and/or (b) the presence of a larger workforce in an industry affects the formation of more businesses in the said industry. At the same time, the trends regarding the number of employed people and productivity were, by and large, in opposite directions, both in terms of activities across countries and of countries across activities. The fortunate case of both increasing over time was rather rare, as was the case of a rising trend amid a general decline or mixed trend patterns in the other member states. However, there may be lessons to be learned from a closer look at what affected these upward trend patterns.

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References

Anastassakou J.N., Cavounidis J., Cholezas I., Chymis A., Kaditi E., Kanellopoulos C., Nitsi E. and Prodromidis P.K. 2011. *Market conditions and competition in the Greek economy.* Vol. 1: *Production of goods*. Coordinated by C. Kanellopoulos. (In Greek.) Athens: KEPE.

Begg D., Fisher S. and Dornbusch R. 2008. *Economics*. 9th edition. Maidenhead, UK: McGraw-Hill.

Black K. 1992. *Business Statistics*. St. Paul, MI: West Publishing.

Cameron S. 2005. *Econometrics*. Maidenhead, UK: McGraw Hill.

Carnot N., Koen V. and Tissot B. 2011. *Economic Forecasting and Policy*. 2nd edition. Houndmills, UK: Palgrave Macmillan.

Eurostat. 2008. *NACE Rev. 2*. Luxembourg: European Commission. (Available online via https://ec.europa.eu/eurostat/documents/3859598/5902521/KS-RA-07-015-EN.PDF.)

Eurostat. 2015. *Structural business statistics (SBS). Glossary*. Luxembourg: European Commission (Available online via https://ec.europa.eu/eurostat/statistics-explained/index.php?title=Glossary:Structural_business_statistics_(SBS).)

Fox K.A. 1968. *Intermediate Economic Statistics*. New York: Wiley.

Franzini L. and Harvey A.C. 1983. "Testing for deterministic trend and seasonal components in time series models." *Biometrica*, 70.3: 673-682.

Handrinos S., Altinoglou K. and Pepe A. 2005. *Evolution of SMEs in Greece. Estimation and comparability of efficiency and flexibility of SMEs and of large manufacturing enterprises*. (In Greek.) Athens: KEPE.

Koutroulis A., Athanassiou E., Cholezas I., Kanellopoulos N.C. and Kotsi A. 2018. *Development and prospects of the manufacturing industry in Greece.* (In Greek.) Athens: KEPE.

Lee C.F., Chen H.Y. and Lee J. 2019. *Financial Econometrics, Mathematics and Statistics: Theory, Method and Statistics*. New York: Springer.

Manolas N. 2007. *The Greek energy sector: Trends and prospects*. (In Greek.) Athens: KEPE.

O'Sullivan M. 2000. "The sustainability of industrial development in Ireland." *Regional Studies*, 34.3: 277-290.

Smith J. D. and Duncan A. J. 1944. *Fundamentals of the Theory of Statistics*. New York: McGraw-Hill.

Tzortzopoulos P. 1985. *Time series analysis. Trend-seasonality.* (In Greek.) 3rd edition. Athens: Oikonomiko.

Voulgaris F., Agiomirgianakis G. and Papadogonas T. 2015. "Job creation and job destruction in economic crisis at firm level: the case of Greek manufacturing sectors." *International Economics and Economic Policy*, 12.1: 21-39.

Zeli A. and Mariani P. 2009. "Productivity and profitability analysis of large Italian companies: 1998-2002." *International Review of Economics*, 56.2: 175-188.

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Work from home in Greece

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Abstract

This article, following the most recent literature and using raw data from the Labour Force Survey, determines the percentage of employees who could potentially work from home in Greece, based on the subject and nature of their job. It is estimated that in 2019 this percentage was approximately 33%; however, it differs significantly among professions and geographical regions. Also, differences are recorded based on both the characteristics of the employee (age, gender, level of education acquired) and the features of his job (industry and sector of employment, position in the labour market, size of local unit). The analysis shows that the possibility of working from home is affected by the structure of the Greek economy, where the numerous small businesses and the high percentage of the self-employed limit the ability to work from home. Moreover, the industrial structure and regional specialization have a significant impact on the number of people who can work from home. The aforementioned differences suggest that the implementation of horizontal policies for the whole economy on the issue under consideration may be neither effective nor equal.

Keywords: *COVID-19, Occupation, Work from home*

JEL: *D24, J21, J81, L23, M54*

1. Introduction

The outbreak of the COVID-19 pandemic led many governments around the world, either immediately or with some delay, to implement measures so that people stay at least two meters away from each other. In other words, they introduced the well-known social distancing in order to contain the spread of coronavirus and to protect public health especially that of vulnerable groups of the population, i.e., people who suffer from underlying health issues or the elderly, where it is more difficult to overcome the symptoms of the virus. The main goal was that social distancing be implemented everywhere, that is, in all markets, production processes, transportations, as well as at all social gatherings and events. Among the measures implemented was the mandatory shutdown of specific workplaces, with priority given to congested places (restaurants, places of entertainment and sports, as well as venues of education and worship), the ban on travel between prefectures and islands, the restriction of movements except those absolutely necessary, as well as the encouragement of work from home (hereafter WFH).

The Greek government, adopting the advice of the special scientific group of the National Public Health Organization (EODY), implemented quite strict restrictive measures within a very short period, and on the 23 of March, a national lockdown was introduced. These measures were meticulously respected by citizens, leading to impressive results in reducing the spread of the coronavirus and to a very small number of infections, hospitalizations and deaths. Thus, since May 4, a gradual relaxation of lockdown measures has been implemented, which is expected to be completed by the end of June. By mid-May, 2760 cases and 155 deaths from COVID-19 had been reported in Greece, while the new daily cases had declined to single-digit numbers.

One of the first measures implemented was the suspension of in-person classes at all educational levels, shortly followed by the mandatory shutdown of almost the entire retail trade industry for the whole country, as well as the closure of sports and entertainment venues. In general, the relevant ministries, examining the conditions of production and distribution of products and services according to the code of economic activity, the well-known KAD, decided to lockdown or strictly regulate the activities of companies, in combination with a special subsidy for workers who became inactive. Moreover, for employees with children in the closed nurseries and elementary schools, special parental leave was granted to one parent. In addition, unnecessary move-

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ments were prohibited, the means of transportation fully maintained social distancing and, generally, the motto "stay home" was universally followed. In the broader context of restricting unnecessary movements and the need to protect public health and the safety of workers, quite a few businesses, in order to continue their production activities, shifted all or part of their personnel to work from home arrangements, while at the same time, the public sector employees were encouraged to work from home whenever possible.[1]

This article, without evaluating any positive effects (saving commuting time, avoiding travel costs, combining professional and family life, reducing the environmental burden) or negative characteristics of working from home (enhancing the informal nature of the work relationship, embroiling of professional and domestic activities, difficulty in controlling and reliably evaluating paid effort and produced output, transferring of costs from employers to employees), examines the percentage of employees who, based on the characteristics of their job, have the ability to work from home. Our analysis follows similar work recently done for the US (Dingel and Neiman, 2020a) and other countries, adopting their methodology and adapting it to Greek statistics. In particular, we use individual-level data from the Labour Force Survey (LFS), conducted by the Hellenic Statistical Authority (ELSTAT), which allow us to examine the anatomy of the ability to work from home using the available detailed information.

The focus of the article seems to be interesting for the formulation of policies related to working from home. On the basis of efficiency and fairness, across-the-board forthcoming arrangements related to WFH are unlikely to have the same effects everywhere. The main finding of the article is that, in Greece, the percentage of those who could work from home is similar to that of other developed countries, which means that there is significant room for a more permanent expansion of WFH, if deemed appropriate. However, the percentage of WFH arrangements differs substantially depending on the characteristics of the employees, the profession, the sector and the field in which they work, so its expansion would probably have an unequal effect upon certain labor markets. Thus, special attention and study is required before its implementation.

2. Related literature

The literature on the possibility of working from home is relatively limited and very recent. The first empirical work that is considered as a reference point for the following studies is that of Dingel and Neiman (2020a), which examines the possibility of working from home in the USA. The authors used information from two sample surveys of the Occupational Information Network (O*Net), covering the "content of the work" and the "generalized work activities", to identify the jobs that can be done from home. If, for example, a job requires daily outdoor work or operating vehicles, mechanical devices or special equipment, the authors classify it as an occupation that cannot be done from home. Dingel and Neiman, after examining all professions at a very detailed level, conclude that in the United States 34% of occupations, corresponding to 46% of wages, can potentially be performed from home, while there are significant differences between major cities and sectors of economic activity. Hensvik et al. (2020) estimate that in the USA the percentage of employees working from home was approximately 15% between 2011 and 2018.

Barrot et al. (2020) calculate the negative effect of social distancing upon total GDP as well as by industry for France and then apply their model to other European countries. In order to do this, they estimate the percentage of employees who have the possibility of teleworking, as well as the reduction of employment because of the various anti-COVID-19 measures implemented along industries. For France, the percentage of teleworking for companies with more than 10 employees is estimated at about 32%, while taking into account the employment restricting measures, the overall reduction of the active labour force amounts to 52%, which, using their production model, leads to a 5.6% reduction of GDP after a six-week social distancing. In the other European countries examined in Barrot et al. (2020), the impact of six weeks of social distancing on their GDP is assumed to differ from that of France only because of differences in the teleworing rate and their industrial structure.[2]

Boeri et al. (2020) examine, for six large European countries, how much the percentage of work from

1. It is necessary to clarify that, conceptually, work from home differs from teleworking. Teleworking was first included in the National General Collective Labor Agreement of 2006-07 and is defined as "*... a form of organization and/or execution of work that uses information technology, based on a contract or employment relationship, where a job that could also be performed at the employer's premises is normally carried out outside of those establishments*". Therefore, teleworking does not include those who work from home without the use of information technology, neither the self-employed. Thus, it becomes clear that working from home is something wider than teleworking.

2. Regarding Greece, Barrot et al. (2020) estimate six weeks of social distancing in monetary terms is equivalent to an 8% reduction in GDP.

home increases when certain COVID-19 constraints are relaxed. They estimate that even after allowing for limited mobility and in-person contact, the share of 'safe' jobs is rather limited and remains below 50%.

Other papers that include many countries, and especially developing ones (Dingel and Neiman, 2020b; Saltiel, 2020; Gottlieb, et al., 2020), conclude that the percentage of employees who can work from home is significantly lower in poorer countries, as indicated by their per capita GDP. Gottlieb et al. (2020) attribute this finding to the high percentage of self-employed people in poor countries who practice occupations that are not offered for work from home; the overall ability in each country to work from home depends, to a large extent, on the corresponding capacity observed in the primary sector and its relative size in total employment.

3. Data and results

In order to calculate the percentage of employees who can potentially work from home, we adopt the methodology applied by Dingel and Neiman (2020a) for the USA. As mentioned in the previous section, Dingel and Neiman utilized the data from two O*NET surveys in order to classify each profession and its potential to be carried out from home, according to certain criteria. In this first step, the authors use the most detailed version of SOC classification (Standard Occupational Classification) and then aggregate it to a two digit level. Following Dingel and Neiman, we converted this two-digit SOC classification to ISCO-08 classification in order to match it with the classification used by ELSTAT. As a result, for each two digit ISCO-08, we have the percentage of professions that can be performed from home.[3] This information is matched to the LFS data and allows us to estimate the percentage of occupations, as well as the number of the employed who could potentially work from home, based on the specific criteria we set. Finally, we can estimate the percentage of those who can work from home by various aspects using the total employment per occupation and the appropriate weighting.

Our estimates show that 32.8% of employees in Greece for 2019 could work from home (see Table 1). In absolute terms, this is equivalent to almost 1.3 million employees, or, more precisely, 1,263 thousand people. This percentage does not differ much from that of other developed countries in Europe, as calculated by Dingel and Neiman (2020b). Among the many European countries with WFH rates between 30-40%, Greece is at a relatively low level.

3.1. Work related characteristics

The percentage of those who can work from home differs significantly between professions at the one-digit classification (see Table 1). The highest percentage is recorded in clerical support workers (75.7%), followed closely by managers (74.2%) and professionals (73.9%). The latter are the most numerous group, as in this category, WFH is estimated to be possible for more than half a million employees[4]. The lowest percentage is recorded in plant and machine operators and assemblers (1.3%). It is worth noting that one in two people who belong to the category of technicians and associate professionals is estimated to be able to work from home, while only one in ten (10.8%) of those employed in service and sales could. We note, therefore, that there is a significant difference between employees who can work at home along the one-digit professions, both in absolute and relative size. These differences become even more pronounced when we move to a more detailed level. For example, a two-digit classification shows that for two professional categories, all employees could work from home, but there are also eight for which no employee could work from home.

It is interesting that examining the professional position, the highest percentage of those who could work from home is found for employees (38.3%), followed by the self-employed with employees (employers) with 32.4%. It is noteworthy that the percentage of the self-employed who could work from home is relatively low (18.9%), which is probably related to the fact that, in Greece, a great number of the self-employed are farmers, craftsmen and repairmen, whose work requires them to be away from their home.

Also of interest is the estimate that WFH is significantly higher among public servants (68.9%) and generally among employees in the wider public sector relative to

3. The choice of the two-digit ranking rather than the three-digit one, which is the most detailed that ELSTAT has, was made for two reasons. First of all, we wanted our results to be directly comparable to those of other works. In addition, because we examine each profession in combination with various characteristics, for some combinations there are very few observations, questioning the robustness of the results.

4. Of the 556 thousand professionals who can potentially work from home, 46% are in education, 20% are business professionals and 15% are engineers and lawyers. Health professional are only 1%.

TABLE 1 Employed individuals who can work from home in 2019

	Profession, ISCO-08	%	Number of employed	Relative contribution
1	Managers	74.2	83,679	6,6%
2	Professionals	73.9	556,170	44,0%
3	Technicians and associate professionals	50.0	155,976	12,4%
4	Clerical support workers	75.7	340,326	26,9%
5	Service and sales workers	10.8	99,330	7,9%
6	Skilled agricultural, forestry and fishery workers	3.3	13,493	1,1%
7	Craft and related trades workers	1.7	6,062	0,5%
8	Plant and machine operators and assemblers	1.3	3,442	0,3%
9	Elementary occupations	1.6	4,359	0,3%
	Professional position			
1	Self-employed with employees	32.4	93,690	7.4%
2	Self-employed without employees	18.9	157,909	12.5%
3	Employees	38.3	997,308	79.0%
4	Family workers	11.3	13,930	1.1%
	Total	**32.8**	**1,262,837**	**100.0%**

Source: ELSTAT, Labour Force Survey.

those working in the private sector (27%) (see Table 2). This result is largely due to the education related professions, which represent a very large number of civil servants, many of whom could theoretically work from home, as well as professions that require the use of computers. It should be noted that any decisions towards more permanent arrangements for the facilitation of work from home to the public sector must take into account that in such cases, unlike the private sector, supervision and evaluation of the produced output at home is extremely difficult.

Part-time employment records a lower WFH rate (25.5%) than full-time employment (33.6%). The sectoral and other characteristics of part-time employment in Greece, which is concentrated in agriculture and retail stores, seem to explain this finding.

It is also noteworthy that WFH is easier for establishments with more than 10 employees (42.8%) than for smaller units (27.5%). To some extent this can be attributed, among other reasons, to a better distribution of responsibilities and duties to larger companies, to greater penetration of modern technology and to the nature of production.

As shown in Table 3, there are striking differences in the percentage of those who could work from home by economic activity. At one end there are industries, such as mining and quarrying, accommodation and food services, with a fairly low ability of WFH, while at the other end, there are industries, such as education, real estate management and scientific work, with a fairly high ability of WFH. In general, it seems that industries that produce internationally tradable products and services (manufacturing, mining, agriculture, hotels) show lower rates of opportunity to work from home compared to industries that focus mainly on the domestic market.

The aforementioned characteristics of the occupations that could be performed from home suggest that these could be characterized as good jobs, as they record relatively high rates of full-time employment, are in sci-

TABLE 2 Number of employed individuals who can work from home by work related characteristics in 2019

	%	Number of employed	Relative contribution
Ownership status			
Public service	68.2	218,474	17.3%
Legal entity of public/private law, Public organization	48.0	139,371	11.0%
Municipality, Municipal enterprise	46.3	52,265	4.1%
Public Utility Organization	38.5	13,831	1.1%
State controlled bank	60.6	6,270	0.5%
Enterprise controlled by the State	34.6	6,555	0.5%
Private sector	27.0	826,071	65.4%
Number of persons working at the local unit			
Up to 10 employees	27.5	688,242	54.5%
More than 10 employees	42.8	574,594	45.5%
Full or part time job			
Part-time employment	25.5	91,906	7.3%
Full-time employment	33.6	1,170,931	92.7%

Source: ELSTAT, Labour Force Survey.

entific professions and enjoy the well-known benefits of employment in the public sector. Confirmation of this is that industries with a higher ability to work from home also have higher monthly wages.

To quantify this relationship, initially the correlation coefficient between the percentage of those who can work from home and the average wages by branch of economic activity is estimated (see Table 4). This correlation coefficient is positive and statistically significant for both genders. In particular, for the whole economy, it is estimated at 0.629, while for women it is higher, at 0.736, and for men a little lower, at 0.572. The data show that for both sexes, the degree of work from home is higher in industries where wages are higher, and this is more pronounced for women. To further specify the exact relationship between work from home and wages, we estimated a fixed effects linear regression, which takes into account both the unobserved characteristics of each industry and factors such as seasonality and the size of each industry. The effect, as shown in the last column of Table 4, remains positive and statistically significant, although it now appears to be stronger for men, while for women it shows greater variability.

From the above, it could be argued that a more widespread and looser implementation of work from home would contribute to the widening of inequalities between workers in jobs considered "good" and those considered "less good", amplifying the segmentation of the labour market.

3.2. Worker characteristics

There is also a noteworthy difference in the number of employees who can work from home, depending on their age (see Table 5). The relationship between age and the ability to work from home appears to follow an inverted U-shaped curve. In particular, younger individuals have low rates (15.2% for those aged 15-19); the peak (37.5%) is recorded in the

TABLE 3 Number of employed who can work from home by economic activity, 2019

		%	Number of employed	Relative contribution
1	Agriculture, forestry and fishing	4.3	19,284	1.5%
2	Mining and quarrying	7.2	901	0.1%
3	Manufacturing	22.5	84,867	6.7%
4	Energy	40.5	11,988	0.9%
5	Water supply, sewerage, waste management and remediation activities	20.9	6,925	0.5%
6	Construction	13.1	19,321	1.5%
7	Trade; repair of vehicles	22.7	157,371	12.5%
8	Transportation and storage	25.4	52,582	4.2%
9	Accommodation and food service	14.0	53,298	4.2%
10	Information and communication	71.4	72,950	5.8%
11	Financial and insurance activities	73.0	61,452	4.9%
12	Real estate activities	79.1	3,982	0.3%
13	Professional, scientific and technical	72.0	157,084	12.4%
14	Administrative and support service	25.3	23,022	1.8%
15	Public administration and defence, compulsory social security	52.1	145,992	11.6%
16	Education	89.5	287,214	22.7%
17	Human health and social work	22.4	55,745	4.4%
18	Arts, entertainment and recreation	44.2	23,730	1.9%
19	Other services	24.7	20,413	1.6%
20	Households as employers	8.1	2,014	0.2%
21	Extraterritorial organisations	62.5	2,704	0.2%

Source: ELSTAT, Labour Force Survey.

age group 50-54 and is followed by systematically lower rates.

Moreover, a significant difference in the percentage of those who could work from home is observed by gender. In particular, while about one in four men (27.3%) could potentially work from home, the corresponding percentage for women is four in ten (40.2%). Perhaps this could be an encouraging factor in facilitating the harmonization of professional and family life for women. The aforementioned age pattern of WFH is preserved even when the examination is done by gender. The interesting thing here is that women not only overall, but also for all age groups, have a higher rate of WFH than men. Only after the age of 60 does this pattern change and probably it has to do with women working in the agricultural sector.

We find a positive relationship between the educational qualifications of the employed and the ability to work from home. More specifically, 59.2% of higher education graduates (at least Higher Education Technological Institution graduates) can potentially work from home, while for the lower level of education (compulsory education, including high school) the corresponding rate is only 7.2%. It is estimated that 23.2%

TABLE 4 Average salary and percentage of employees who can work from home 2015-2019

	Correlation coefficient	Effect of average wage
Men	0.572*	0.077*
Women	0.736*	0.065**
Total	0.629*	0.081*

Source: ELSTAT, Labour Force Survey.

Notes: The second column shows the results of the Spearman correlation coefficient between average wages and the percentage of working from home for all two-digit industries. The third column shows the coefficient from a fixed effects linear regression of the percentage of work from home with average wages for all two-digit industries. All regressions also include yearly and quarterly dummies. All estimates are weighted based on the size of each sector.

* p-value 0.001, ** p-value 0.1.

of secondary level graduates could work from home. Following these figures, the relative participation of the educational categories follows a similar pattern, since two out of three who could work from home are graduates of higher education, 30% of secondary and only 4.7% have completed up to compulsory education. It should be noted that within these broad educational categories there are differences depending on the subject of degree, since technical professionals are less likely to be able to work from home. To some extent, this may explain the differences by education and gender, with women having a higher ability to work from home than men at all levels of education.

3.3. Regional structure

We find significant differences in the percentage of the employed who could work from home based on the regional area in which they live (see Table 6). The highest rate of WFH is found in Attica, where more than four out of ten employed individuals, more precisely 41.8%,

TABLE 5 Number of employed individuals who can work from home by gender, age and level of education, 2019

	Total		Men		Women	
	%	Relative contribution	%	Relative contribution	%	Relative contribution
Age group						
15-19	15.2	0.2%	14.9	0.2%	15.9	0.1%
20-24	21.3	2.3%	14.2	1.7%	29.4	2.8%
25-29	29.1	8.0%	22.6	7.3%	37.6	8.6%
30-34	34.0	11.4%	26.5	10.5%	43.6	12.3%
35-39	34.7	14.1%	27.8	13.4%	43.8	14.7%
40-44	33.6	16.2%	27.4	15.5%	41.4	16.8%
45-49	33.9	14.7%	27.9	14.6%	41.9	14.9%
50-54	37.5	17.0%	31.0	16.5%	46.1	17.4%
55-59	32.9	9.5%	30.7	11.3%	36.4	7.9%
60-64	27.8	5.2%	28.3	6.8%	27.1	3.6%
65-69	20.8	1.1%	22.8	1.7%	17.3	0.6%
70-74	20.9	0.2%	20.8	0.3%	21.2	0.1%
Level of education						
Tertiary	59.2	64.6%	55.6	62.8%	62.7	66.3%
Secondary	23.6	30.6%	19.1	31.0%	30.3	30.3%
Compulsory	7.2	4.7%	6.8	6.2%	7.9%	3.4%
Total	**32.8**	**1,262,837**	**27.3**	**603,934**	**40.2**	**658,903**

Source: ELSTAT, Labour Force Survey.

TABLE 6 Number of employed individuals who can work from home by region and degree of urbanity, 2019

Region	%	Number of employed	Relative contribution
East Macedonia and Thrace	24.0	48,307	3.8%
Central Macedonia	31.3	199,279	15.8%
West Macedonia	25.0	21,413	1.7%
Epirus	29.5	33,192	2.6%
Thessaly	29.6	73,373	5.8%
Ionian islands	28.7	22,123	1.8%
West Greece	24.7	52,982	4.2%
Central Greece	24.0	46,048	3.6%
Attica	41.8	595,333	47.1%
Peloponnese	25.9	54,345	4.3%
North Aegean	26.2	18,412	1.5%
South Aegean	25.1	32,669	2.6%
Crete	26.0	65,361	5.2%
Degree of urbanity			
Urban area of Athens	44.0	517,826	41.0%
Urban area of Thessaloniki	38.2	124,989	9.9%
Other urban areas	34.3	360,676	28.6%
Semi-urban areas	26.3	134,055	10.6%
Rural areas	16.0	125,291	9.9%

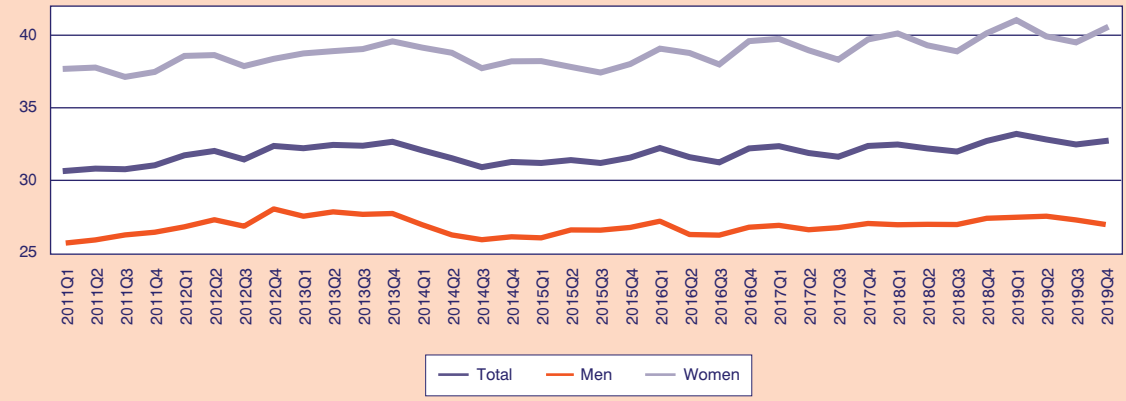
Source: ELSTAT, Labour Force Survey.

could work from home. The second highest percentage is observed in Central Macedonia, which includes Thessaloniki, with a percentage of 31.3%. In addition to any positive or negative effects of WFH, these numbers also show that there is a realistic margin for improving air quality in major cities and saving on travel and fuel costs. At the other end, Eastern Macedonia and Thrace, as well as Central Greece, have relatively low rates of WFH. The first is probably due to the relatively large number of farmers and the second is due to industry workers. The Aegean Regions also have relatively low rates of WFH. This is obviously related to the dominance of the tourism professions there, which usually require the on-site presence of the employed.

The high number of those who can work from home in major cities is also confirmed when we look at it in terms of urbanity. Almost one in two employees in the urban area of Athens (44.0%) is estimated to be able to work from home, and almost four out of ten (38.2%) in the urban area of Thessaloniki. In contrast, in rural areas, the percentage examined is limited to only 16.0%.

All these suggest, in a clear manner, that the regional structure of employment is of great importance for the overall number of those who could potentially work from home. Regions that have a relatively higher concentration of professions related to industry or the agricultural sector seem to lag behind regions where a large percentage of employees are employed in administrative services. It is worth noting, however, that in Greece, where agricultural activities are concentrated in small family businesses, if our main concern is that of social distancing, as a means of preventing the

FIGURE 1
Evolution of the percentage of workers who can work from home by gender overtime



Source: ELSTAT, Labour Force Survey.

spread of COVID-19, such jobs could also be considered, to some extent, as safe jobs, although they cannot be performed from home.

3.4. Stability of results

In order to test the stability of our results, we performed the same calculations for each quarter from 2011 and onwards. We consider that the stability of the percentage of those who could work from home over time to be a first check of the robustness of the results we presented and shows that the structure of the labour market in our country has not changed drastically in the short term. Indicatively, Figure 1 shows the diachronical evolution of the total percentage of the employed who could work from home and the corresponding percentage by gender. It is clear that over the examined period there is a relative stability and no sharp changes, beyond the expected seasonal fluctuations observed.

4. Conclusion and policy implications

This article for the first time attempts to estimate the number of those who could theoretically work from home in Greece. We adopt a methodology that has already been applied in other developed countries and the results are generally similar to those of other developed countries. It is estimated that almost a third of those employed could work from home. However, there are significant differences between women (higher WFH) and men (lower WFH), between professions, with the so-called scientific professions having a higher ability to work from home compared to manual professions, between industry and sector of economic activity.

WFH suddenly gained a lot of attention as a result of the COVID-19 pandemic, and the efforts undertaken to limit its spread, which among other things included work from home as a means of implementing the necessary social distancing. The abovementioned estimates show that there is room for expanding work from home. However, any attempt to expand it permanently, in addition to the reactions it provokes from unions and other stakeholders, requires careful steps, as it can widen existing inequalities between "good" and "less good" jobs, while it can harm the efficient employment of certain workers. Labour productivity, when working from home, is not necessarily and permanently the same as when working in the workplace. It is necessary to rationally regulate the framework of WFH, taking into account, in addition to the opinion of the stakeholders, the structural features and operation of the specific labour markets. The degree of expansion of work from home also depends on the technological capabilities of the country, which, although improving, in some geographical areas still remain insufficient.

Moreover, it is appropriate to take into consideration the interrelations of the decision to work from home. For example, the widespread implementation of work from home for a professional group may require the staying at home of other members of the household. In other occasions, working from home can have significant mutual benefits for employees and employers and help in the professional integration of people with mobility problems, as well as the extension of maternity leave. However, it is necessary for

the employer to bear the cost (required equipment, increased operating costs of the house due to longer stay). In addition, it is necessary to strictly keep the working hours, which should not be extended under the pretext of working from home, while it is essential that all safety and hygiene conditions at home are fully satisfied.

Like everything new, work from home, which is a manifestation of flexibility in the labour market, has advantages and disadvantages. As long as there is political will, the necessary legal framework, which will guarantee the rights of the employees, can be formed so that the choice to work from home is not made difficult for employers. The recent experience has shown that working from home on extreme occasions, such as the COVID-19 pandemic, is necessary for both psychological and economic reasons.

5. References

Barrot, J.-N., Grassi, B. and Sauvagnat, J. (2020), 'Sectoral effects of social distancing', *Covid Economics* **3**.

Boeri, T., Caiumi, A. and Paccagnella, M. (2020), 'Mitigating the work security trade-off while rebooting the economy', *Covid Economics* **2**.

Dingel, J. and Neiman, B. (2020*a*), 'How many jobs can be done at home?', *Covid Economics* **1**.

Dingel, J. and Neiman, B. (2020*b*), 'How many jobs can be done at home?', *Becker Friedman Institute White Paper*.

Gottlieb, C., Grobovšek, J. and Poschke, M. (2020), 'Working from home across countries', *Covid Economics* **8**.

Hensvik, L., Le Barbanchon, T. and Rathelot, R. (2020), 'Which jobs are done from home? Evidence from the American time use survey', *IZA Discussion Paper* **13138**.

Saltiel, F. (2020), Who can work from home in developing countries? From <https://sites.google.com/view/fernandosaltiel/>.

KEPE, *Greek Economic Outlook,* issue 42, 2020, pp. 95-100

Tourism and the coronavirus: The effects on the Greek economy and the compensatory role of the public sector

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Abstract

This article estimates the contribution of tourism to the Greek economy and the multiplier effects that the shrinking tourism demand, due to the pandemic of COVID-19, will have on GDP, employment, and the foreign sector of the economy. Contrary to what is usually supported, we estimate that the contribution of tourism on the Greek economy is in accordance with the contribution of tourism to the other southern European economies. Furthermore, we estimate, on the basis of the Sraffian multiplier framework, that the multiplier effects of government's final consumption expenditures are considerably greater than those of the international travel receipts. Thus, the projections for a relatively higher recession in the Greek economy that are based on the overestimation of the role of the tourism sector do not seem to be valid.

Keywords: *International travel receipts, Greek economy, COVID-19, Sraffian multiplier, Contribution of tourism to the economy*

JEL classification: *C67, D57, E11, E12, E61, Z32*

Introduction

The tourism sector is expected to face one of the most significant blows from the international spread of the new Coronavirus (COVID-19). On this basis, the urgent questions that concern our country can be summarized as follows:

- What is the contribution of tourism to the Greek economy?
- To what extent is the economy exposed to a possible collapse in tourism demand?
- To what extent can government intervention offset any losses?
- What will be, in the end, the extent of the possible recession in the Greek economy?

This article attempts to answer the above questions in detail, highlighting the real contribution of tourism to the Greek economy; the real dimensions of the multiplier effects of a possible collapse of tourism demand on GDP, employment and the balance of goods and services; and, finally, the compensatory role of the public sector.

The article is structured as follows: Section 1 summarizes developments in the Greek tourism sector until the emergence of COVID-19. Section 2 analyzes the contribution of tourism to the Greek economy. Section 3 compares the negative effects on the economy of the contraction of tourism with the positive effects of expansionary fiscal policies, thus assessing the extent of the possible recession. Finally, the conclusions of the investigation are summarized.

1. The developments in Greek tourism until the emergence of COVID-19

According to the Bank of Greece (BoG), the country's international travel receipts in 2019 reached €18,179 billion, i.e., an increase of 13.0% over the previous year, while international travel arrivals reached 34,005 million, i.e., an increase of 2.8% over the previous year. Furthermore, in the first two months of 2020,[1] the country's international travel receipts reached €527 million, i.e., an increase of 22.9% over the same period of previous year, while international travel arrivals reached 1,417 million, i.e., recording an increase of 21.8% compared to the same period of previous year. All of the above predicted that, under normal circumstances, 2020 would be another good year for Greek tourism.

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

1. For a detailed overview of the developments of Greek tourism in 2018 and 2019, see Vagionis and Soklis (2019 and 2020).

2. The contribution of tourism to the Greek economy

2.1. The problems of estimating the contribution of tourism to the Greek economy

The modern recognized approach to assessing the contribution of the tourism sector to the economy uses the system of Tourism Satellite Accounts (TSA), through which the tourist gross value added, the tourist gross domestic product and the indicator of contribution of tourism to the economy are estimated (tourism ratio). The tourism ratio, which is defined as the ratio of total (inbound and outbound) tourist consumption to the total supply of the economy, is an internationally recognized indicator of the importance of the sector of tourism in an economy.[2] Greece is one of the few countries in the European Union (EU) that has not yet developed a TSA system and, therefore, there is no an accurate estimate of the amount of tourist gross value added and tourist gross domestic product in the Greek economy: the common estimates for the contribution of Greek tourism to the GDP of the economy range from 10% to 30%, or even higher. Therefore, there is no precise estimate of the real contribution of tourism to the Greek economy.

If we examine the data of the sector of "Accommodation and Food Services", which is primarily the sector related to tourism activities, then, according to the most recent relevant data of the Hellenic Statistical Authority (ELSTAT), i.e. for the year 2017, this sector constituted 6.8% of gross value added and 8.6% of employment of the Greek economy.[3] However, not all activities in this sector belong to tourism production, while there are other sectors in which some of the activities can be described as tourist related. Therefore, until the Greek TSA is developed, we cannot have an accurate estimate of the amount of tourism production.

On the other hand, we have sufficient data on tourism expenditures in Greece and, therefore, we can estimate the "tourism ratio". The incoming tourism expenditure in the country can be approached through the travel revenues that are estimated through the "Border Survey" of the BoG, while an estimate of internal tourist expenditure is given by the "Qualitative Characteristics of Resident Tourists" (Vacation Survey) of ELSTAT. The latest available data from ELSTAT's "Vacation Survey" refer to the year 2018; therefore, we will evaluate the tourism ratio for this year. According to the data of the BoG, travel revenues for the year 2018 reached €16.086 billion. According to ELSTAT's data, domestic tourist expenditures on domestic travel for pleasure, for the same year, reached €1.715 billion, and the total expenditure of domestic tourists for travel for business purposes reached €132.572 million. From the above, we estimate that the domestic tourist expenditure is approximately €17.9 billion.[4]

The usual practice for the assessment of the contribution of tourism to the Greek economy is to divide the domestic tourist expenditure by the GDP. Such an estimate would give a tourism contribution of 9.7% to the Greek economy for the year 2018. However, this practice, used before the development of the TSA tool, is now considered misleading and that it overestimates the contribution of tourism to the economy.[5] Indeed, domestic tourism expenditure includes, for example, the consumption of imported products, which are obviously not included in the economy's GDP. Furthermore, this kind of measurement does not take into account the intermediate consumption used to produce the tourism product required to meet tourism demand, which obviously includes imported inflows. Therefore, tourism expenditure as a percentage of GDP is not an appropriate indicator for assessing the contribution of tourism to the economy.

2.2. The estimation of the contribution of tourism to the Greek economy

As mentioned before, the proper indicator for the measurement of the contribution of tourism to the economy, and at the same time, to be compatible with the international standard system of national accounts, is the tourism ratio. An assessment of the tourism ratio of the Greek economy for 2018 can be calculated using the above approach of domestic tourism expenditure (€17.9 billion) as well as the overall supply of the economy. Given the latest available data from ELSTAT, i.e., the total supply of goods and services in the Greek economy for the year 2018, and the definition of the tourism ratio, the tourism ratio is about

2. See, e.g., Eurostat (2019).

3. The corresponding figures for sectors related to public sector activities are 20.3% (gross value added) and 21.5% (employment).

4. We are referring to appreciation because travel receipts are not synonymous with the concept of tourist expenses.

5. See, e.g., Hackl and Chatzimarinakis (2017).

TABLE 1 The contribution of tourism in Greece and in competitive countries

Country	Tourism ratio
Greece	4.6%-5.6%*
Spain	5.1%
Italy	3.9%
Malta	5.8%
Portugal	5.6%
EU	**3.4%**

Source: Eurostat, *Tourism Satellite Accounts, 2019 Edition.*

* Authors' estimates.

4.6%. If we assume that the other facts and figures of the unaccounted tourist consumption can reach up to 1/5 of the domestic tourist expenditure, then the tourism ratio of the Greek economy can reach up to 5.6%.[6]

This proportion may seem small compared to what is usually published about the contribution of tourism to the Greek economy, but it is in keeping with the relative proportions announced by other European Union (EU) countries. Table 1 represents the contribution of tourism in Greece and in selected countries which compete with Greece in tourism, i.e., Spain, Italy, Malta, Portugal, as well as the average of EU countries, as evidenced recently by Eurostat (2019).

As it can be seen, the tourism ratio of these economies ranges from 3.9% (Italy) to 5.8% (Malta), while the corresponding average of EU countries is 3.4%. Moreover, the tourism ratio of Greece is significantly higher (on average by about 50%) than the average of EU countries, but corresponds with the other southern European countries. Therefore, our assessment of the contribution of tourism to the Greek economy (4.6%-5.6%) is absolutely realistic and in line with the relevant estimates of other EU countries.

Finally, it should be noted that the contribution of tourism to the economy should not be confused with the multiplier effects of the changes in tourism demand. That is to say, a multiplication of the estimated contribution of tourism to the economy with the so-called "tourist multiplier" is not a valid way to estimate the overall contribution of tourism to the economy. The contribution of tourism to the economy, as mentioned above, is given by the tourism ratio and by the assessment of the gross value added of tourism and the tourist gross domestic product through the TSA. On the other hand, the multiplier effects estimate, *ceteris paribus,* the changes in, e.g. the output and the employment of the sectors of the economy that are caused through the existing interrelations between the sectors of the economy, when tourism demand is changed. However, just as changes in tourism demand also alter the product and employment of the other sectors, the changes in demand for the other goods and services may also cause a change in the tourist product and employment. For example, in a recent KEPE announcement (2020), we estimated that 5.7% of GDP growth, caused by an increase in government spending, was based on the "Hotel and Restuarants" sector.[7] The above changes, through multiplier effects, constitute an analysis of the behaviour of the economic system and cannot be added to the contribution of a sector in GDP as this would violate basic identities of national accounts. More than that, the overall tourist demand multiplied by the "tourist multiplier" cannot be added as a contribution to GDP: In addition to what we have already pointed out, such an assessment would amount to arguing that there was no such thing as a tourism sector in the economy the previous year (zero tourist demand). The multipliers, by definition, estimate the effects of alterations in demand.

3. The multiplier effects of tourism on the Greek economy

3.1. The Sraffian multiplier

In the following, we analyze the multiplier effects of tourism on the Greek economy. In particular, we as-

6. Since, on the one hand, travel receipts do not coincide with the notion of tourism expenditure and, on the other hand, the notion of tourism expenditure is not equivalent to the notion of tourism consumption, an estimation of the "tourism ratio" cannot be precise until the development of the Greek TSA. For instance, our estimation, on the one hand, underestimates the tourism ratio because the estimation of tourism consumption should include, e.g., tourism social transfers in kind, while, on the other hand, overestimates the tourism ratio because the notion of tourism consumption should not include all the travel expenditures. Thus, if we assume that the part of tourism consumption that has not been included in our estimation is about 20% of the domestic tourism expenditures, and we ignore the aforesaid overestimation involved in the travel receipts, then the tourism ratio of the Greek economy would reach 5.6%.

7. See Rodousakis and Soklis (2020b).

sess the impact of the reduction in international travel receipts on GDP, employment and the balance of goods and services of the Greek economy, based on the concept of the "Sraffian multiplier".

This multiplier is not a scalar, but a square matrix of produced commodities (instead of industries) and the multiplier effects depend, in a rather complicated way, on the (i) technical conditions of production; (ii) income distribution (and commodity prices); (iii) savings ratios out of wages and profits; and (iv) consumption patterns associated with the two types of income. Moreover, it includes, as special versions or limit cases, the usual Keynesian multiplier, the multipliers of the traditional input-output analysis, and their Marxian versions.[8]

The analytical framework of our estimations has been described in detail in Mariolis and Soklis (2015) and in Mariolis et al. (2018). The basic equation derived from this analysis is given by

$$\boldsymbol{y} = \boldsymbol{\Pi d}$$

where $\boldsymbol{\Pi}$ denotes the $n \times n$ matrix of multipliers linking the $n \times 1$ vector of autonomous demand (government expenditures, investments, and exports), $\boldsymbol{d}$, to the $n \times 1$ vector of net output, $\boldsymbol{y}$, and n is the number of produced commodities (sectors) of the economy.

For this purpose, we use Input-output data from the Supply and Use Table (SUT) of the Greek economy for the year 2015, provided via ELSTAT.[9]

3.2. The multiplier effects of international travel receipts

The empirical results suggest that a decrease in international travel receipts by €1 million would lead to a total (direct and indirect):

- decrease in GDP of about €1.076 million
- decrease in the levels of total employment of about 26.403 persons
- decrease in the balance of goods and services of about €0.676 billion, of which more than two-thirds are due to losses of receipts for accommodation and food services.

TABLE 2 The distribution (%) of the losses in GDP per commodity

Commodity	The distribution of the losses in GDP
Accommodation and Food Services	52.1%
Real Estate Services	11.4%
Land Transport Services	8.4%
Wholesale and Retail Trade	4.3%
Arts and Entertainment	4.2%
Air Transport Services	4.2%
Other Commodities	14.4%

Source: Authors' estimations.

TABLE 3 The distribution (%) of the losses in employment per sector

Sector	Distribution of the losses in employment
Hotel and Restuarants	31.0%
Agriculture	17.9%
Land Transport Activities	5.9%
Personal Service Activities	5.9%
Foods	4.2%
Wholesale and Retail Trade	4.1%
Other Sectors	31.0%

Source: Authors' estimations.

Tables 2-4 describe the distribution (%) of the losses in GDP (employment) per commodity (sector) and the distribution (%) of the decrease or increase in the balance of goods and services per commodity.

8. The concept of the Sraffian multiplier is based on Kurz (1985), Metcalfe and Steedman(1981) and Mariolis (2008). For its empirical applications, see, e.g., Mariolis and Soklis (2018) and Mariolis et al. (2018).

9. See Rodousakis and Soklis (2020a).

TABLE 4 The distribution (%) of the decrease in the balance of goods and services per commodity

Commodity	The distribution of the decrease in the balance of goods and services per commodity
Accommodation and Food Services	67.7%
Land Transport Services	10.9%
Real Estate Services	9.4%
Minerals	-7.0%
Wholesale and Retail Trade	5.8%
Air Transport Services	5.2%
Other Commodities	8.0%

Source: Authors' estimations.

3.3. The negative effects of declining international travel receipts

Taking into account the GDP of the Greek economy for the year 2019, the level of employment, and the deficit of the balance of goods and services, the application of the previous analysis indicates that a decrease in international travel receipts by 1 billion euros would lead to a total (direct and indirect):

- decrease in GDP of about 0.57%
- decrease in employment of about 0.61%
- increase in the deficit of the balance of goods and services of about 38.9%

Particularly, a decrease of international travel receipts in the range of, say, 50% would lead, *ceteris paribus*, to a total:

- decrease in GDP of about 5.2%
- decrease in the levels of employment of about 5.6%
- increase in the trade balance deficit of about €6.113 billion.

Finally, the extreme scenario of a total loss of international travel receipts would lead, *ceteris paribus*, to a total:

- decrease in GDP of about 10.4%
- decrease in the levels of employment of about 11.2%
- increase in the deficit of the balance of goods and services of about € 12.226 billion.

3.4. A comparison between the effects of declining international travel receipts and increasing government spending

The empirical results suggest that an increase in government spending by €1 million would lead to a total (direct and indirect):

- increase in GDP of about €1.487 million
- increase in the levels of total employment of about 33.524 persons
- decrease in the deficit of the balance of goods and services of about €0.359 million

From this comparison, it follows that the multiplier effects of government spending on the Greek economy are stronger than those of the tourism sector. Furthermore, in order to give an idea of the relative weight of the public sector in comparison with tourism, we note that according to the most recent relevant data of ELSTAT, which relate to the year 2017, the sectors related to public sector activities constitute 20.3% of gross value added and 21.5% of employment in the Greek economy. Therefore, well-targeted fiscal policies and the implementation of appropriate sectoral redistributive policies could significantly offset some of the negative COVID-19 shocks in the Greek economy.

3.5. Forecasts for the recession and the impact of international travel revenues

According to the European Commission's spring forecast, the pandemic is sinking the European economy, and the Greek one even more. In 2020, GDP is projected to decline by 9.7% in Greece, compared to 7.7% in the Eurozone and 7.4% in the EU. Correspondingly, in the recent *World Economic Outlook* report, the International Monetary Fund (IMF) forecasts a 10% decline, the largest of any other economically developed member state of the Fund, with the exception of San Marino. The main argument of both the European Commission and the IMF is the great dependence of the Greek economy on tourism and, therefore, the negative impact of a decline in international travel revenues. However, given that (a) the contribution of tourism to the Greek economy is equivalent to the rest of the countries of the European South, (b) in the ex-

treme scenario that all tourist receipts are lost, the reduction of the country's GDP will be about 10.4%, and (c) some of these losses may be offset by an increase in government spending, the Ministry of Finance's estimates for a 5% to 7% recession seem, given current data, more valid.[10]

3.6. Conclusions

In this article we have analyzed the contribution of the tourism sector to the Greek economy and the effects that the shrinking tourism demand will have in 2020 due to the spread of Covid-19; at the same time, the compensatory role of the public sector in reducing the recession has been also analyzed. Therefore, the main findings of our analysis are:

- The methods commonly used to assess the contribution of tourism to the Greek economy are not correct and lead to a significant overestimation of the weight of tourism.
- The contribution of tourism to the Greek economy, as evidenced by the tourism ratio, is significantly higher than the EU average, but in absolute proportion to the contribution of tourism in the countries of the European South.
- As evidenced by the effects on the Greek economy through the Sraffian multiplier, in the extreme scenario of zero international travel receipts, the reduction in the GDP would be, *ceteris paribus,* 10.4%, the reduction in employment 11.2% and the increase in the trade balance deficit by approximately €12.226 billion.
- The multiplier effects of government spending on the Greek economy are significantly stronger than those of the tourism sector.

Given that the public sector accounts for about 1/5 of the Greek economy in terms of production and employment, the expansion of fiscal policy combined with the exercise of appropriate redistributive sectoral policies makes it possible to offset a significant part of the negative impact of declining international travel. Therefore, the predictions based on the overestimation of the role of tourism in the Greek economy for the extent of the recession in the Greek economy do not seem to be correct. On the other hand, the effects of the recession on employment, the foreign sector, and public finances should not be underestimated, and the exact amount of the recession will depend on the corresponding course of both investment and other exports of the economy.

References

Eurostat (2019), *Tourism Satellite Accounts in Europe*, 2019 Edition, Statistical Reports, Luxembourg: Publications Office of the European Union.

Hackl, P. and Chatzimarinakis, S. (2017), *TSA for Greece: Potential and Needs*. General Report, Technical Assistance action to support tourism planning and policy for the promotion of sustainable tourism development in Greece.

Kurz, H. D. (1985), Effective demand in a "classical" model of value and distribution: the multiplier in a Sraffian framework, *The Manchester School*, 53, pp. 121-137.

Mariolis, T. (2008), Pure joint production, income distribution, employment and the exchange rate, *Metroeconomica*, 59, pp. 656-665.

Mariolis, T. and Soklis, G. (2015), The Sraffian multiplier for the Greek economy: Evidence from the Supply and Use Table for the year 2010, Centre of Planning and Economic Research (KEPE), *Discussion Paper No. 142*.

Mariolis, T. and Soklis, G. (2018), The Static Sraffian Multiplier for the Greek Economy: Evidence from the Supply and Use Table for the Year 2010, *Review of Keynesian Economics*, 6, 114-147.

Mariolis, T., Ntemiroglou, N. and Soklis, G. (2018), The Static Demand Multipliers in a Joint Production Framework: Comparative Findings for the Greek, Spanish and Eurozone Economies, *Journal of Economic Structures*, 7:18.

Metcalfe, J. S. and Steedman, I. (1981), Some long-run theory of employment, income distribution and the exchange rate, *The Manchester School*, 49, pp. 1-20.

Rodousakis, N. and Soklis, G. (2020a), The COVID-19 effects on the Greek economy: The special case of the tourism sector (in Greek), Centre of Planning and Economic Research (KEPE), *Technical Report* No. 2/2020.

Rodousakis, N. and Soklis, G. (2020b), The COVID-19 effects on the Greek economy: The key role of the public sector (in Greek), Centre of Planning and Economic Research (KEPE), *Technical Report* No. 3/2020.

Rodousakis, N. and Soklis, G. (2020c), Effects of COVID-19 on the Greek Economy: The total imprint of the pandemic (in Greek), Centre of Planning and Economic Research (KEPE), *Technical Report* No. 7/2020.

Vagionis, N. and Soklis, G. (2019), Developments in the Greek tourism sector, *Greek Economic Outlook,* No. 40, pp. 39-48.

Vagionis, N. and Soklis, G. (2020), Outlook of the Greek tourism sector, *Greek Economic Outlook,* No. 41, pp. 47-59.

10. See Rodousakis and Soklis (2020c).

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