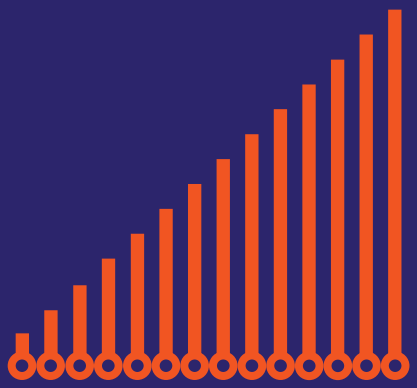
CENTRE OF PLANNING AND ECONOMIC RESEARCH

Issue 29, February 2016

# GREEK ECONOMIC OUTLOOK



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

# Contents

Issue 29 - February 2016

Editorial 3

1. Macroeconomic analysis and projections 4

1.1. Recent developments and prospects in the main demand components 4

1.2. Recent Current Account developments (January-September 2015) 10

1.3. The Evolution of the Consumer Price Index (CPI) in Greece and the Eurozone 12

1.4. Factor model forecasts for the short-term prospects in GDP 14

2. Public finance 16

2.1. State Budget execution 2015 16

2.2. Evolution and structure of Public Debt 20

3. Human resources and social policies 24

3.1. Recent developments in Greek labour market key variables 24

3.2. Recent developments in income inequality and distribution 31

4. Development policies and sectors 36

4.1. Export prospects in the fruit and vegetable sector 36

4.2. Competitiveness of the Greek Economy 42

4.3. Natural gas networks and market: Developments and prospects 47

Special topics

Assessment of the impact from changes in the heating oil excise duty on consumption and state revenues 52

Recent developments in the Western Balkans: Economic outlook and geopolitical challenges 63

The effects of the Greek bonds exchange program (PSI+) and the impaired provisions for the systemic banks' equity 71

The impact and the evolution of investment psychology in the Greek stock market 79

Forthcoming in series KEPE STUDIES 87

# Editorial

Issue 29 of the *Greek Economic Outlook* is being published at a time when many crucial issues remain open due to the ongoing assessment of the economic policy programme. These include social security reform, targeted at ensuring the viability of the system and guaranteeing a viable pension for future generations of Greek citizens, and tax system reform, through which the government hopes to achieve a fair and balanced distribution of the tax burden among all taxpayers. Finally, as negotiations on the fiscal gap are still ongoing, our journal hopes to contribute to this dialogue by presenting informative articles and policy proposals.

In this context, the articles presented in Part One examine important current topics relating to the Greek economy, namely factor model forecasts for short-term prospects of the GDP, recent developments and prospects in the main demand components and current account, and the evolution of the Consumer Price Index (CPI) in Greece. Public finances are also examined, specifically through the analysis of the 2015 State Budget execution as well as the evolution and structure of Public debt. The section on human resources and social policies discusses recent developments in key variables of the Greek labour market as well as income inequality and distribution. Finally, sectoral policies are examined through the analysis of the export prospects in the fruits and vegetable sector, the competitiveness of the Greek economy and the developments and prospects of the natural gas market.

Part Two of the journal hosts four articles that attempt to present a deeper and more specialised analysis of important current topics. The first article presents an "Assessment of the impact from changes in the heating oil excise duty on consumption and state revenues". The second article examines the "Recent developments in the Western Balkans: Economic outlook and geopolitical challenges", while the third article analyses "The effects of the Greek bonds exchange program (PSI+) and the impaired provisions for the systemic banks' equity". Finally, the last article studies "The impact and the evolution of investment psychology in the Greek stock market".

*RITSA PANAGIOTOU*
*Editor*

# 1. Macroeconomic analysis and projections

## 1.1. Recent developments and prospects in the main demand components

*Ersi Athanassiou*

According to the latest seasonally adjusted data of the quarterly National Accounts (ELSTAT, provisional data, November 2015), the third quarter of 2015 was characterized by the return of recessionary conditions in the Greek economy, with the rate of change of the GDP amounting to -1.1% compared to the corresponding quarter of the previous year (see Table 1.1.1). Important factors behind this negative turn in the GDP were the adverse developments in domestic demand, due to the conditions induced by the imposition of the bank holiday and capital controls. These conditions were largely responsible for both the sharp decline in fixed capital investment in the third quarter of 2015 and the concurrent significant deceleration of the rate of change of private consumption, which nevertheless remained positive compared to the corresponding period of the previous year. Overall, the decline in domestic demand in the midst of these conditions reached -1.4% in the third quarter of 2015, resulting in a corresponding negative contribution of -1.43 percentage points to the rate of change of the GDP (Figure 1.1.1).

With respect to developments in the external sector during the third quarter of 2015, the bank holiday and capital controls had major consequences both for exports, where the previously upward trend was sharply reversed, and for imports, which declined strongly, having already entered a downward path in the second quarter of the year. On the whole, the large positive contribution to the rate of change of the GDP from the decrease in imports outweighed the corresponding negative contribution from the decline in exports by a considerable margin. As a result, the overall contribution of the external sector to the rate of change of the GDP was significantly positive (2.95

**TABLE 1.1.1 Main macroeconomic data**

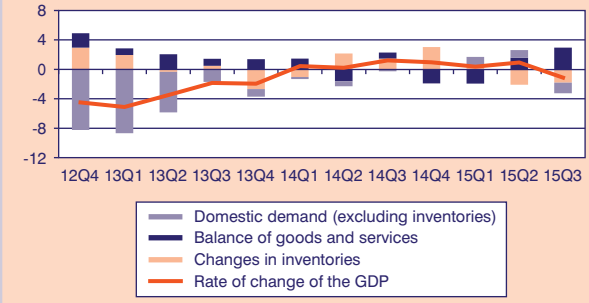
*% rates of change compared to the corresponding period of the previous year (seasonally adjusted data at constant prices)*

| | 2014Q1 | 2014Q2 | 2014Q3 | 2014Q4 | 2015Q1 | 2015Q2 | 2015Q3 | 9 month period Jan. – Sept. 2015 | 9 month period Jan. – Sept. 2014 |
|---|---|---|---|---|---|---|---|---|---|
| Private consumption | 1.1 | 0.2 | 0.7 | 0.8 | 0.7 | 1.8 | 0.3 | 0.9 | 0.6 |
| Public consumption | 0.4 | 1.9 | -3.5 | -8.1 | 0.4 | -1.5 | 0.4 | -0.2 | -0.4 |
| Gross fixed capital formation | -8.9 | -8.0 | 2.0 | 4.8 | 10.1 | -0.5 | -12.9 | -1.4 | -5.1 |
| Domestic demand* | -0.3 | -0.7 | -0.3 | -0.1 | 1.4 | 1.1 | -1.4 | -0.5 | -6.7 |
| Exports of goods and services | 5.1 | 4.7 | 9.4 | 10.3 | 3.2 | 1.4 | -11.4 | -2.5 | 6.4 |
| Exports of goods | 1.6 | -0.7 | 2.4 | 11.2 | 5.7 | 2.0 | 0.7 | 2.8 | 1.1 |
| Exports of services | 10.9 | 11.4 | 17.1 | 9.8 | 0.9 | 0.4 | -24.9 | -8.6 | 13.2 |
| Imports of goods and services | -0.2 | 9.7 | 6.0 | 16.2 | 9.3 | -3.5 | -19.9 | -5.0 | 5.1 |
| Imports of goods | -0.8 | 10.5 | 6.9 | 17.7 | 8.6 | -4.2 | -16.3 | -4.3 | 5.4 |
| Imports of services | 2.7 | 6.2 | 2.0 | 9.6 | 12.1 | -0.6 | -34.5 | -8.2 | 3.6 |
| Balance of goods & services | -44.6 | 84.7 | -33.4 | 122.5 | 106.7 | -44.8 | -177.9 | 2.5 | -37.2 |
| GDP | 0.4 | 0.2 | 1.2 | 1.0 | 0.4 | 0.9 | -1.1 | 0.1 | 0.6 |

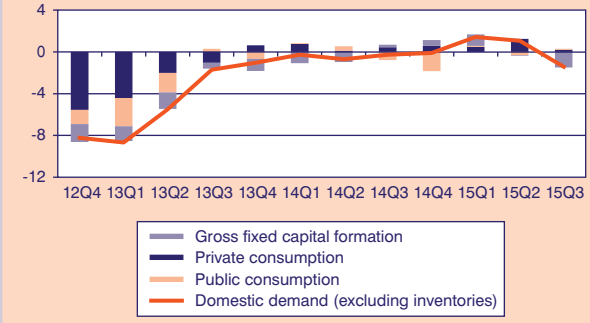
*Source: National Accounts*, ELSTAT (November 2015), own calculations.

* Excluding the change in inventories.

**FIGURE 1.1.1**
**Contributions to the rate of change of the real GDP**
*Domestic and net external demand*

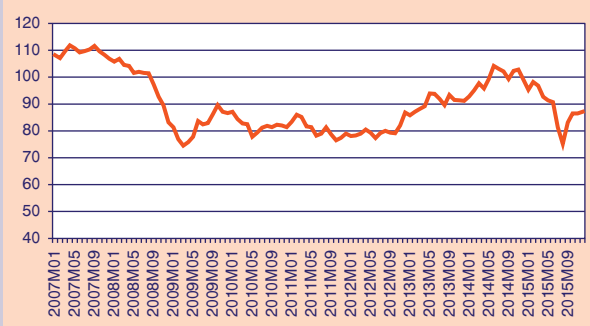



*Individual components of domestic demand*




*Source: National Accounts*, ELSTAT, own calculations.

**FIGURE 1.1.2**
**Economic sentiment indicator**




*Source:* Eurostat.

percentage points), thus playing a decisive role in reducing the depth of the recession.

From the aforementioned evolution in the figures of domestic demand and the external sector, it is evident that developments in inventories played a major role in shaping the negative rate of change of the GDP in the third quarter of 2015. During a period in which the smooth flow of imports was seriously disrupted, part of the pressing needs of the market for imported goods and raw materials was covered via the consumption of stocks. As a result of this phenomenon, the contribution of the change in stocks to the rate of change of the GDP during the third quarter of 2015 was considerably negative (-1.8 percentage points).

The deterioration of conditions in the Greek economy, as depicted in the aforementioned National Accounts data, are also reflected in the major decline of the economic sentiment indicator in July and August 2015 (see Figure 1.1.2). However, the more recent significant recovery of this indicator in September, October and December 2015 appears to mark a gradual return of the economy to more normal conditions, following the new agreement for the financing of the country and the completion of the process of national elections in September.

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

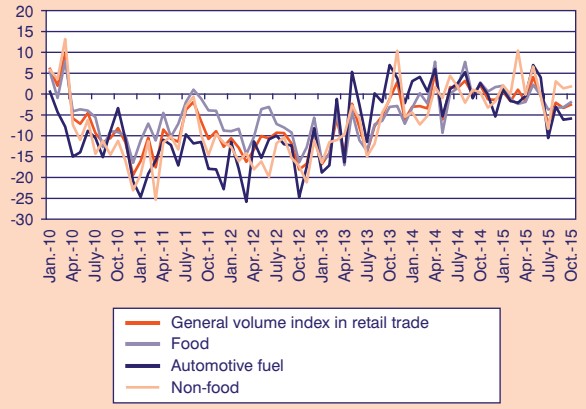
## 1.1.1. Private consumption

The momentum built up in private consumption until the second quarter of 2015 weakened significantly in the third quarter of the year, without, however, being fully eliminated. In particular, according to the seasonally adjusted data of the National Accounts, the rate of change of private consumption stood at 0.3% in the third quarter of 2015, from 0.7% and 1.1%, respectively, in the first and second quarters of the same year. Thus, the contribution of private consumption to GDP growth amounted to only 0.2 percentage points in the third quarter of 2015, from 0.5 and 1.2 points in the previous two quarters.

Additional indications regarding the recent dynamics of private consumption expenditure are provided by the evolution of the monthly volume index in retail trade for the period July-October 2015.[1] More particularly, following the fluctuations recorded during the first half of the year, the general index moved consistently downwards thereafter, with a heavy negative percentage change observed in July (-7.2%), and relatively milder decreases recorded in August (-2.1%), September (-3.3%) and October 2015 (-2.5%). Negative contri-

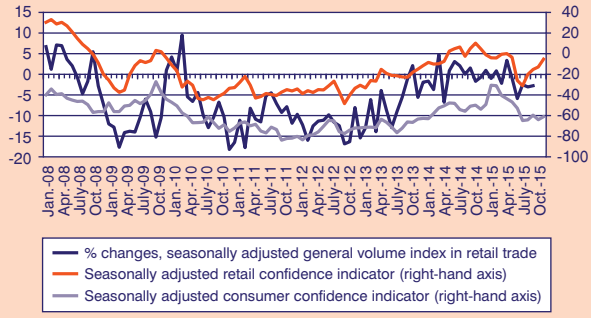
1. The data for October are provisional.

**FIGURE 1.1.3**
**Percentage changes in the general volume index and the main sector indices in retail trade**




*Source:* ELSTAT, own calculations.

**FIGURE 1.1.4**
**General volume index in retail trade and confidence indicators**




*Source:* ELSTAT, EUROSTAT, own calculations.

butions to the development of the general index came from the side of two of the three main retail sector categories, namely the *automotive fuel* sector and the *food* sector. Concerning the evolution of the index of the *non-food* sector, the relevant percentage change was negative only in July, while in the next three months the index followed an upward course (Figure 1.1.3).

The above trends are also mirrored in the evolution of the indices in the individual retail store sub-categories, where, in six out of the eight cases, the period from July to October 2015 was characterized by negative developments. More particularly, the indices referring to *supermarkets, department stores, automotive fuel, food-beverages-tobacco, pharmaceuticals-cosmetics* and *furniture-electrical equipment-household equipment* registered negative percentage changes for this period as a whole, compared to the corresponding period of 2014 (amounting to -3.2%, -4.7%, -6.3%, -1.7%, -2.5% and -9.4%, respectively). On the contrary, positive developments took place over the same period in the indices of the *clothing-footwear* and *books-stationery-other books* sub-categories (amounting to 7.4% and 6.1%, respectively). It is worth noting that in July 2015 all eight individual sub-categories recorded significant decreases in their indices, while subsequently there were mostly either milder decreases or a return to positive rates of change.

The data and indicators analysed above point to (a) the significant consequences for private consumption arising from the imposition of the bank holiday and capital controls and (b) the unwinding of the relevant negative pressures to private consumption after the agreement on the third Financial Assistance Programme for Greece and the completion of the September election process. Nevertheless, it is notable that the reaction of private consumption to the critical economic developments that took place in recent months was rather moderate, perhaps due to the continued modest improvement of the main labour market indicators, as well as the rising course of tourism receipts.

With respect to the prospects of private consumption, an important role in the short-term is expected to be played by the possible adverse effects on household disposable income, in the framework of the implementation of the Financial Assistance Programme. Nevertheless, the smooth progress of the programme will be decisive for the further reduction of uncertainty, and the establishment of the stability and safety conditions required for the definitive recovery of private consumption to viable rates of growth. In any case, on the basis of the consumer and retail confidence indicators, the expectations of both consumers and retailers with respect to the course of private consumption appear to have recently improved. More specifically, the retail confidence indicator increased rapidly after August 2015, amounting to -5.3 in December, from -31.0 in July of the same year. Furthermore, the trend followed by the consumer confidence indicator was also in the same direction, with the indicator's value amounting to -61.1 in December, from -64.8 in August 2015 (Figure 1.1.4).

## 1.1.2. Investment

The path of recovery which gross fixed capital formation had followed since the third quarter of 2014, was interrupted in the second quarter of 2015 and was subsequently fully reversed, with the rate of change of investment expenditure subsiding to -12.9% in the third quar-

ter of the year (Table 1.1.2). As a result, the contribution of investment to the rate of change of the GDP equalled -1.5 percentage points in the third quarter of 2015, from 1.1 and -0.1 points in the previous two quarters.

Specifically, with regard to investment other than construction, developments in the individual categories during the third quarter of 2015 were, in most cases, characterized by a sudden deterioration. More particularly, expenditure on machinery and equipment and ICT equipment registered a marked drop during this period (-15.7% and -15.1%, respectively), following five consecutive quarters of recovery. At the same time, investment in transport equipment declined significantly (-11.1%), following nine consecutive quarters of rapid growth, while investment in other products remained stagnant (0.1%).

With respect to investment in construction, expenditure in other constructions declined significantly in the third quarter of 2015 (-13.1%), having already reverted to a downward course during the fourth quarter of 2014. In addition, a further sharp decline was recorded in the case of investment in dwellings (-34.3%), which has followed a nearly uninterrupted path of rapid contraction since mid-2008.

The adverse developments in fixed capital investment during the third quarter of 2015 reflect the significant deterioration of the country's investment climate in the course of this period. The escalating uncertainty regarding the outcome of negotiations with the institutions, the imposition of the bank holiday and capital controls, and the related informal suspension of payments on the part of the state, intensified the market's financing and liquidity problems, undermined investor confidence and contributed to delays in the progress of road works and other construction projects. In parallel, these conditions, combined with both the continuation of the regime of high taxation on real estate property, and the uncertainty with respect to the direct effects on the real estate market from the measures aimed at addressing the non-performing loans problem, have left no margins for the stabilization of the housing market. Thus, the decline of investment expenditure in dwellings has been prolonged, despite the historically low levels to which this expenditure has already subsided.

Additional information about recent developments in residential investment is derived from the residential buildings indicator with respect to square meters of useful floor area, based on building permits. Both the individual monthly observations of the residential buildings indicator, and the estimated private building activity,[2] exhibited significant deterioration during the most recent period of reference. More particularly, the monthly percentage changes in the residential buildings indicator were negative in July, August and

**TABLE 1.1.2 Main investment aggregates**

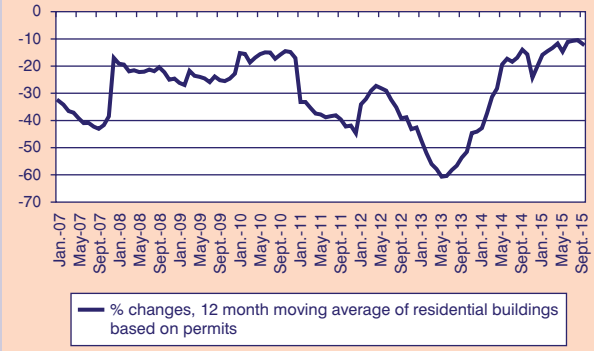
*% rates of change compared to the corresponding period of the previous year (seasonally adjusted data, constant prices)*

| | Quarters | | | | | 9 month period Jan. – Sept. | |
|---|---|---|---|---|---|---|---|
| | 2014Q3 | 2014Q4 | 2015Q1 | 2015Q2 | 2015Q3 | 2015 | 2014 |
| Cultivated assets | -15.1 | 59.0 | -17.1 | -35.9 | -34.8 | -30.6 | -13.1 |
| Other machinery and equipment and weapon systems | 18.1 | 19.7 | 22.9 | 8.7 | -15.7 | 4.1 | 5.3 |
| Transport equipment and weapon systems | 20.0 | 101.4 | 86.4 | 18.1 | -11.1 | 26.4 | 21.1 |
| Information Communication Technology (ICT) equipment | 26.0 | 31.3 | 31.3 | 3.7 | -15.1 | 4.6 | -0.5 |
| Dwellings | -44.4 | -52.2 | -30.4 | -8.3 | -34.3 | -25.1 | -52.3 |
| Other construction | 5.6 | -6.8 | -13.6 | -12.7 | -13.1 | -13.1 | 5.1 |
| Other products | -4.5 | -4.0 | -0.9 | 0.0 | 0.1 | -0.3 | -1.9 |
| Gross fixed capital formation | 2.0 | 4.8 | 10.1 | -0.5 | -12.9 | -1.4 | -5.1 |

*Source: National Accounts*, ELSTAT (November 2015), own calculations.

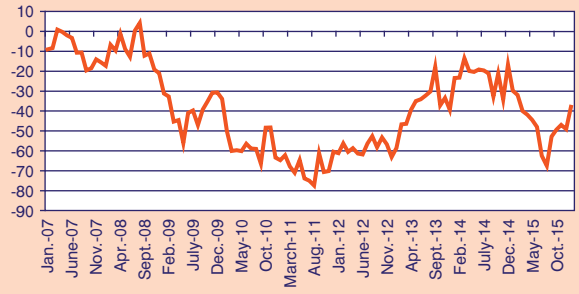
2. A twelve-month moving average and the related percentage point changes are calculated.

**FIGURE 1.1.5**
**Estimated residential building activity based on permits**




*Source:* EUROSTAT.

**FIGURE 1.1.6**
**Construction confidence indicator**




*Source:* EUROSTAT.

September 2015 (-30.6%, -12.1% and -16.0%, respectively), while, in parallel, there was a continuation of the negative rates of change of the estimated private building activity (-10.7% in July, -10.5% in August and -11.9% in September) (Figure 1.1.5).

For the construction sector as a whole, additional information is derived from the available statistical data on the course of the general production index in construction during the third quarter of 2015.[3] As it appears, the index exhibited a negative turn in this period, recording a decline in the area of -29.5% compared to the corresponding quarter of 2014. This development was due both to the sharp fall of the sub-index of production of civil engineering (-37.7%), which relates to infrastructure works (e.g. highways, bridges, tunnels, pipelines, networks and port development), and to the negative shift in the sub-index of production of building construction (-15.1%), which reflects developments in the construction of dwellings, industrial and commercial buildings and other buildings.

Regarding the short-term prospects for fixed capital investment, the liquidity and financing conditions of the domestic business sector, as well as the attractiveness of investment in the country, have not as yet recovered from the additional blow imposed by the capital controls. Nevertheless, the new agreement for the financing of the country includes €35 billion in European funds for the support of growth, and provides for the promotion of crucial structural reforms which can contribute decisively to the improvement of the investment climate in the country. These prospects, in combination with the dynamics already exhibited by investment prior to the recent adverse developments, justify a certain degree of optimism for the recovery of investment within the current year. This assessment is in accordance with the most recent developments in the construction confidence indicator, which returned to an upward course after August 2015 (Figure 1.1.6). However, it must be emphasized that the fulfilment of these expectations is conditional upon the smooth implementation of the new Financing Programme.

## 1.1.3. External balance of goods and services

As mentioned above, the recent course of the main external sector aggregates was gravely affected by the critical developments in the Greek economy, and more particularly by the bank holiday and capital controls.

Specifically, concerning imports, the third quarter of the year was characterized by a major decline both in the case of goods (-16.3%) and in the case of services (-34.5%), the result being a positive contribution of 6.49 percentage points to the rate of change of the GDP (see Figure 1.1.7). In parallel, with respect to exports, their contribution to the rate of change of the GDP amounted to -3.87 percentage points during the same period, as in the field of services, exports declined by a considerable -24.9%, while in the field of goods, exports increased by a marginal 0.7%. It is worth noting that the decline in services exports was a result of the dramatic decline of receipts in the categories of transportation and other services (by -53.4% and -37.8%, respectively, according to Bank of Greece data), which was, however, mitigated to a certain degree by the continuing increase in tourism receipts (by 2.5% according to Bank of Greece data).

3. Note that the reference concerns the indicator adjusted for the number of working days while data for the third quarter of 2015 are provisional.

**FIGURE 1.1.7**
**Contributions to the rate of change of the GDP**
*Individual components of external demand*


*Source: National Accounts*, ELSTAT, own calculations.

Concerning the prospects of the external sector, its contribution to the rate of change of the GDP is, at first, expected to decline as import procedures progressively return to normal. Further along, in the course of 2016, the contribution of the external sector to the GDP will depend on the further improvement of performance with respect to services exports, on the strengthening of goods exports, but also on the degree to which a possible increase in internal demand will be covered more by domestically produced goods and less by imports. It is clear that in the current conjuncture, a decisive role in the country's performance in the above fields will be played by the implementation of the new investment necessary for the strengthening of the country's productive capacity.

## 1.1.4. Conclusions and prospects

According to the above analysis of the main demand components, the fragile growth dynamics which the Greek economy appeared to develop until recently were seriously disrupted by the critical developments that took place in the country in the course of 2015. As a result, the rate of change of the GDP switched back to a negative level in the third quarter of that year.

In the short term, the negative pressures on the GDP from the domestic demand side are expected to continue, while, in parallel, the positive contribution to the rate of change of the GDP from the side of the external sector is expected to decline. Consequently, and according to the forecasts provided by the KEPE dynamic factor model (see Section 1.4), Greece's GDP is expected to move downwards until mid-2016. Further along, however, the prospect of smooth implementation of the new Financial Support Programme justifies a certain degree of optimism for an increase in consumption and a recovery of investment within 2016, as it will contribute progressively to the definitive stabilization of the economy, the reduction of uncertainty and the resolution of the serious difficulties in the liquidity and financing of businesses. These conditions will also determine, to a significant extent, the margins for a substantial improvement in the country's export performance within 2016 and onwards.

# 1.2. Recent Current Account developments (January-September 2015)

*Ioanna Konstantakopoulou*

The Greek economy has shown a surplus in the Current Account of €1.77 billion in the first nine months of 2015. As a percent of GDP it stood at 1.34% compared to 0.04% of GDP in the corresponding period of 2014. This positive development (see Tables 1.2.1 and 1.2.2) comes from the improvement in the result of the trade balance and reflects the decrease of goods imports. In particular, imports of goods amounted to €31.4 billion, down by 13.78% compared to the same period of 2014. The decline in oil prices led to a reduction in oil imports, which is the main component of Greek goods imports. The services balance shows a marginal decrease due to reduced receipts from transport services, while the primary income balances and secondary income showed no significant changes.

## 1.2.1. Trade balance

In the first nine months of 2015, the goods balance deficit as a percentage of GDP stood at 9.73% compared with 12.4% in the same period of 2014 (see Figure 1.2.1.). In absolute terms, the deficit amounted to €12.85 billion, compared with €16.5 billion in the corresponding period of 2014.

**TABLE 1.2.1 Current Account** *(as percent of GDP)*

| | CA | Goods | Exports | Imports | Sevices | Primary Income | Secondary Income |
|---|---|---|---|---|---|---|---|
| 2009 | **-12.37** | -13.97 | 7.46 | 21.43 | **4.84** | **-2.84** | **-0.40** |
| 2010 | **-11.44** | -13.49 | 9.30 | 22.80 | **5.36** | **-2.53** | **-0.78** |
| 2011 | **-10.01** | -12.70 | 11.52 | 24.21 | **6.57** | **-3.15** | **-0.73** |
| 2012 | **-3.83** | -11.00 | 14.20 | 25.20 | **7.24** | **0.43** | **-0.50** |
| 2013 | **-2.05** | -11.52 | 14.91 | 26.43 | **8.73** | **-0.25** | **1.00** |
| 2014 | **-2.12** | -12.55 | 15.09 | 27.63 | **10.29** | **0.32** | **-0.19** |
| 2014 (Jan.-Sept.) | **0.04** | -12.41 | 14.98 | 27.39 | **11.82** | **0.57** | **0.07** |
| 2015 (Jan.-Sept.) | **1.34** | -9.73 | 14.06 | 23.79 | **11.31** | **-0.03** | **-0.20** |

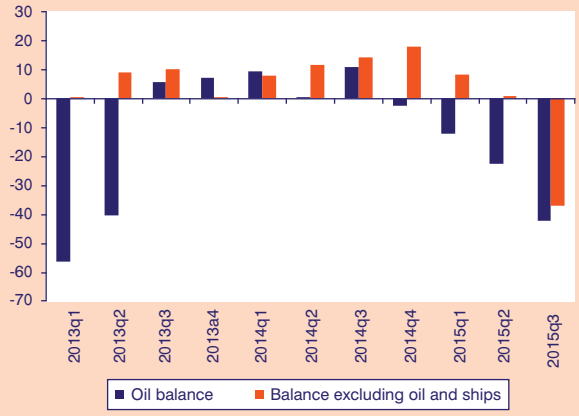
*Source:* Bank of Greece and ELSTAT.

**TABLE 1.2.2 Current Account** *(in EUR billions)*

| | CA | Goods | Exports | Imports | Sevices | Primary Income | Secondary Income |
|---|---|---|---|---|---|---|---|
| 2009 | **-29.37** | -33.19 | 17.72 | 50.91 | **11.50** | **-6.74** | **-0.95** |
| 2010 | **-25.85** | -30.49 | 21.03 | 51.53 | **12.12** | **-5.71** | **-1.76** |
| 2011 | **-20.72** | -26.29 | 23.84 | 50.13 | **13.61** | **-6.53** | **-1.51** |
| 2012 | **-7.33** | -21.03 | 27.15 | 48.18 | **13.84** | **0.82** | **-0.95** |
| 2013 | **-3.69** | -20.78 | 26.90 | 47.68 | **15.75** | **-0.46** | **1.80** |
| 2014 | **-3.77** | -22.28 | 26.79 | 49.07 | **10.29** | **0.57** | **-0.33** |
| 2014 (Jan.-Sept.) | **0.05** | -16.50 | 19.91 | 36.42 | **15.72** | **0.76** | **0.09** |
| 2014 (Jan.-Nov.) | **-1.90** | -20.24 | 24.66 | 44.90 | **17.75** | **0.62** | **-0.03** |
| 2015 (Jan.-Sept.) | **1.77** | -12.85 | 18.56 | 31.40 | **14.92** | **-0.04** | **-0.26** |
| 2015 (Jan.-Nov.) | **1.05** | -15.75 | 22.72 | 38.47 | **16.67** | **0.42** | **-0.27** |

*Source:* Bank of Greece.

**FIGURE 1.2.1**
**Oil balance and balance excluding oil and ships (% change compared to the corresponding quarter of the previous year)**




*Source:* Bank of Greece.

This positive development comes from the reduction in the oil trade deficit of €1.25 billion compared to the same period of 2014, primarily due to the sharp decline in oil prices. It is known that the Greek economy has complete oil dependency. We observe (see Figure 1.2.1) that the shrinking of the oil trade deficit began from the first quarter of 2015 and continued until the third quarter of 2015. Indicatively, we note that fuel imports decreased by €3.15 billion during the first nine months of 2015 compared to the corresponding period of 2014, while oil exports decreased by €1.9 billion. The imposition of capital controls in June 2015 led to the fall of imports excluding oil and ships and, at a later stage, to shrinking the trade balance deficit. Particularly, the imports of goods excluding oil and ships shrank by €1.3 billion compared to the corresponding quarter of 2014, while exports remained at the same level.

Moreover, the imposition of capital controls affected the balance of ships, the deficit of which shrank and amounted to €0.36 billion (see Figure 1.2.1), since the recording of the buying and selling of ships has not been possible.

## 1.2.2. Services balance

The surplus in the services balance expressed as a percentage of the GDP was 11.3% in the first nine months of 2015, down by 4.32% compared to the corresponding period of 2014. In absolute terms, the surplus stood at €14.92 billion. This decline comes mainly from the decrease in the net transport services receipts by €1.44 billion compared to the first nine months of 2014. The main reason for the above mentioned development is the reduction in transport receipts of around €1.71 billion compared to the first nine months of 2014. Net travel receipts increased by €0.53 billion compared to the same period of 2014, and, therefore, the imposition of capital controls has not affected tourist traffic.

## 1.2.3. Primary Income

The primary income surplus in the first nine months of 2014 turned into a marginal deficit of €0.04 billion, decreased by €0.8 billion. As regards the component of the payments from portfolio investment, where interest payments are recorded for the Greek government securities, a reduction of payments of around €0.394 is observed.

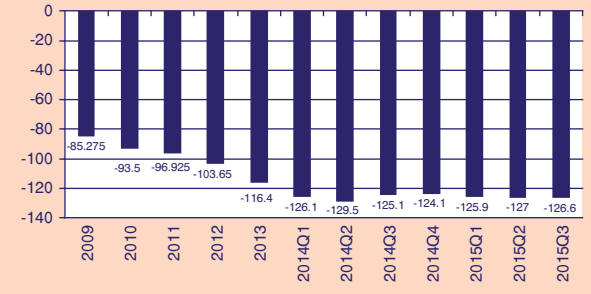
## 1.2.4. Secondary Income

The secondary income showed a deficit of €0.26 billion, up by €0.347 billion in the corresponding period of 2014. Moreover, the deficit of primary income expressed as a percentage of the GDP was 0.20%, whereas for the first nine months of 2014 it was 0.07%.

## 1.2.5. Net International Investment Position

An significant variable that reflects the state of the economy in relation to the external sector is the net international investment position. Despite the improvement of the Current Account during the crisis, net foreign liabilities continued to exceed -35% of GDP. Note that this is the threshold used in the process of macroeconomic imbalances, over which increases the probability of future shocks. The net external liabilities of the country after 2011 exceed 100% of GDP (Figure 1.2.2). More specifically, in the first nine months of 2015 the net investment position amounted to 126.5% of GDP, a marginal improvement over the corresponding period of 2014.

**FIGURE 1.2.2**
**Net International Investment Position 2009-15q3**
*(as percent of GDP)*




*Source:* Eurostat.

# 1.3. The Evolution of the Consumer Price Index (CPI) in Greece and the Eurozone

*Yannis Panagopoulos*

According to the observed trend of the Consumer Price Index (CPI) there is now some serious evidence that deflation is going to terminate in Greece. More specifically, as we can see from Table 1.3.1 and from Diagram 1.3.1, the almost zero headline inflation (-0.2%, in December 2015) and the slightly negative core inflation (-0.6, in November 2015) symbolise that we are close to the end of a deflation status regarding the Greek economy.

However, we should be slightly reserved about the termination of deflation for the beginning of 2016. The reason for this, following the ELSTAT data, goes back to July 2014 when the headline and the core inflation reached -0.3% and 0.0%, respectively, on a y-o-y[1] basis, but then the headline inflation started to decelerate again, up to -2.8%, while the core inflation reached -1.7% (December 2014). However, following a more optimistic trend, we observed that the harmonized inflation –both core and headline– is already moving with slightly positive rates (see Table 1.3.1).

Additionally, according to the Hellenic Statistical Authority (ELSTAT), the aforementioned headline deflation rate (-0.2%, y-o-y, in December 2015) can be mainly attributed to subsequent price decreases in six (6) main sub-categories, namely: (a) the "Housing" category (by 3.6%) due to reductions in the prices of house rents as well as due to reductions in the prices of residential heating and natural gas,[2] (b) the "Household equipments" category (by 1.7%) mainly due to decreases in the immediate consumption goods as well as in some household textile products, (c) the "Transportation" category (by 2.1%) mainly due to decreases in the price of cars and due to decreases in gasoline prices,[3] (d) the "Recreation and culture" category (by 1.5%) mainly due to decreases in the prices of optical and visual equipments of PCs and in the prices of leisure services and equipments, e.g. theater tickets, electronic games, newspapers, journals, etc, (e) the "Education" category (by 1.2%) mainly due to decreases in the fees for secondary schools and (f) the "Miscellaneous goods and services" category (by 3.6%) basically due to reductions of the prices of personal care products, the prices for car and motorcycle insurance and, finally, the prices for legal and accounting services.

Part of the aforementioned deflation process was offset, mainly, by the increase in the prices of five (5) subcategories, namely: (a) the "Food and non-alcoholic beverages" category (by 2.8%), due to price increases mainly in fresh fish, eggs, sweets, dried fruits, olive oil, etc.,[4]

**TABLE 1.3.1 Inflation in Greece & in the Eurozone**

| | Headline Inflation (Greece) | Core Inflation (Greece) | Harmonized inflation (Greece) | Core Harmonized inflation (Greece) | Harmonized inflation (EU19) | Core Harmonized inflation (EU19) |
|---|---|---|---|---|---|---|
| 2015M4 | -2.1 | -1.6 | -1.8 | -0.7 | 0.0 | 0.7 |
| 2015M5 | -2.1 | -1.6 | -1.4 | -0.2 | 0.3 | 0.9 |
| 2015M6 | -2.2 | -1.8 | -1.1 | 0.2 | 0.2 | 0.8 |
| 2015M7 | -2.2 | -1.7 | -1.3 | 0.1 | 0.2 | 0.9 |
| 2015M8 | -1.5 | -1.3 | -0.4 | 0.8 | 0.1 | 0.9 |
| 2015M9 | -1.7 | -1.4 | -0.8 | 0.5 | -0.1 | 0.8 |
| 2015M10 | -0.9 | -0.7 | -0.1 | 0.8 | 0.1 | 1.0 |
| 2015M11 | -0.7 | -0.6 | -0.1 | 0.6 | 0.1 | 0.9 |
| 2015M12 | -0.2 | NA | 0.4 | 0.8 | 0.1 | 0.9 |

*Source:* ELSTAT, EUROSTAT.

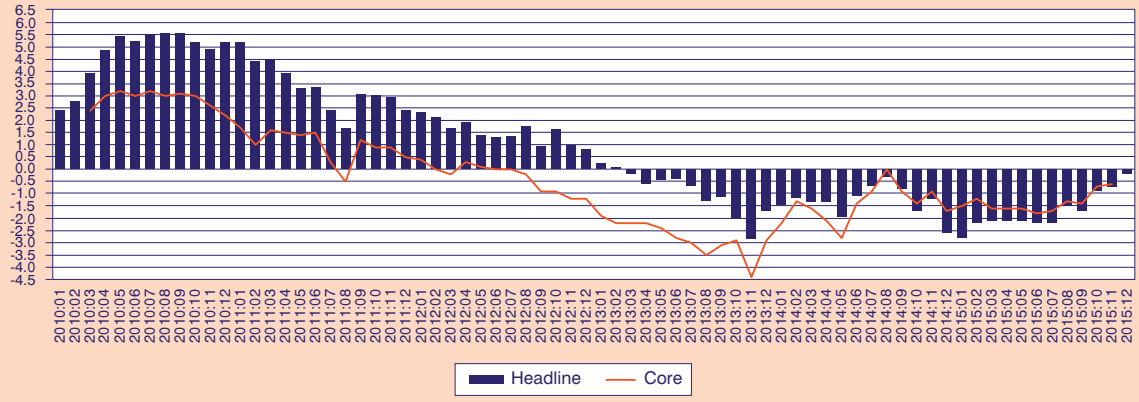
1. y-o-y: year on year.
2. Part of this reduction was offset by the increase in prices of electricity and solid fuels.
3. Part of this reduction was offset by the increase in prices of combined public transport as well as the airplane tickets.
4. Part of this increase was offset by reductions in the prices in feta cheese and poultry.

(b) the "Alcoholic, drinks and tobacco" category (by 1.4%) basically due to price increases in cigarettes, (c) the "Clothing and Footwear" category (by 0.8%) due to price increases on these products, (d) the "Health" category (by 1.1%) especially due to price increases in pharmaceutical products and private medical services[5] and (e) the "Restaurants-Hotels-Cafés" category (by 2.7%) mainly due to increases in their prices.

Regarding the harmonized inflation rates in the Eurozone, we can quote —as it is already written in the *Greek Economic Outlook* (Vol. 27)— that: "*....from Table 1.3.1 it looks like the harmonized inflation rates will soon return to positive values*". Indeed, after a short period of deflation, in May 2015 the headline harmonized inflation rate returned to positive values and remains positive (0.1%, in December 2015). This was advocated by the fact that, in the last six months, the harmonized core inflation rate of the Eurozone never fell below 0.7% and appears rather rigid around 0.8%-1.0% (see also Table 1.3.1).

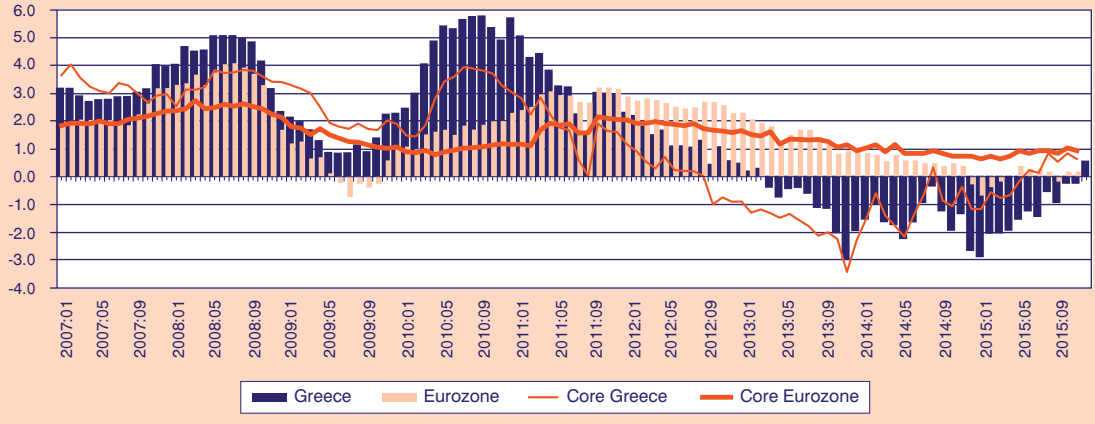
Finally, the headline harmonized inflation rates, for both Greece and the Eurozone, seem to gradually converge towards zero change. However —as observed in Diagram 1.3.2— there is one difference regarding this convergence process: in the case of the Eurozone, from the middle of 2014 onwards, the headline harmonized inflation rate converges towards zero, without any serious volatility, from the positive side of the diagram while, in the case of Greece, it converges from the negative side of the diagram, crossing the zero line only recently (December 2015). Additionally, the Greek headline harmonized inflation rate was accompanied by high volatility.

**DIAGRAM 1.3.1**
**CPI, % change relative to the respective month of the previous years**




*Source:* ELSTAT, EUROSTAT.

**DIAGRAM 1.3.2**
**Harmonized indices of consumer prices, % change relative to the respective month of the previous years**




*Source:* ELSTAT, EUROSTAT.

5. Part of this increase was offset by the decrease in prices regarding medical, dental and paramedical services.

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

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

The current section presents the updated short-term forecasts of KEPE concerning the evolution of the rate of change of real GDP in Greece in the last quarter of 2015 and the first two quarters of 2016. The forecasts are produced by implementing a dynamic structural factor model, a detailed description of which can be found in Issue 15 (June 2011) of the *Greek Economic Outlook*. The underlying time series database used to estimate the model and produce the forecasts encompasses the main aspects of economic activity in the country on a quarterly basis, spanning the time period from January 2000 up to September 2015. Specifically, the database incorporates both real economy variables (such as the main components of GDP from the expenditure side, general and individual indices concerning industrial production, retail sales, travel receipts, the labor market, the economic sentiment and business expectations) and nominal variables (such as the general and individual consumer price indices, monetary variables, bond yields, interest rates, exchange rates and housing price indices). It is noted that the seasonal adjustment of all time series was carried out by use of the Demetra+ software, which is freely available from Eurostat.[1]

According to the econometric estimates presented in Table 1.4.1, the mean annual rate of change of real GDP is predicted at around -0.2% for the whole of 2015. This forecast for a moderate recession, which incorporates published seasonally adjusted GDP data up to the third quarter of 2015 and an estimated negative rate of change of -1.2% for the last quarter of 2015, is very close to the forecast made in the preceding period of reference (-0.3%). In addition, the estimated negative rates of change for the first two quarters of 2016 point to a deterioration of economic conditions during the first half of the year, as compared to the corresponding time period of 2015. At the same time, the evolution of the forecasts indicates a tendency towards a deceleration of negative rates of change in the second quarter of 2016. More specifically, the forecast for the first half of 2016 lies at -1.1%, with the predictions for the rates of change of real GDP in the first and second quarters amounting to -1.2% and -0.9%, respectively.

The above presented forecasts of the rate of change of real GDP reflect the main dimensions of the most recent developments in the Greek economy. Given the incorporation of statistical data for the third quarter of 2015, the prediction of the continuation of recessionary conditions based on negative rates of change for the last quarter of 2015 and the first half of 2016 seems to be in agreement with the unprecedented circumstances which prevailed in the Greek economy in the second half of 2015 and their adverse effects on domestic real economic activity. More particularly, (a) the imposition of the bank holiday and capital controls, the latter being still in force, (b) the agreement on the third Financial Assistance Programme for the country, with all its potential implications in terms of additional economic burdens and new austerity measures, and (c) the uncertainty and wait-and-see stance

**TABLE 1.4.1 Real GDP rate of change**
*(%, y-o-y)*

| | 2015 | 2016 | |
|---|---|---|---|
| Quarters | 2015Q4 | 2016Q1 | 2016Q2 |
| Quarterly rate of change | -1.23<br>[-1.38 , -1.08] | -1.21<br>[-1.46 , -0.95] | -0.92<br>[-1.27 , -0.56] |
| Mean annual (2015) – and six-month (2016) rate of change | -0.18*<br>[-0.22 , -0.15] | -1.06<br>[-1.36 , -0.76] | |

*Note:* Values in brackets indicate the lower and upper boundaries of the 95% confidence interval of the forecasts.
*This figure incorporates official seasonally adjusted data for the first three quarters of 2015.

1. The TRAMO/SEATS filter was used for the seasonal adjustment.

caused by the conduction of parliamentary elections in September, acted as additional strains over the already fragile and transitory economic conjuncture that prevailed up to the first half of 2015. All the aforementioned factors adversely affected certain aspects of those economic developments which had been contributing, until recently, to the gradual unwinding of the crisis and to the slow but steady movement towards a growth track, such as the rebalancing of fiscal aggregates, the reversal of the negative dynamics in main macroeconomic variables, and the normalization of conditions in the financial sector.

The recent course of a significant number of economic variables (as examined on a non-seasonally adjusted basis) is particularly indicative of the worsening of the economic situation in the country, as compared to the corresponding periods in 2014. More specifically, private consumption expenditure returned to a negative path, after an almost uninterrupted two-year period of positive developments, while at the same time both investment and exports followed an unfavorable course. Negative developments further characterized the turnover index in industry, the volume index in retail trade, the turnover index in wholesale trade, transport receipts, private passenger car registrations, as well as the construction and building activity indicators. The deteriorating conditions in the domestic economic environment were further demonstrated in the return of most of the high frequency indicators reflecting expectations and assessments and/or displaying leading features (e.g. sectoral business expectations indicators, indicators concerning assessments on order-book levels in manufacturing and exports, as well as export expectations indicators) to almost 2012 levels, including the overall Economic Sentiment Indicator for Greece.

Among the exceptions, in other words the variables which did not exhibit negative developments during the period of reference, were travel receipts, the General Industrial Production Index, a number of competitiveness indicators, as well as the key labour market aggregates (i.e., employment and unemployment), indicating the continuation of the gradual, even if on a small scale, course of adjustment, and despite the overall particularly adverse conditions.

The actual path of real GDP in the last quarter of 2015 and the first half of 2016 can be expected to develop in a more or less favourable direction than indicated by the above presented forecasts, depending on a wide range of critical and decisive factors. These refer, on the one hand, to the major economic and structural issues facing the country, such as the promotion of the key growth pillars aiming at the enhancement of employment, the rebalancing of the main fiscal aggregates, but also the reestablishment of smooth financing conditions in the Greek economy. On the other hand, additional factors relating to the international economic, geopolitical and geostrategic developments affecting the Greek economy and society on multiple levels are anticipated to assume a key role in one direction or the other in the short to medium term.

# 2. Public finance

## 2.1. State Budget execution 2015

***Elisavet I. Nitsi***

According to the most recent data published by the General Accounting Office,[1] the execution of the 2015 State Budget shows reduced revenues relatively to 2014, as well as the recently revised targets set by the 2016 State Budget and the Medium-Term Financial Strategy 2015-2018 (MTFS), but, mainly, to the provisions made in the 2015 State Budget. On the other hand, state revenues are slightly reduced, which led to a smaller than expected primary surplus, especially compared to the target set by the 2015 State Budget.

More specifically, the State Budget execution for 2015 exhibited a primary surplus of €2,270 million or 1.29% of GDP, compared to €1,872 million in 2014 (Table 2.1.1). The deviation from the targets set is significant, as even the latest estimate of the 2016 State Budget was for €3,257 million surplus, showing a deviation of €987 million or 0.56% of GDP. The same holds for the MTFS target, which expected a surplus of €3,831 million, a deviation by €1,561 million or 0.89% of GDP from the real outcome. Regarding the 2015 Budget, the provision was for a surplus of €5,797 million, with an even larger gap of €3,527 million or 2.01% of GDP.

**TABLE 2.1.1 State Budget execution 2015, million € on a modified cash basis**

| | 2014 | 2015 | | | |
|---|---|---|---|---|---|
| | Outcome | Outcome | 2016 Budget estimates[1] | MTFS 2015-2018 targets[2] | 2015 Budget targets[3] |
| **State Budget** | | | | | |
| Net Revenue | 51,367 | 51,421 | 53,091 | 53,185 | 55,603 |
| Expenditures | 55,063 | 54,951 | 55,664 | 55,454 | 55,705 |
| **Ordinary Budget** | | | | | |
| Net Revenue | 46,650 | 46,589 | 48,618 | 49,407 | 50,871 |
| Expenditures | 48,472 | 48,545 | 49,264 | 49,054 | 49,305 |
| - Primary Expenditures | 41,928 | 41,298 | 41,924 | 41,431 | 41,887 |
| - Interest Payments | 5,569 | 5,800 | 5,830 | 6,100 | 5,900 |
| **Public Investment Program (P.I.P.)** | | | | | |
| Net Revenue | 4,717 | 4,832 | 4,473 | 3,778 | 4,732 |
| Expenditures | 6,592 | 6,406 | 6,400 | 6,400 | 6,400 |
| State Budget Primary Balance* | 1,872 | 2,270 | 3,257 | 3,831 | *5,797* |
| State Budget Balance | -3,697 | -3,530 | -2,573 | -2,269 | -103 |

*Source:* General Accounting Office, State Budget Execution Monthly Bulletin 2015, January 2016.

1. Year Estimates as they are depicted in the 2016 State Budget.
2. Estimates as they are depicted in the Medium Term Fiscal Strategy (MTFS) 2015-2018.
3. Year Estimates as they are depicted in the 2015 State Budget.

** Deficit (-) / Surplus (+).*

1. Data is presented on a modified cash basis as they were published in the State Budget Execution Bulletin, December 2015, General Accounting Office, Ministry of Finance.

The State Budget's deficit, interest paid included, reached €3.53 billion or 2.01% of GDP, reduced by 4.44% compared to 2014, but higher by €960 million in comparison to the deficit estimate of the 2016 Budget, €1,264 million compared to the deficit target of the MTFS and €3,430 million with regard to the 2015 Budget target.

More specifically, net revenues of the State Budget execution for 2015 stood at €51.4 million, increased by only €54 million compared to the revenues collected in 2013 or 0.9% of GDP. They are definitely lower compared to the provisions of the 2015 State Budget, by 7.53%, but also to the revised estimates of the 2016 State Budget by 3.15%, as well as the MTFS by 3.32%. Moreover, the net revenues of the 2015 Ordinary Budget reached €46.6 billion, that is less by €61 million compared to the corresponding revenues of 2014. However, the 2015 Budget's provision provided additional revenues of €4,285 million or 2.44% of GDP, while those of the MTFS were €2,818 million or 2.6% of GDP. However, this gap can be attributed to accrued income from holding Greek government bonds in the portfolios of the Eurosystem central banks (ANFA's & SMP's) amounting to € 3.6 billion, but are not counted in the primary balance, according to the definition of the Program.

From the recurring revenues, €19.8 billion were collected from direct taxation, showing a decrease of 3.5% compared to 2014 (Table 2.1.2), about 9.7% above the 2016 Budget's estimates and about 3% above the 2015 Budget's provisions. Revenues from income tax decreased by 0.9%, even though they were higher than the 2016 Budget's revised estimates by 2.12%, but fell short in regard to the 2015 Budget's estimates by 8.28%. Revenues from indirect taxation and consumption taxes remain steady–at a level of €23.8 billion and €8.8 billion, respectively, even though they were expected to be higher by 5.5%. Non-tax revenues amounted €3.9 billion, increased by 9% compared to the previous year. Moreover, non-recurring revenues reached €1.8 billion.

Finally, the Public Investment Program's (PIP) revenue increased by 2.44% compared to 2014, 2.11% compared to the 2015 Budget provisions, 8.03% in regard to the 2016 Budget's revised estimates and 27.90% in comparison to the MTFS target.

The State Budget expenditure amounted €46.59 billion, slightly reduced compared to last year's expenses (€112 million or 0.2% of GDP), but also to the provisions from the 2015 Budget (€754 million or 1.35%

**TABLE 2.1.2 State Budget Revenues by category, million € on a modified cash basis**

| | 2014 | 2015 | | |
|---|---|---|---|---|
| Revenue category | Outcome | Outcome | 2016 Budget estimates[1] | 2015 Budget targets[2] |
| Recurring revenue | 47,819 | 47,432 | 46,312 | 50,324 |
| Direct taxes | 20,464 | 19,758 | 19,165 | 21,880 |
| Income taxes | 12,207 | 12,093 | 11,842 | 13,184 |
| Indirect taxes | 23,776 | 23,773 | 23,597 | 25,154 |
| V.A.T. | 13,618 | 13,629 | 13,519 | 14,411 |
| Consumption taxes | 8,702 | 8,760 | 8,798 | 8,922 |
| Total tax revenues | 44,240 | 43,531 | 42,762 | 47,033 |
| Total non-tax revenues | 3,579 | 3,901 | 3,550 | 3,291 |
| Non-recurring revenue | 1,817 | 1,825 | 5,408 | 2,847 |
| Total revenue | 50,020 | 49,510 | 51,988 | 53,748 |
| Tax refunds | 3,370 | 2,922 | 3,370 | 2,877 |
| Total net revenue | 46,650 | 46,589 | 48,618 | 50,871 |
| Public Investment Budget | 4,717 | 4,832 | 4,473 | 4,732 |
| Total State Budget Revenues | 51,367 | 51,421 | 53,091 | 55, 603 |

*Source:* General Accounting Office, State Budget Execution Monthly Bulletin 2015, January 2016.

1. Year Estimates as they are depicted in the 2016 State Budget.
2. Year Estimates as they are depicted in the 2015 State Budget.

**TABLE 2.1.3 Ordinary Budget expenditure by category, million € on a modified cash basis**

| Expenditure category | 2014 Outcome | 2015 Outcome | 2015 2016 Budget estimates[1] | 2015 Budget targets[2] |
|---|---|---|---|---|
| Salaries & Pensions | 18,478 | 16,740 | 18,804 | 18,766 |
| of Central Government personnel | 16,198 | 16479 | 16,519 | 16,472 |
| for hospital personnel and other Government bodies | 2,280 | 2,260 | 2,280 | 2,284 |
| Grants to social security funds, Medical care, Social protection | 14,421 | 14,388 | 14,495 | 13,974 |
| Medical care | 58 | 56 | 59 | 58 |
| Grants to social security funds | 11,100 | 11,557 | 11,558 | 11,312 |
| Other healthcare expenses (Cover of hospital deficit) | 1,450 | 1,289 | 1,324 | 1,160 |
| Social protection | 1,813 | 1,486 | 1,553 | 1,444 |
| Operational and other expenditures | 5,733 | 5,383 | 5,707 | 5,352 |
| Other expenditures | 3,295 | 2,787 | 2,918 | 3,796 |
| Ordinary Budget total primary expenditure | 41,928 | 41,298 | 41,924 | 41,887 |
| Interest payments | 5,569 | 5,800 | 5,830 | 5,850 |
| Total Ordinary Budget expenditure | 48,472 | 48,545 | 49,264 | 49,305 |
| Total State Budget expenditure | 6,592 | 6,406 | 6,400 | 6,400 |
| Expenditure category | 55,063 | 54,951 | 55,664 | 55,705 |

1. Year estimates as they are depicted in the 2016 State Budget.
2. Year estimates as they are depicted in the 2015 State Budget.

*Source:* General Accounting Office, State Budget Execution Monthly Bulletin 2015, January 2016.

of GDP), the MTFS (€503 million or 0.91% of GDP), as well as the 2016 Budget's estimates (€713 million or 1.28% of GDP). The Ordinary Budget expenditures stood at €48.55 billion, of which €41.3 billion refer to primary spending, while interest payments amounted to €5.83 billion (Table 2.1.3). More specifically, the total expenditures for salaries and pensions display a slight increase of 1.4% compared to the previous year, mainly due to retroactive payments that were adjudicated by the Council of State's decisions for unconstitutional wage and pension cuts in 2012, as there isn't any significant change in the wage and pension bill. Furthermore, doctors' remuneration declined by 2.4%, while the allowances for doctors on call increased by 10%.

The grants to the social security funds were increased by 4.1%, as much as the revised target of the 2016 State Budget, but is higher by 2.17% compared to the target set by the 2015 State Budget. The most significant deviation occurs in OGA, with its grant to reach €3.3 billion, indicating the growing survival problem of the fund which must be immediately resolved. Expenditure for EKAS follow with a gap of €199 million compared to the grand given the previous year, while OAEE and EOPYY received €130 million more than last year's grant.

Moreover, €1.7 billion have been allocated to cover hospitals' deficits, an amount that is well below both the previous year's expenditures as well as the 2015 State Budget's target, by 11%. Social protection expenditures decreased by 18% compared to 2014, and 4.3% in regard to the target set by the 2016 State Budget's revised target, due to the fact that no social dividend was given and Operational and Other expenditures appear lower by 6.1% in comparison to the corresponding period of 2014.

Finally, the PIP expenditures were at the same level as in 2014, that is €6.4 billion, which is similar to the targets set by the 2015 and the 2016 Budget, as well as the MTFS (Table 2.1.1).

From the above it is clear that the 2015 Budget diverges from the targets set by its enactment in No-

vember 2014. This may be due to several factors that relate to the drafting of the Budget in a period where elections could be foreseen and, therefore, it was more optimistic than the conditions allowed, as it turned out later. The 2015 Budget was based on assumptions about the outcome of the year, as the overestimation of the primary surplus and the recovery of the economy, predicting for 2015 a 2.9% growth rate and a primary surplus of 3% of GDP. It can, also, be attributed to the successive electoral processes and, particularly, to the prolonged negotiations with the country's creditors that created lack of liquidity for the Greek economy, as there was no external financing, to the risk of "Grexit" that was visible before the August Agreement and, finally, to the imposition of capital control that caused further economic suffocation, especially for business.

Regarding the primary surplus, although much smaller than expected, is due to the reduced expenditures owing to the state's decision to postpone, temporarily, its dues for all public procurement contracts, as the €1.5 billion planned for the settlement of past years' liabilities of the General Government's entities weren't used. It can also be attributed to revenue collection, since Greek taxpayers paid their tax liabilities using up their savings after the imposition of the capital controls.

Overall, the implementation of the 2015 Budget was clearly better than expected. Although the problems of the Greek economy have not been resolved, all the necessary steps should be taken to get the economy out of the recession and into growth in 2016. To achieve this objective both the government and the opposition should avoid past mistakes and agree upon the priorities of the country's economic policy. The assessment of the economic program should soon come to an end in order to ensure the refinancing of the Greek economy and normalizing its liquidity, so as to, finally, open the debate on debt relief. Moreover, it is particularly important to immediately agree upon a plan for the economic reconstruction of the country with substantial financial support from EU partners, so that the increased liquidity can create growth potential for the Greek economy.

However, apart from the fiscal adjustment, there should be an agreement of the political parties on the important issues that come to a vote immediately: the social security and the taxation system reforms. Those two issues need to be resolved, not only as a part of the August Agreement, but because they are chronic problems of the Greek economy. The social security system is the black hole of the Budget, amounting €11.5 billion in 2015, as there is a significant social security contribution evasion and, given the high unemployment rates, it will require increasing grants. At the same time the taxation system needs to raise revenues for the state, in addition to attacking tax evasion, to be used as the necessary equivalents to finance social policy, which, in the economic crisis Greece is going through, is essential. The country's tax system should become more equitable, where everybody has to pay and not only employees and pensioners who cannot hide their income. Examples include farmers, who demonstrate against the abolition of the extra-accounting method for their taxable income determination, as, with the tolerance of all previous governments, they "legally" avoided being taxed on their actual income, professionals who systematically evade taxes, and others. The government, therefore, in cooperation with the opposition parties, without counting the political cost, especially when it comes to farmers due to the significance of the rural vote, should not withdraw from the August Agreement and immediately vote for and implement these reforms not only to proceed with the assessment of the Greek economy consolidation program, but mainly because it is necessary to rescue the pension system and increase the country's growth potential. Equivalent measures that are sought must be used to finance social policies for the weak part of the population, such as the unemployed, the homeless, etc. and not for the "pampered children" of Greek politicians, that is farmers and other interest groups who are lobbing to avoid their fair share of the tax and social security contribution burden.

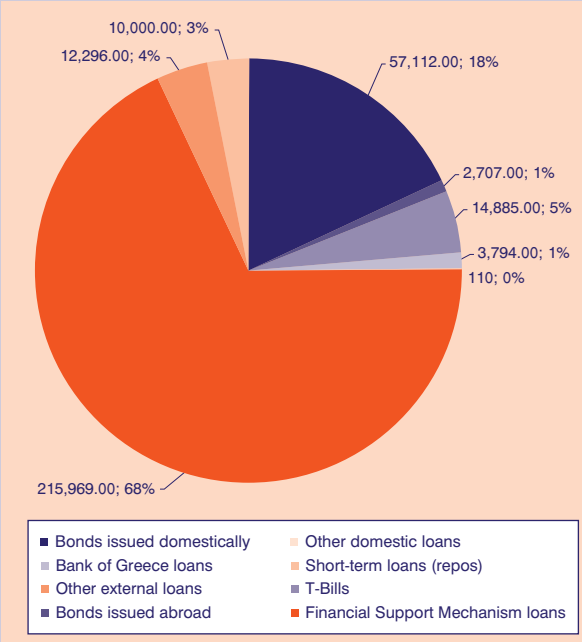
# 2.2. Evolution and structure of Public Debt

*Triantopoulos Christos*

The level of public debt regarding both 2015 and the estimates for next year demonstrate, on the one hand, the general situation of the economy, and, on the other hand, the developments in the field of public finances. According to data of the 2016 Budget (November 2015), the General Government debt in 2015 is estimated to amount to € 316.5 billion or 180.2% of GDP, compared with € 317.1 billion or 178.6% of GDP in the previous year (Table 2.2.1). In terms of Central Government, that is to say if the intragovernmental debt is excluded (the short-term borrowing through repos by General Government entities), the debt is estimated to stand at the end of 2015 at € 326.5 billion, increased by about € 2.4 billion compared to the previous year.

The estimates, however, regarding the level of public debt in 2015 —also impacting 2016— are expected to be revised and improved, resulting in lower levels than those estimated in the Budget 2016 due to the lower needs, compared to the initial estimate, concerning the recapitalization of banks. The lower funding needs for the support of the new bank recapitalization resulted in a corresponding reduction of (the initially estimated) borrowing needs, a fact also reflected at the recent data of the General Accounting Office, according to which the Central Government debt at the end of November 2015 stood at €316.9 billion (€9.4 billion lower than the annual estimate). Therefore, public debt in 2015 is estimated to stand at lower levels than those of 2014 and those depicted in the Budget 2016 estimates, following the developments of the first six months (i.e. the return of funds to the EFSF, the failure to complete the second economic adjustment program, short-term loans from the EU, etc.), but also the lower than initially projected financing needs regarding the bank recapitalization (great private participation and reduction of public share) in the last quarter of the year.

**FIGURE 2.2.1**
**Budgetary Central Government Debt (November 2015), (million €; % of debt)**




*Source:* Ministry of Finance (2015).

**TABLE 2.2.1 General Government Debt**

| | 2013 | 2014 | 2015* | 2016** |
|---|---|---|---|---|
| **A. State Budgetary Government Debt** | **321,478** | **324,128** | **326,500** | **337,600** |
| B. Debt of Public Law Legal Entities, etc. | 5,483 | 2,179 | -300 | -500 |
| **C. Central Government Debt according to ESA (A+B)** | **326,961** | **326,307** | **326,200** | **337,100** |
| D. Debt of Local Government and Social SF (intragovernmental debt excluded) | -7,746 | -9,190 | -9,700 | -9,500 |
| **E. General Government Debt (C+D)** | **319,215** | **317,117** | **316,500** | **327,600** |
| *(% of GDP)* | *177.0%* | *178.6%* | *180.2%* | *187.8%* |

*Source:* Ministry of Finance, Budget 2016.

*Notes:* * Estimation (with the initial estimation of the 2015 bank recapitalization needs).
** Provision.

**TABLE 2.2.2 Budgetary Central Government Debt by Major Categories**

| | 2011 | | 2013 | | 2015* | | 2016** | |
|---|---|---|---|---|---|---|---|---|
| | € million | % of debt | € million | % of debt | € million | % of debt | € million | % of debt |
| **A. Bonds** | **259,774.18** | **70.6** | **76,296.25** | **23.7** | **59,810.00** | **18.3** | **56,830.00** | **16.8** |
| Bonds issued domestically | 240,940.37 | 65.5 | 73,415.28 | 22.8 | 57,112.00 | 17.5 | 54,754.00 | 16.2 |
| Bonds issued abroad*** | 18,833.81 | 5.1 | 2,880.97 | 0.9 | 2,698.00 | 0.8 | 2,076.00 | 0.6 |
| **B. T-Bills** | **15,058.63** | **4.1** | **14,970.82** | **4.7** | **14,880.00** | **4.6** | **14,800.00** | **4.4** |
| **C. Loans** | **93,145.19** | **25.3** | **230,210.90** | **71.6** | **242,110.00** | **74.2** | **256,270.00** | **75.9** |
| Bank of Greece | 5,683.99 | 1.5 | 4,734.61 | 1.5 | 3,792.00 | 1.2 | 3,320.00 | 1.0 |
| Other domestic loans | 836.71 | 0.2 | 115.50 | 0.0 | 109.00 | 0.0 | 292.00 | 0.1 |
| Financial Support Mechanism loans | 73,210.36 | 19.9 | 213,152.48 | 66.3 | 225,907.00 | 69.2 | 241,123.00 | 71.4 |
| Other external loans**** | 13,414.13 | 3.6 | 12,208.31 | 3.8 | 12,302.00 | 3.8 | 11,535.00 | 3.4 |
| **D. Short-term loans***** | **0.00** | **0.0** | **0.00** | **0.0** | **9,700.00** | **3.0** | **9,700.00** | **2.9** |
| **Total (A+B+C+D)** | **367,978.00** | **100.0** | **321,477.97** | **100.0** | **326,500.00** | **100.0** | **337,600.00** | **100.0** |

*Source:* Public Debt Bulletin (December 2011, December 2012, December 2013) and Budget 2016.

*Notes:* * Estimation.
** Provision.
*** Including securitization issued abroad.
**** Including special purpose and bilateral loans.
***** Including repos.

The limited borrowing from the EU/ECB/IMF Support Mechanism, due to the aforementioned factors, has and will continue to affect —after the update of estimates— the structure of the Central Government debt. Therefore, according to the Budget 2016 estimates, and maintaining the structural changes that occurred after the dual restructuring of public debt in 2012, it is estimated that in 2015 18.3% of the debt consists of bonds, 4.6% in T-bills and 74.2% of the debt are loans and, mainly, loans from the EU/ECB/IMF Support Mechanism (69% of debt). In this context, it is estimated that the share of loans from the EU/ECB/IMF Support Mechanism will increase further in 2016, reaching 71.4% of the Central Government debt (Table 2.2.2). This share, however, is likely to be smaller, since, according to data from the General Accounting Office regarding public debt in November 2015, loans from the EU/ECB/IMF Support Mechanism stand at €215.9 billion, representing 68% of the Central Government debt, while bonds constitute 18.9% of this debt (Figure 2.2.1).

Furthermore, a change is also detected in the characteristics of the Central Government debt in recent years, as in September 2015 the largest part of public debt was non-tradable (76.2%) and at floating rate (68.5%), reversing in both cases the situation compared to 2011, while increasing the ratios compared to the previous year (Table 2.2.3). This development regarding debt composition is, of course, due to the financing derived from the EU/ECB/IMF Support Mechanism, which is based on non-negotiable and floating rate loans. Also, developments in funding from the EU/ECB/IMF Support Mechanism in 2015 also affected the share of the currency in which the Central Government debt is denominated; as a result, in September 2015 96.1% of this debt is expressed in euros, compared to 95.7% in December 2014 and 95.9% in December 2013.

In parallel, the contribution of short-term loans to the financing needs of the Central Government remained in place through the broad use of the repo agreements with the General Government entities. Specifically, the use of this method has been extended, with a series of legislative measures, to increase the range of General Government partner institutions and has been developed as an intragovernmental borrowing tool, which covers the inability to raise funds through the EU/ECB/IMF Support Mechanism or the international markets. Thus, according to data of the General Accounting Office, in November 2015 the repos agreements with

**TABLE 2.2.3 Composition of Budgetary Central Government Debt**

| | December 2011 | December 2012 | December 2013 | December 2014 | September 2015 |
|---|---|---|---|---|---|
| **A. Rate** | | | | | |
| Fixed rate [1] | 62.0% | 32.7% | 28.5% | 33.2% | 31.5% |
| Floating rate[1,2] | 38.0% | 67.3% | 71.5% | 66.8% | 68.5% |
| **B. Trade** | | | | | |
| Tradable | 74.7% | 34.3% | 28.4% | 25.0% | 23.8% |
| Non-tradable | 25.3% | 65.7% | 71.6% | 75.0% | 76.2% |
| **C. Currency** | | | | | |
| Euro | 97.5% | 96.7% | 95.9% | 95.7% | 96.1% |
| Non-euro area currencies | 2.5% | 3.3% | 4.1% | 4.3% | 3.9% |

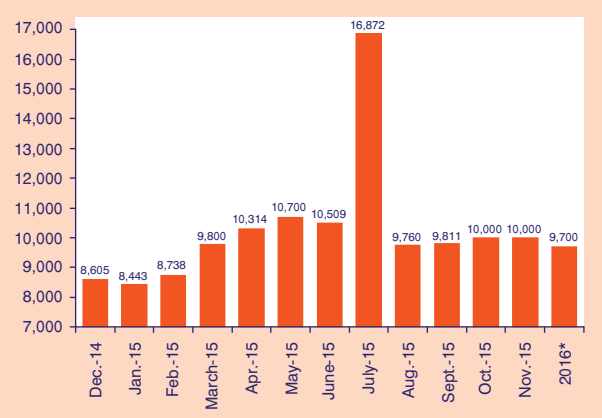
*Source:* Public Debt Bulletin (December 2011, December 2012, December 2013, December 2014, September 2015).

*Notes:* 1. Fixed/floating participation is calculated including Interest Rate Swap transactions.
2. Index-linked bonds are classified as floating rate bonds.

General Government entities accounted for €10 billion of the Central Government debt, compared to €8.6 billion in December 2014 (Figure 2.2.2). The short-term borrowing includes, of course, the bridge loan from the EU from June 2015 until the beginning of the third economic adjustment program, amounting to approximately €7 billion. As a result, short-term loans in July 2015 —only in this specific month— amounted to €16.9 billion. The use of the repos agreements tool is planned to continue in 2016, as, according to Budget 2016 data, an amount of €9.7 billion through repos will be provided. Thus, it is a new funding regime that has led in recent years to the increase of intragovernmental debt (Table 2.2.1) and to the reduction of the General Government debt against the Central Government debt.

According to data of the 2016 Budget, which take into account the initial estimate of the financing needs for the new recapitalization of banks, public debt in 2016 is projected to increase by €11.1 billion compared to 2015 and is expected to stand at €327.6 billion or 187.8% of GDP, while in terms of Central Government debt it is estimated to stand at €337.6 billion (Table 2.2.1). Additionally, in 2016 the total Central Government debt that is matured, according to data of Budget 2016, amounts to €11.7 billion of which €2.9 billion are bonds and €4.3 billion are loans, while €4.4 billion are T-bills. The latter should also include the T-bills, amounting to €10.5 billion, which expired in 2015 and were "transferred" to the next year (Figure 2.2.3). In general, as noted in Budget 2016, "[...] the time horizon of maturities of the Central Government debt [...]

**FIGURE 2.2.2**
**Central Government's short-term loans**



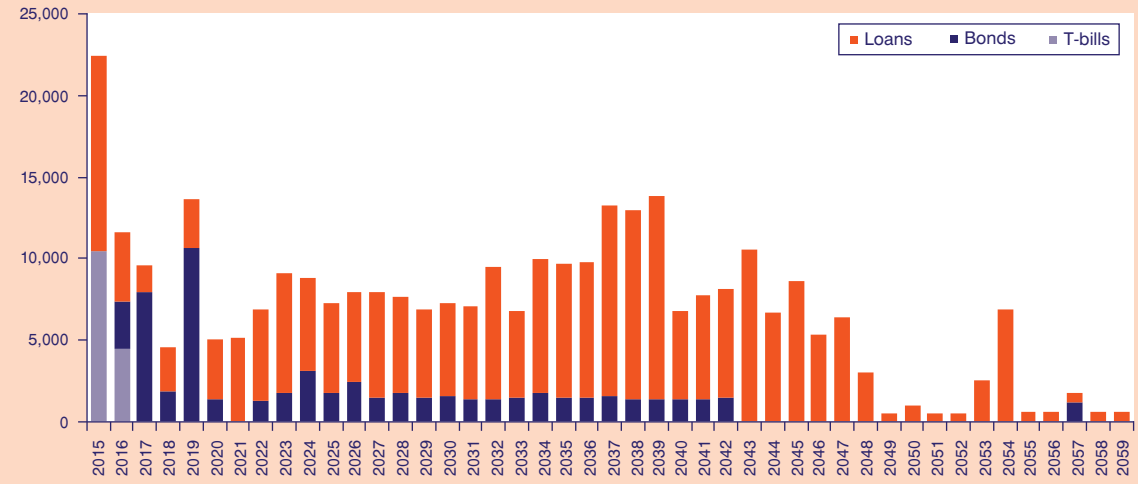

*Source:* Ministry of Finance (2015).

*Note:* * 2016 Budget annual estimation.

extends to the year 2059. The inability to borrow from the markets since May 2010, with the exception of the issuing a five-year and a three-year bond in 2014, resulted in a drastic reduction of bonds and in replacing them with loans. This weakness is expected to be reversed in the coming years with the gradual return of the Greek government to the markets for borrowing [...]".

However, the profile of the Greek public debt as well as its characteristics are expected to be affected, on the one hand, by a possible restructuring of public debt —following that of 2012— in the framework

**FIGURE 2.2.3**
**Maturity profile of the Central Government Debt (September 2015)**




*Source:* Ministry of Finance, 2016 Budget.

of the implementation of the new economic adjustment program and, on the other hand, by a possible change in the method of the debt sustainability analysis for Greece, for which, however, the return of the Greek economy in the path of growth remains a crucial condition.

# 3. Human resources and social policies

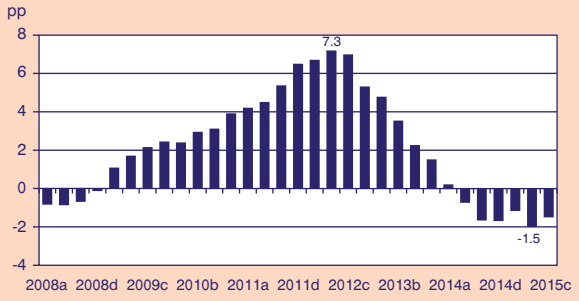
## 3.1. Recent developments in Greek labour market key variables

*Ioannis Cholezas*

### 3.1.1. Introduction

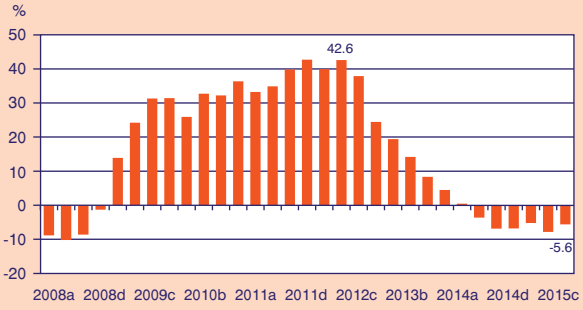
The unemployment rate continued to fall in the third quarter of 2015, despite adverse economic and political conditions in the country, reaching the 2012 level at approximately 24%. In October, the unemployment rate for the general population stabilized at 24.5%. Compared with September, it increased marginally, proportionately to previous years, and compared with October 2014, it decreased by almost 1.5 percentage points. According to the latest monthly data made public by OAED, the number of the enrolled unemployed increased in November, as it usually happens every year, but the increase is larger this year than it was last year. Nevertheless, the number of unemployed individuals is smaller than it was a year ago. Additionally, employment continued to rise. Especially in the field of paid employment, developments, although negative in the last four months of 2015 on aggregate, are better than they were in 2014. Note that the labour market performed quite well in December, since more jobs were created compared with every other December in recent years. A potentially dark side is the further expansion of flexible types of employment, which involve reduced pay and increased uncertainty for employees. Last but not least, data analysis relies on differentials traditionally recorded between men and women, the young and old, as well as individuals with various educational backgrounds.

**GRAPH 3.1.1**
**Unemployment rate changes on an annual basis (in pp)**




*Source:* Labour Force Surveys (LFS), ELSTAT, KEPE calculations.

**GRAPH 3.1.2**
**Changes in the number of the unemployed on an annual basis (%)**




*Source:* Labour Force Surveys (LFS), ELSTAT, KEPE calculations.

### 3.1.2. Unemployment

According to Labour Force Surveys (LFS) conducted by ELSTAT, the unemployment rate for individuals over 15 years of age was reduced further in the third quarter of 2015, both on a quarterly, by 0.6 percentage points (pp), and an annual basis,[1] by 1.5 pp, staying on a downward path that started in the second quarter of 2014 (Graph 3.1.1). Consequently, it equals 24% for the general population (15+), almost at the same level as the second quarter of 2012. The number of the unemployed evolved similarly (Graph 3.1.2). Following the large increases recorded in 2012, it seems that the number of unemployed individuals continues to shrink on a yearly basis from the second quarter of 2014 and onwards. The reduction in the number of the unemployed by 5.6% in the third quarter of 2015 equals 19.6 thousand fewer unemployed persons compared with the second quarter of 2015 and 181.8 thousand fewer unemployed persons compared with the maximum

1. Comparing with the respective quarter of the previous year means isolating the effect of seasonality.

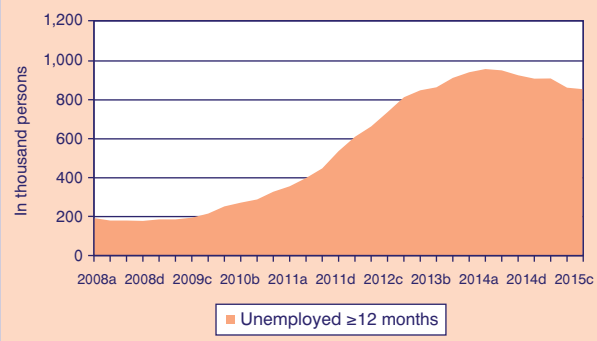
number recorded in the first quarter of 2014. The observation is definitely encouraging, especially given the economic surroundings in the past year and the uncertainty involved, mostly due to political turbulences. Nevertheless, there is no room for complacency.

The key problem that needs to be addressed is the unacceptably large number of unemployed individuals, i.e. approximately a quarter of the labour force is still jobless. It is no coincidence that the long-term unemployed, i.e. being unemployed for more than 12 months, represent 73.7% of the total unemployed in the third quarter of 2015. The respective share in 2014 was slightly higher (74.4%), but this does not cancel the risks involved, such as human capital depreciation, discouragement and job search cessation, among others, and the need to meet the challenge effectively. Compared with the before-crisis era, the share of the long-term unemployed has increased by more than 24 pp (49.5% in the third quarter of 2008).[2] Furthermore, the number of the long-term unemployed is five times bigger in the third quarter of 2015 compared with 2008 (855 thousand vs. 180 thousand persons). The evolution of the number of the long-term unemployed from 2008 until the third quarter of 2015 is depicted in Graph 3.1.3. Perhaps the most interesting observation is the decrease in the number of the long-term unemployed since the second quarter of 2014 and onwards.[3] Be reminded that at this exact time the unemployment rate started to decline, which could mean two things. First, the long-term unemployed are still competitive and manage to get jobs even under adverse labour market conditions, like those dominating in recent years. Second, the long-term unemployed were discouraged and withdrew from the labour market.[4] A solid answer would involve in-depth analysis, which lies beyond the scope of this article.[5]

An additional issue, which reinforces the negative effects of unemployment and has been discussed many times in the past, is the low rate of unemployment protection, i.e. the insufficient safety net. According to OAED monthly data, in November 2015 just 12.4% of the unemployed are entitled to an unemployment benefit (15.2%, if only those actively seeking a job are considered). However, the unemployment benefit coverage is slightly higher than it was a year ago, although the volatility of the variable, even on a monthly basis, is a source of concern. In either case, increasing unemployment protection requires additional funds, which are extremely limited nowadays, or/and public spending savings, an equally difficult task, given the public spending rationalization that took place in recent years. Therefore, any solution should probably involve thinking out of the box.

Women and youth (aged 15-29) are two population groups which face greater difficulties in finding employment for various reasons related to their personal characteristics or/and certain social attitudes, e.g. discrimination. It is worth noting that the majority of youth are not entitled to an unemployment benefit, since one of the prerequisites is to be formerly employed for a minimum amount of time. Even before the crisis, these two groups had higher unemployment rates compared

**GRAPH 3.1.3**
**Number of the long-term unemployed**




*Source:* Labour Force Surveys (LFS), ELSTAT, KEPE calculations.

2. Note that the share of the long-term unemployed was unacceptably high even before the economic crisis, an observation that implies the existence of structural problems in the labour market, such as cases of mismatching between skills demanded by employers and skills supplied by employees, limited geographic mobility, etc.

3. Note that, according to OAED data, the long-term unemployed in November 2015 constitute 50.7% of the total unemployed. The divergence is significant compared with LFS data. Nevertheless, the share has increased compared with November 2014, but it has declined steadily since June 2015. Thus, the downward movement of the share of the long-term unemployed seems to be also verified by monthly OAED data.

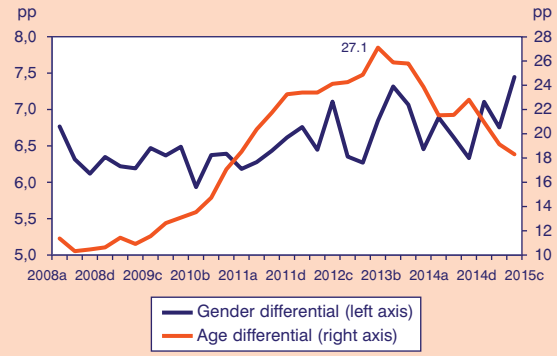
4. The labor force decreased throughout 2014 and the first quarter of 2015, which means that this is not impossible. On the other hand, the labour force increased considerably in the second and third quarters of 2015, compensating for the losses of previous quarters (2014a-2015a).

5. There is another possibility also. If unemployed individuals participate in subsidized job programs, they stop being classified as such, since the unemployment spell is interrupted and unemployment time starts from zero.

with men and older individuals and that did not change during the crisis. For example, in the third quarter of 2008 the unemployment rate for females was 10.9%, while it was 4.7% for men. In the respective quarter of 2015, the unemployment rate for females was 28.1% vs. 20.7% for males. Similarly, in the third quarter of 2015 the unemployment rate for youth was 39.2%, almost double compared with that of individuals over 30 (20.9%). It is interesting to analyse the behaviour of these groups with respect to unemployment during the crisis. In other words, to attempt to answer the question of whether unemployment differences widened or shrunk during the crisis.

Differences in unemployment rates for males and females (left-hand axis) and between youth and older individuals (right-hand axis) are presented in Graph 3.1.4.[6] The first observation is that the unemployment difference is significantly smaller between males and females, ranging from 5.9 pp in the second quarter of 2010 to 7.4 pp in the third quarter of 2015. In contrast, the difference between youth and individuals aged 30+ ranges from 10.3pp in the second quarter of 2008 to 27.1 pp in the second quarter of 2013. The second observation is that the gender unemployment gap exhibits intense seasonal volatility and, specifically, it seems to systematically decrease in the second quarter every year. That is not the case for the age unemployment gap though. This could be the result of gender segregation in specific sectors of economic activity, which exhibit seasonal fluctuation. In addition, the trend of the gap is positive in 2015, contrary to 2014. The fourth observation involves the unemployment gap between youth and 30+, which increases until the second quarter of 2013, but then it decreases until the third quarter of 2015. This decrease is mainly fuelled by the decrease in the youth unemployment rate, which went down from 49.5% in the second quarter of 2013 to 39.2% in the third quarter of 2015. A possible interpretation is the significant mobilisation of the state through subsidised employment schemes (active labour market policies) addressing mostly youth, while the reduction in the minimum wage for those below 25 years of age since February 2012 may also have had a positive effect. Nevertheless, determining the exact effect of every single intervention on youth unemployment requires thorough examination and is out of the scope of this article.

**GRAPH 3.1.4**
**Unemployment differentials between males-females and youth-older individuals**




*Source:* Labour Force Surveys (LFS), ELSTAT, KEPE calculations.

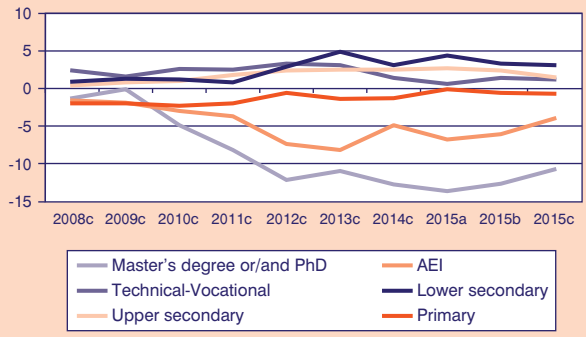
Individuals with different levels of education also have significantly different chances of getting a job. Usually, more educated individuals have better labour market prospects, either because technological advances increase the demand for more educated individuals or because educated individuals are preferred by employers due to their increased productivity –real or perceived. Even during the crisis, more educated individuals are found to face a lower risk of unemployment, despite the fact that the crisis has caused significant damage to entire sectors of economic activity, such as construction, for example.[7] Just to get an idea, in the third quarter of 2015 the unemployment rate for individuals with a PhD and/or a Master's degree was 13.2%, 10.8 pp lower than the national unemployment rate, while for AEI graduates the unemployment rate was 20%, 4 pp lower than the national average. Furthermore, compared with the third quarter of 2008, the first group faces a 7.2 pp higher unemployment rate and the second group a 14.3 pp higher unemployment rate. Nevertheless, these two changes represent the smallest increases in unemployment rates amongst all education groups.

Specifically, Graph 3.1.5 represents the deviation from the national mean for six levels of education. Two observations are straightforward. The first one is the almost linear relationship between the size of the deviation and education, i.e. the higher the level of education the larger the deviation, contrary to the

6. Different axes are necessary due to wide differences in unemployment rates between youth and older individuals. The difference in unemployment rates between two groups is usually referred to as an unemployment gap.

7. When an entire sector of activity is hurt, it is more likely that the damage is similar for all those employed, irrespective of their characteristics, such as the level of education, for example.

**GRAPH 3.1.5**
**Unemployment rate deviatios for selected education groups from the national mean**




*Source:* Labour Force Surveys (LFS), ELSTAT, KEPE calculations.

case of unemployment.[8] Note that during the crisis the smallest deviation is recorded for primary school graduates and the largest for PhD or/and Master's degree holders. The second observation involves the size of the deviation itself. In other words, since 2009 deviations from the national mean based on the level of education increased significantly. That means the crisis reinforced existing unemployment differentials or, put differently, it made education more important as far as the risk of unemployment is concerned.[9]

Another observation with regard to levels of education, which is not straightforward, is the existence of unemployment differentials both across levels of education and over time. Moreover, the standard deviation in the first case increased during the crisis from 1.7 pp in the third quarter of 2008 to 6.5 pp in the third quarter of 2013, while it has decreased since then (5.1 pp in the third quarter of 2015). This could be an indication that the situation in the labour market is stabilizing, at least as far as education is concerned. In the second case, which involves the changes in the unemployment rate by level of education over time, unemployment seems more volatile amongst graduates from lower levels of education. Thus, it ranges from 8.9 pp for Gymnasium graduates (lower secondary) to 3 pp for PhD or/and Master's degree holders (5.6 pp for AEI graduates). This could mean that during the crisis graduates from higher levels of education faced lower unemployment rates, which are also less volatile at the same time. Thus, they experienced less uncertainty.

## 3.1.3. Employment

Usually, but not always, employment moves to the opposite direction with unemployment. Thus, when the number of the unemployed increases, the number of the employed decreases and vice versa. Nevertheless, it is possible that the two variables move in the same direction, since there are more choices available to someone who stops working or stops looking for a job, such as withdrawal from the labour market in order to raise children, to migrate or to retire, among others.

According to the quarterly LFS data, the employment rate went down during the crisis, from 49.2% in the third quarter or 2008 to 39.7% in the same quarter of 2015. This drop in employment is more pronounced amongst males (13.5 pp vs. 5.5 pp for females) and younger individuals (25-29: 16.6 pp and 20-24: 14.5 pp). Indeed, youth already have a lower employment rate compared with individuals over 30 and so do females (39.7% vs. 49.2% for males). In numbers, the reduction in employment for those over 15 years of age translates to about 1 million fewer jobs in period 2008-2015. Nevertheless, it seems that the situation is improving, although at a slow pace; since 2013 the number of the employed has been stabilising, while since the third quarter of 2014 it has somewhat increased.

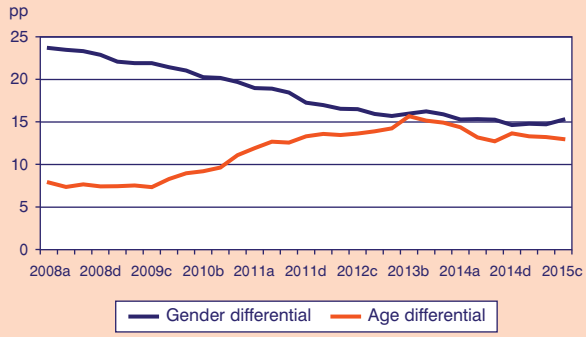
Specifically, in the third quarter of 2015 employed individuals increased by 2.3% compared with the third quarter of 2014 and by 1.3% compared with the previous quarter. On an annual basis, the increase in employment is larger for females, while on a quarterly basis it is larger for males, who seem to exhibit more seasonal volatility. There are similar developments for youth and individuals over 30 years of age, since both groups show an increase in employment. Employment increases more on a quarterly basis for the first group and more on an annual basis for the second group. In either case, increased employment, although small as it is, is encouraging and to some extent expected due to seasonality. Indeed, compared with 2014, the increase in employment on a quarterly basis was the same for individuals over 15 years of age and for individuals over 30, smaller for males and bigger for females and youth.

The employed, in the third quarter of 2015, number 3,671 individuals, of which 57.8% are males and 86.5%

8. The unemployment rate decreases as the level of education increases.

9. Technical-Vocational education is an exception to the rule, since the unemployment rate for graduates is bigger than lyceum graduates. This is an issue which attracted the public attention recently, while at the same time attempts are made to restructure the system, e.g. through the introduction of a dual system of education, i.e. combining education and employment.

**GRAPH 3.1.6**
**Employment differentials between males and females and between young and old individuals**




*Source:* Labour Force Surveys (LFS), ELSTAT, KEPE calculations.

are individuals over 30. The differentials in percentage points between the employment rates of males and females and between young and individuals 30+ are presented in Graph 3.1.6. Since the beginning of the crisis the gender employment differential has decreased from 24 pp in early 2008 to approximately 15 pp in early 2015. Employment rate movements show that the reduction came about mainly from the fastest decrease in the employment rate for men, who suffered more from the crisis, as discussed in previous issues of *the Greek Economic Outlook*. Since late 2012 the gender differential seems to have stabilized around 15 pp. The employment differential between young and old individuals is traditionally smaller compared with the gender differential, while during the crisis it increased from 7.5 pp in early 2008 to 16 pp in early 2013. This increase can be attributed to the reduction in the employment rate of individuals over 30, mainly due to increased unemployment rates. Onwards, the differential decreases to 13 pp in the third quarter of 2015, showing signs of stabilisation since mid-2014.

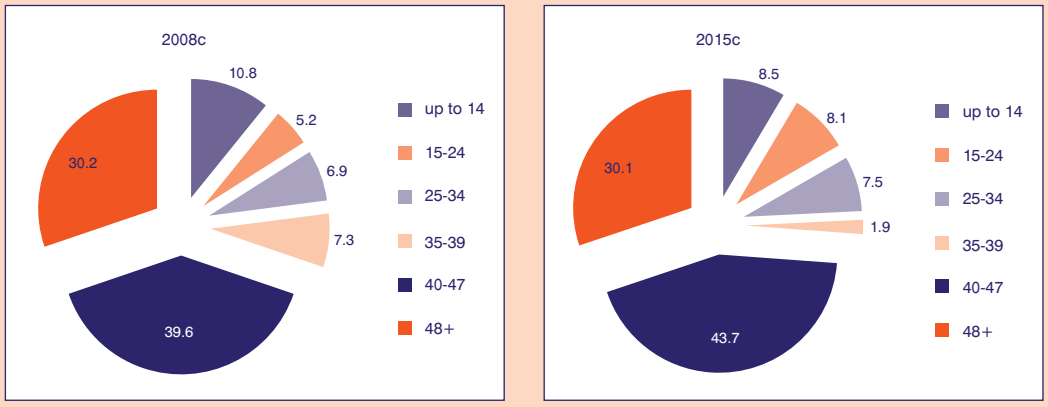
Changes in employment due to the crisis are different for graduates from various levels of education, since the effects of the crisis on labour demand are not identical, despite the overwhelming nature of the crisis, its massive impact on the entire economy and the results that chosen policies had on economic activity. Specifically, more educated individuals are more likely to be employed, i.e. they have a higher employment rate.[10] For example, it seems that in the third quarter of 2015 over seven out of ten PhD and/or Master's degree holders and six out of ten AEI graduates and Technical-Vocational education graduates are employed. On the contrary, only two out of ten primary education graduates and three out of ten lower secondary education (Gymnasium) graduates are employed. It is also interesting that during the crisis (2008c-2015c) the employment rate dropped faster for AEI graduates and Technical-Vocational education graduates than any other educational group. This could be attributed, on the one hand, to the fast increase in the number of individuals graduating from higher levels of education contrary to the groups of individuals graduating from lower levels of education who decrease, and, on the other hand, to the reduction of employment, which, despite being bigger for individuals with lower levels of education, is partly compensated by the reduction in the relevant population share. Therefore, the net effect is severely reduced. Generally, there are no significant differences in the employment rates of graduates from different educational levels during the crisis. The biggest positive deviations from the national mean are reported for PhD and/or Master's degree holders, followed by Technical-Vocational education graduates. The biggest negative deviation involves primary education graduates. This situation remained almost unchanged during the crisis.

The smaller number of employed individuals during the crisis, which could, to some extent at least, be explained by personal characteristics, such as gender and education, is only one aspect of reduced employment. The other aspect involves reduced employment intensity, which is reflected in fewer working hours per week, the expansion of part-time employment and the share of employed individuals who are underemployed.

The share of those working 15-24 and 25-34 hours per week, i.e. those who work less than full-time, increased during the crisis as shown in Graph 3.1.7. At the same time, the share of those working 40-47 hours per week, i.e. those who work overtime, also increased. In addition, the share of those working 35-39 hours per week reduced substantially. If these observations are combined they lead one to the conclusion that the two extremes of the distribution of weekly hours worked were reinforced during the crisis, i.e. those who work fewer and those who work longer hours. This is probably the result of firms' efforts to adapt to the new conditions shaped by the crisis through employing workers part-time or using work-in-shifts job contracts and through employing workers overtime. In the first case, firms

10. The type of employment is an issue worth discussing. For example, individuals are often employed in jobs that require lower education than the one they possess (over-education) or a different type of education.

**GRAPH 3.1.7**
**Distribution of the employed based on weekly working hours**




*Source:* Labour Force Surveys (LFS), ELSTAT, KEPE calculations.

keep their employees and maintain their firm-specific skills or hire new employees for fewer hours (sometimes substituting for old employees) and, in the second case, they avoid hiring new workers who probably need training, which incurs some cost for the firm and certainly involves some kind of commitment on behalf of the firm, due to the institutional framework of the Greek labour market.

Lower employment intensity is obvious also from the evolution of part-time employment. According to LFS data, in period 2008c-2015c the number of the part-time employed increased by approximately 30% and, from 5.5% of the total employed in the third quarter of 2008, represent 9.1% of the total employed in the third quarter of 2015. Given the decrease in the number of employed in general, the turn towards fewer working hours is straightforward, at least on the demand side of labour. On the supply side there seems to be an opposite trend, since those who look for full-time jobs but cannot find one, and are forced to work fewer hours, more than doubled during the same period of time, reaching 231.8 million persons in the third quarter of 2015. For the sake of argument, it should be noted that 41.6% of those who worked fewer hours in the third quarter of 2008 wished to work full-time. In the third quarter of 2015 the respective share equals 69.4%. This is obviously the result of increased flexibility in the labour market, which does not seem to benefit employed individuals.[11] However, it might be the case that persons who worked part-time before the crisis, due to income decreases during the crisis (see next article by N.C. Kanellopoulos), are now willing to work more hours to support family income. Fortunately enough, compared with both the third quarter of 2014 and the previous quarter of 2015, in the third quarter of 2015 the number of full-time employed individuals increased (by 2.8% and 1.8%, respectively) and part-time employed individuals decreased (by -1.7% and -3.5%, respectively).

To reinforce the above argument regarding the expansion of involuntary part-time employment, it suffices to examine the LFS data for underemployment and its evolution over time.[12] It is certainly not an accident that during the crisis the number of the underemployed increased from 96.2 thousand to 235.8 thousand individuals, a change which translates to approximately a 2.5 times increase. The fact that two out of three underemployed individuals are females and 35.5% are youth aged 15-29 is interesting. Also note that during the crisis male underemployment increased faster than female, while young underemployment increased slower than for individuals over 30. Consequently, the share of underemployed males increased to 46.2% (from 35.3%), while youth's share decreased to 26% (from 35.5%). Therefore, although underemployment continues to be an issue for females (8.2% are under-

11. The alternative to part-time work is probably unemployment, which is definitely a worse outcome. However, fewer working hours are often not enough to preserve a decent living standard, and, thus, it is far from an ideal situation.

12. The term "underemployed" refers to persons who work part time, when they would like to work full time, and are available to take on a full-time job immediately.

employed compared with 5.1% of males) and youth (12.4% are underemployed compared with 5.5% of those over 30), the crisis led to the reduction of the gap between males and individuals over 30. Last but not least, compared with the third quarter of 2014, in the third quarter of 2015 underemployment decreased mainly amongst females and individuals over 30, which is encouraging.

As far as paid employment is concerned, which constitutes the largest part of employment (65.6% of those employed in the third quarter of 2015), the developments are also encouraging. According to the latest available data from ERGANI, in the last four months of 2015 (September-December) net flows of paid employment were negative, but reduced, compared with 2014. On a monthly basis, the net flow of paid employees was positive only in December, when 7,826 new jobs were created. Note that this is the best performance over the past 15 years, with the exception of 2013. On an annual basis, and despite widespread uncertainty in the economy, two elections and imposed capital controls, the balance is positive (99,700 new jobs of paid employment) and bigger than the respective balance of 2014 (99,122 new jobs). In addition, over the past 15 years it falls short only compared with 2013 (133,488 new jobs).

Unfortunately, as has been noted in previous issues of *the Greek Economic Outlook*, the type of new jobs is an issue. Specifically, in the fourth quarter of 2015 the share of part-time and work-in-shift job contracts increased compared with the respective period in 2014 (28.7% vs. 27.8% and 12.7% vs. 11.4%, respectively), while the share of full-time jobs decreased. On a yearly basis, the picture is similar, with the share of new full-time jobs going down by more than one percentage point and the share of new work-in-shift jobs going up by 1.6 pp (to 18.8%) compared with 2014. Therefore, paid employment increases through flexible types of job contracts, which entail lower pay and greater uncertainty with multiple adverse effects on employed individuals.

### 3.1.4. Conclusions

The situation in the labour market has improved, at least compared with the recent past. For starters, unemployment has decreased, although only moderately, while employment has strengthened. Differentials do exist between males and females, on the one hand, and youth and individuals over 30, on the other hand. Education seems to matter with respect to both the unemployment and the employment probability of an individual, i.e. more educated individuals have better prospects in the labour market and face less uncertainty during the crisis. In addition, underemployment, as a consequence of inadequate labour demand, continues to be more common amongst females and youth, even though the crisis narrowed the differentials, and constitutes another aspect of reduced employment. Another interesting observation is the reduction in the number of the long-term unemployed, although it cannot be safely concluded without further analysis whether this reduction is fuelled by their return to employment or their dropping out of the labour market. Last, but not least, developments in paid employment in 2015 are positive, while December gives ground for optimism as the net balance of paid employment flows is positive and sizeable. Nevertheless, the expansion of flexible types of employment is troublesome, to the extent that they are not desirable to those involved, they often do not ensure satisfactory living standards, and they increase uncertainty for employed individuals.

High unemployment rates are an important issue and have significant economic (and other) consequences. The slight decrease in unemployment rates over the past quarters should not lead to relaxed efforts. Policies that target the labour market (active and passive) should be further reinforced and become more focused. The recent attempt to set up a mechanism to diagnose the needs of the labour market[13] could facilitate the implementation of more focused labour market interventions, as it is expected to increase the effectiveness of training and retraining programmes and also to provide important information, which will improve matching between the demand and supply of labour. Moreover, institutional interventions, which will free up markets, such as the deregulation of certain occupations or the simplification of procedures for establishing and operating a firm, are expected to have a further positive effect on employment. Unemployment rates will most certainly fall once economic recovery is achieved and the economy gets back on a growth path, hopefully in a way that will allow the entire society to share the benefits– mostly through the creation of the type of new jobs necessary to sustain decent and satisfactory living standards.

13. See http://www.eiead.gr/index.php?option=com_content&view=article&id=339%3A2015-07-17-14-03-55&catid=73%3Aefdfaqs&Itemid=44&lang=el.

## 3.2. Recent developments in income inequality and distribution

***Nikolaos C. Kanellopoulos***

The current economic crisis, combined with the structural characteristics and the chronic rigidities of the Greek economy, had a multilevel impact upon the living conditions of households. The most profound is the dramatic increase in unemployment and the large reduction of the disposable family income. Moreover, the harsh fiscal adjustment resulted in the reduction of government spending, significant tax increases and the drastic reduction of the public sector as an employer. All these are expected to worsen the social welfare indicators. This section presents some basic characteristics of income inequality and income distribution, as well as their evolution over the last twenty years.

To measure the welfare of households at national and European levels, the main source of statistical data is the Survey on Income and Living Conditions (EU-SILC).[1] The survey is conducted annually by ELSTAT, is coordinated by Eurostat and provides comparable EU-wide data on the distribution and composition of income and social exclusion. Moreover, it collects information on demographic characteristics of individuals, their position in the labour market, etc. The data used here is the EU-SILC for the recent years to the latest available, namely those of 2014 (EU-SILC 2014), which were published in the summer of 2015 and concern incomes of 2013.

We utilize two indices to measure inequality. In particular, we use the well known Gini coefficient[2] and the quintiles ratio (S80/S20).[3] Even though many indices, which measure total inequality, appear in the international literature and could be calculated, here we adopt the aforementioned indices as they are widely adopted by many researchers as well as by Eurostat and ELSTAT. Since the Gini coefficient is sensitive to income changes in the middle of the income distribution, and the ratio S80/S20 to changes at the extreme values of the income distribution, it is useful to consider both indicators simultaneously. It is necessary to clarify that when referring to income, we mean equivalent disposable household income.

Greece, compared with other European countries, consistently records high income inequality, as measured by the Gini coefficient. In particular, in 2008 Greece recorded the seventh highest rate in Europe of 27 with 33.4 and in 2014 the ninth with 34.5. However, the improvement of Greece's relative ranking is not because inequality declined in Greece, but because it increased more in certain other countries. Figure 3.2.1 shows that even before the ongoing economic crisis, Greece was facing relatively high income inequality, while during the years of this crisis it increased markedly. However, over time Greece systematically records a higher Gini coefficient than the European average.

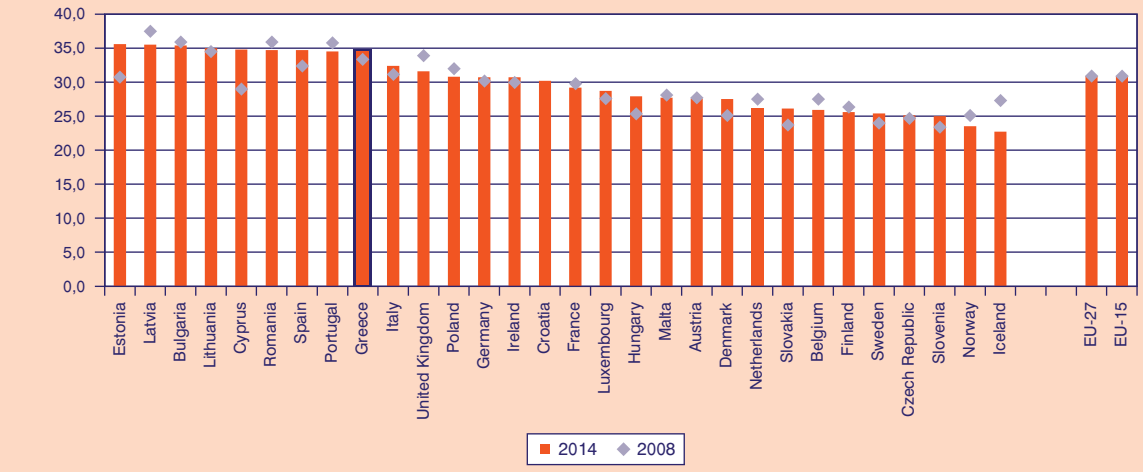
The stability rather than the volatility is shown in income inequality in Greece over the last twenty years regardless of which of the two indicators is used for its measurement (see Figure 3.2.2). According to data from ELSTAT, the Gini coefficient in 2014 for the total population was 34.5, slightly higher than the corresponding coefficient in 2013 (34.4) and 1.1 percentage points higher than in 2008 (33.4), the last year before the crisis. A similar picture emerges when the ratio of quintiles is used (S80/S20), which in 2014 was estimated at 6.5, even recording a marginal decrease compared to 2013 (6.6), but an increase compared with 2008 (5.9). However, we must be careful about the conclusions drawn by the S80/S20, since this index is sensitive to outliers. On the other hand, during the five years before the crisis, when the economy was showing remarkable growth rates, both indices exhibit some, albeit small, reduction of inequality. These developments appear to suggest that during the period of the crisis, where the most vulnerable households have significant loss of income, income inequality increases, while the period of growth with the integration of more and more into the labour market, inequality tends to decrease.

1. In 2003 EU-SILC succeeded the European Community Household Panel survey (ECHP). In this article we use data from both surveys.

2. The Gini coefficient is the ratio of cumulative shares of the total population, as allocated by the amount of one's income, to the cumulative share of the total amount received. Obviously, when all individuals receive the same amount and we have full equality the Gini coefficient is equal to 0. On the contrary, when all income is received by one individual the index is equal to 1. Therefore, the closer to 1 the index is, the more unequal a distribution is. The interpretation of the indicator means that with a value of 0.3, the incomes of any two people differ by 30% from the average income.

3. This ratio is defined as the ratio of income received by the 20% of the population with the highest income to the corresponding income received by the 20% of the population with the lowest income. This indicator shows how substantially richer the richest 20% of a country is in relation to the corresponding poorest. If the index takes a value of 5 this means that for every euro the poorest 20% of the population receives, the richest 20% receives 5 euros.

**FIGURE 3.2.1**
**Gini coefficient in European countries**




*Source:* Eurostat, EU-SILC.

Table 3.2.1 presents some descriptive indicators of the income distribution for selected years. These indicators are useful as they demonstrate over time if specific dimensions in income distribution became more or less unequal on an annual basis. Initially, we present the 10th (P10) and the 90th (P90) percentiles[4] as a ratio of the median, then their ratio (P90/P10) as well as the Gini coefficient and the ratio S80/S20 (panel A). Apparently the 10th percentile increased up to 2010 by about 6 points, showing an improvement in the relative position of low income households, and thereafter has declined even lower than its value in 1995. On the other hand, the 90th percentile decreased until 2012, indicating that the relative position of wealthy households decreased in the same period, while it increased in 2014, but it did not exceed its 2003 value. This shows that the ongoing economic crisis has caused higher income loss to the economically weaker than to the financially wealthy, which should be associated with the burst of unemployment and its persistence at extremely high levels.

The aforementioned changes result in the decrease in the ratio of two percentiles until 2010 and an increase since then. It follows that, while until 2010 there had been a convergence between high and low incomes, since then the gap has begun to widen, but at lower levels than the initial one. However, it is worth mentioning that the increase in the P90/P10 ratio during the period 2010-2014 equals the reduction which took place between 1996 and 2010, i.e. the convergence achieved over thirteen years disappeared within four years of the crisis. Moreover, the Gini coefficients and the ratio S80/S20 follow a similar pattern, i.e. initially they fall until 2010 and then rise, confirming the previous findings.

**FIGURE 3.2.2**
**Evolution of income inequality, 1995-2014**


*Source:* ELSTAT, ECHP, EU-SILC.

In the second part of Table 3.2.1 we report the cumulative share of the equivalent national income for selected percentiles. It seems that, in general, income distribution does not vary dramatically by percentile. In particular, the proportion of national income corresponding to the lowest 20% of the sample, despite temporary fluctuations, remained relatively constant over time (around 6.5%, with a slight increase before the crisis and thereafter a slight decrease). On the other hand, the percentage of total income received by the

4. The 10th (90th) percentile shows the income level below which lies the 10% (90%) of the population relative to the income of the person who is in the middle of the distribution.

**TABLE 3.2.1 Income inequality, 1995-2014**

| | 1995 | 2003 | 2008 | 2010 | 2012 | 2014 |
|---|---|---|---|---|---|---|
| A. Selected percentiles, percentile ratio and inequality indices | | | | | | |
| P10/P50 | 39.8 | 41.7 | 45.0 | 46.0 | 38.7 | 39.1 |
| P90/P50 | 213.7 | 206.3 | 200.6 | 195.0 | 189.8 | 202.0 |
| P90/P10 | 5.4 | 4.9 | 4.5 | 4.2 | 4.9 | 5.2 |
| Gini | 35.0 | 34.7 | 33.4 | 32.9 | 34.3 | 34.5 |
| S80/S20 | 6.5 | 6.4 | 5.9 | 5.6 | 6.6 | 6.5 |
| B. Cumulative shares of selected percentiles | | | | | | |
| S5 | | 0.6 | 0.6 | 0.8 | 0.4 | 0.7 |
| S20 | 6.0 | 6.5 | 6.9 | 7.2 | 6.1 | 6.4 |
| S40 | 18.0 | 18.7 | 19.5 | 19.8 | 18.5 | 18.7 |
| S50 | 26.0 | 26.5 | 27.5 | 27.7 | 26.7 | 26.6 |
| S80 | 59.0 | 58.6 | 59.5 | 59.6 | 59.6 | 58.9 |
| S95 | | 83.7 | 83.9 | 83.9 | 84.2 | 83.9 |
| C. Mean equivalent per capita income | | | | | | |
| € (in constant 2009 prices) | 10,353 | 11,538 | 12,920 | 13,345 | 9,721 | 8,268 |
| CPI | 59.7 | 83.9 | 98.8 | 104.7 | 109.8 | 107.4 |

*Source:* Eurostat, ECHP, EU-SILC.

*Notes:* Income: Gross equivalent income in 2009 prices, individual distribution. Percentiles: (value of percentile/median) × 100.

richest households followed the opposite trend. Moreover, these rates now correspond to a continuously decreasing average national income (at 2009 constant prices), as shown by the third section of Table 3.2.1. The average equivalent per capita income was €10,353 in 1995 and €13,345 in 2010, an increase of 29%. Four years later it is estimated at €8,268, or 38% less. So, although percentiles receive over time about the same percentage of total income, since the latter has fallen dramatically, all are now worse off, at least in terms of purchasing power.

The loss of income during the years of crisis was not the same for all population groups (see Table 3.2.2). During the period between 2008 and 2014, the equivalent disposable income decreased by 36.0% for the entire population. It seems that men and younger individuals recorded reductions higher than the total. Single parent households, households without seniors and households with children record higher reductions than that of the whole country. This decrease is more pronounced for the unemployed and those outside the labor force, while it seems to be less for pensioners. Namely, employees who pay contributions to social security funds recorded a decrease in their mean income by 31.4%, while the corresponding reduction for pensioners was 29.1%. Finally, regardless of the level of education, disposable equivalent income decreased, although the decrease is less pronounced for tertiary graduates.

The aforementioned analysis shows that income reduction during the economic crisis was not identical for all socioeconomic groups. An interesting approach is to examine the anatomy over time of the income distribution, i.e. how much the disposable equivalent income, both in absolute and relative terms, has changed at different points of the income distribution. Figure 3.2.3 presents the highest income (limit) of each decile of the income distribution in 2007 and 2014 (at constant 2009 prices), as well as their absolute and percentage changes. It is obvious that all deciles suffered a reduction in their income. In absolute terms the income loss increases as we move to higher deciles. Indicatively, the decrease for the first decile is €1,957 and €7,645 in the nineth. It seems that the austerity measures (pension cuts, wage reductions in the public sector, etc.), as well as the increased taxation, have

**TABLE 3.2.2 Changes in equivalent disposable income for selected population groups**

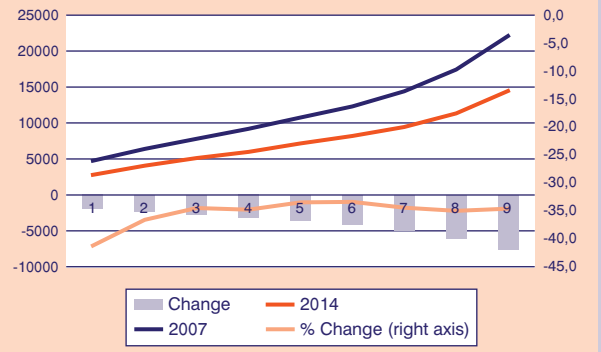
| | Change 2003-2008 | | Change 2008-2014 | |
|---|---|---|---|---|
| | Absolute | % | Absolute | % |
| **Total** | 1,382 | 12.0 | -4,652 | -36.0 |
| **Gender** | | | | |
| Men | 1,342 | 11.4 | -4,756 | **-36.3** |
| Women | 1,421 | **12.5** | -4,551 | -35.7 |
| **Age** | | | | |
| <16 | 1,441 | **12.6** | -4,731 | **-36.7** |
| 16-24 | 1,264 | **12.3** | -4,624 | **-39.9** |
| 25-49 | 987 | 7.8 | -5,175 | **-38.1** |
| 50-64 | 1,916 | **16.0** | -4,980 | -35.8 |
| 65+ | 1,565 | **16.1** | -3,280 | -29.0 |
| **Household type** | | | | |
| One adult | 1,370 | **13.1** | -3,711 | -31.5 |
| Single parent with at least one dependent child | 2,591 | **29.4** | -4,490 | **-39.3** |
| Two adults | 1,788 | **15.6** | -4,420 | -33.3 |
| Two adults under 65 years old | 1,620 | 11.8 | -5,801 | **-37.8** |
| Two adults, at least one, 65 years old and more | 2,137 | **22.4** | -3,344 | -28.7 |
| Two adults with two dependent children | 1,161 | 9.8 | -4,300 | -33.1 |
| Two adults with three or more dependent children | 2,801 | **31.0** | -5,214 | **-44.0** |
| Two or more adults without dependent children | 1,431 | **12.1** | -4,727 | -35.5 |
| Two or more adults with dependent children | 1,296 | 11.3 | -4,688 | **-36.7** |
| Three or more adults | 1,100 | 9.0 | -5,073 | **-38.0** |
| Three or more adults with dependent children | 1,728 | **18.5** | -4,751 | **-42.8** |
| Households without dependent children | 1,425 | **12.2** | -4,604 | -35.2 |
| Households with dependent children | 1,331 | 11.7 | -4,698 | **-36.9** |
| **Most frequent activity** | | | | |
| Employed | 1,219 | 9.0 | -4,625 | -31.4 |
| Not employed | 1,240 | **12.4** | -4,446 | **-39.5** |
| Unemployed | 957 | **12.2** | -3,528 | **-40.0** |
| Pensioner | 1,122 | 8.4 | -4,194 | -29.1 |
| Other inactive | 1,263 | **12.9** | -4,298 | **-38.7** |
| **Level of education** | | | | |
| Lower secondary | 1,028 | 11.3 | -4,098 | **-40.6** |
| Higher secondary | 513 | 4.1 | -5,229 | **-40.4** |
| Tertiary | 964 | 5.2 | -7,571 | **-38.8** |
| **Tenure status** | | | | |
| Owner | 1,572 | **13.6** | -4,727 | -35.9 |
| Renter | 540 | 4.8 | -4,236 | -35.7 |

*Source:* ELSTAT, EU-SILC.

*Notes:* Income: Gross equivalent income in 2009 prices, individual distribution. Bold font indicates increases (reductions) greater than the average increase (reduction).

resulted in larger income losses for the highest deciles, since these measures had a strong progressive design in order not to unduly affect the poorest. It is interesting however to note that the reduction in income as a percentage of income in 2007 is not progressive, since it seems that the lower deciles lost a higher percentage of their income, while from the third decile the percentage losses essentially do not differ. In that regard, the crisis affected the whole income distribution. However, the highest deciles record greater losses in absolute

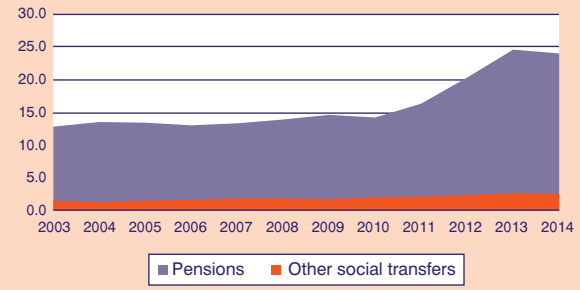
**FIGURE 3.2.3**
**Absolute and percentage income change by decile, 2007-2014**




*Source:* Eurostat, EU-SILC.

*Notes:* Income: Gross equivalent income in 2009 prices, individual distribution.

**FIGURE 3.2.4**
**Redistributional effect of social transfers**




*Source:* Eurostat, EU-SILC.

terms, but the lowest deciles lose most of their income and hence most of their purchasing power.

Finally, it is interesting to examine the effect of social transfers in reducing inequality. Social transfers include pensions (old age, survival, disability, etc.), as well as all social benefits (family allowances, unemployment and long-term unemployment benefits, EKAS, etc.). Using the EU-SILC data for 2014, the Gini coefficient before all social transfers was estimated at 61. If only pensions are included in the equivalent disposable income, the Gini coefficient is reduced to 37. When the remaining social benefits are taken into consideration the Gini coefficient is further reduced by only 2.5 points. It seems that, like in the case of poverty,[5] pensions are highly significant, since it is the social transfer with the greatest redistributive effect. It is worth mentioning that the redistributive impact of pensions is much more pronounced from 2010 onwards, where it nearly doubled (see Figure 3.2.4). The most likely reason is probably the fact that the continuous reductions in pensions were strongly progressive and, as a rule, they affected higher pensions, and in particular those higher than €1,000.

To sum up, even before the ongoing economic crisis, Greece was among the countries with high inequality in the EU27. Although the relative ranking has somewhat improved recently, this is due to the fact that in certain other countries inequality has widened and not because inequality was reduced in Greece. In particular, during the crisis income losses, as a percentage of total income, were larger for the financially weak than for the financially strong, which should be linked with the high increase in the unemployment rate and its persistence at very high levels. In that regard, during the crisis income inequality increases, while in the period of growth, with the integration of more and more in the labour market, inequality was, even slightly, reduced. The disposable income decreased by 36% for the total population between 2008 and 2014, whereas the reduction for specific population groups (men, young people, unemployed, outside the labor force, single parent households, households without elderly, households with children) is higher. Moreover, the reductions of the equivalent disposable income have taken place in a strongly progressive manner, since higher income groups have lost more money, although the lowest income groups have lost more of their total income. Finally, the general redistributional ineffectiveness of social benefits is confirmed, since their effect on reducing the Gini coefficient is relatively small (2.5 units), in contrast to pensions (24 units).

In that regard, the implementation of policies to protect the most affected socioeconomic groups, who have lost much of their income, is essential. In this context, positive results are expected from the universal application of the minimum guaranteed income and at the same time the implementation of policies for the reintegration of the unemployed into employment. The low efficiency of social benefits requires their overall reassessment and possibly the unification and integration of eligibility criteria. Finally, friendly policies towards employment should be promoted. In particular, policies that encourage hiring, whether these are structural reforms, such as the liberalization of markets, or the ongoing active labour market policies, can act as the catalyst for the reduction of unemployment, the improvement of welfare indicators and the restoration of the fragile social cohesion.

5. Kanellopoulos, N. C. (2015). "Recent developments in the evolution of poverty and social exclusion", *Greek Economic Outlook*, Issue No 26, pages 31-34.

## 4.1. Export prospects in the fruit and vegetable sector

*Georgia Skintzi*

### 4.1.1. International aspects of the fruit and vegetable sector

The fruit and vegetable sector is one of the most dynamic sectors in the international trade arena. International exports of fruits and vegetables reached $223 billion in 2014, increased by 41% compared to 2010 and almost doubled during the last decade (in 2005 international exports were $113).[1] The main exporting countries (based on the sum of their exports during the period 2010-2014) are the USA, China, Spain and the Netherlands. These four countries represent 37% of world exports of fruits and vegetables. Table 4.1.1 presents the export value of fruits and vegetables of the ten main exporting countries[2] and Greece. Among the ten main exporters are traditional competitors of Greece, such as: Spain, Italy and Turkey. Greece is ranked between the 21st and the 23rd position, in the global ranking, over the period 2010-2014.

The ten main exporting countries present positive growth rates on average as far as the value of exports of fruits and vegetables is concerned. Impressive growth rates are recorded for the USA, China and Mexico, as shown in Table 4.1.2. The average annual growth rate of exports in the USA is 9.6%, in China and Mexico over 10%, while in Greece it is 4.3%, over the period 2010-2014. The value of exports of fruits and vegetables decreased in 2012 in most of the countries under investigation with the exception of the USA and Spain. Global exports also decreased in 2012, while Greek exports remained stable. It should be noted that Greek exports decreased in 2014 by 1.7% (compared to 2013) for the first time during the five-year period under examination (2010-2014).

The main importers of fruits and vegetables are the USA ($28 billion) and Germany ($21.8 billion) as shown

**TABLE 4.1.1 Value of fruit and vegetable exports (in billion $) of the ten largest exporters and Greece**

| | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| USA | 17.8 | 20.3 | 22.2 | 24.2 | 24.8 |
| China | 16.0 | 19.1 | 18.4 | 20.1 | 20.5 |
| Spain | 15.1 | 16.2 | 16.6 | 18.8 | 19.0 |
| Netherlands | 14.6 | 17.1 | 16.4 | 18.5 | 18.6 |
| Belgium | 8.5 | 9.4 | 9.2 | 10.5 | 9.7 |
| Italy | 8.7 | 9.3 | 8.9 | 9.6 | 9.6 |
| Mexico | 7.6 | 8.7 | 8.6 | 10.0 | 10.7 |
| Turkey | 6.2 | 6.7 | 6.6 | 6.9 | 7.6 |
| France | 6.1 | 6.7 | 6.3 | 6.9 | 6.6 |
| Germany | 5.2 | 5.9 | 5.7 | 6.5 | 6.5 |
| Greece | 2.1 | 2.3 | 2.3 | 2.5 | 2.4 |

*Source:* UN Comtrade.

1. The data used are from the UN Comtrade database. It should be noted that for the year 2014 data regarding a number of countries, whose total exports account for 4% of the word exports, have not been incorporated.

2. The ranking of countries is based on the sum of their exports during the period 2010-2014.

**TABLE 4.1.2 Fruit and vegetable exports rate of change for the ten main exporting countries and Greece**

| | 2010 | 2011 | 2012 | 2013 | 2014 | Average annual growth rate |
|---|---|---|---|---|---|---|
| USA | 13.3 | 13.7 | 9.6 | 8.8 | 2.4 | 9.6 |
| China | 30.5 | 19.6 | -3.7 | 9.2 | 2.0 | 11.5 |
| Spain | 0.6 | 7.1 | 2.7 | 13.2 | 1.2 | 4.9 |
| Netherlands | 6.2 | 17.0 | -4.4 | 12.7 | 1.0 | 6.5 |
| Belgium | -2.1 | 10.0 | -2.5 | 14.8 | -7.5 | 2.5 |
| Italy | 9.3 | 6.0 | -3.8 | 7.3 | 0.5 | 3.9 |
| Mexico | 13.6 | 15.6 | -1.2 | 15.4 | 7.5 | 10.2 |
| Turkey | 15.0 | 8.8 | -2.1 | 4.9 | 10.0 | 7.3 |
| France | 7.2 | 9.8 | -6.3 | 9.6 | -4.0 | 3.3 |
| Germany | -1.8 | 13.6 | -3.4 | 13.6 | 0.2 | 4.4 |
| Greece | 7.8 | 7.2 | 0.1 | 8.3 | -1.7 | 4.3 |

*Source:* UN Comtrade, own calculations.

**TABLE 4.1.3 Value of imports of fruits and vegetables for the ten main importing countries (in billion $)**

| | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| USA | 20.9 | 23.6 | 24.6 | 26.4 | 28.2 |
| Germany | 17.9 | 20.3 | 19.8 | 21.9 | 21.8 |
| UK | 12.0 | 13.3 | 12.7 | 14.1 | 14.4 |
| France | 11.2 | 11.9 | 11.9 | 13.2 | 13.1 |
| Netherlands | 9.0 | 11.1 | 10.9 | 11.9 | 12.2 |
| Russia | 9.1 | 10.8 | 10.3 | 10.9 | 10.0 |
| Japan | 8.0 | 9.4 | 10.0 | 9.3 | 9.0 |
| Canada | 7.7 | 8.7 | 9.0 | 9.6 | 9.9 |
| Belgium | 6.8 | 7.6 | 7.3 | 8.8 | 8.4 |
| China | 4.2 | 5.5 | 6.9 | 7.4 | 8.6 |

*Source:* UN Comtrade.

in Table 4.1.3 (countries are ranked based on the sum of their imports during the period 2010-2014). The USA, Germany, France, the Netherlands, Belgium and China are in the list of the top ten exporters and the top ten importers. As shown in Table 4.1.4, the main importing countries present a positive rate of change of their exports during the five-year period 2010-2014. China presents the highest average annual import growth rate, which is 22.8%. Russia also records a high average annual import growth rate of 7.5%. Nevertheless, it should be noted that in 2014 Russia recorded the highest year-on-year decline in imports of fruits and vegetables over a ten-year period (2005-2014); this could be attributed to the Russian embargo on imports from EU countries that started in August 2014.

## 4.1.2. Greece's performance in the international trade arena

In this section the performance of Greece in the ten largest importing countries is presented. Tables 4.1.5 and 4.1.6 illustrate the value of imports of fruits and vegetables from Greece as far as the top ten import-

**TABLE 4.1.4 Fruit and vegetable imports rate of change for the ten main importing countries**

| | 2010 | 2011 | 2012 | 2013 | 2014 | Average annual growth rate |
|---|---|---|---|---|---|---|
| USA | 1.9 | 12.8 | 4.3 | 7.4 | 6.7 | 6.6 |
| Germany | 2.9 | 13.6 | -2.5 | 10.2 | -0.5 | 4.8 |
| UK | 5.8 | 11.4 | -4.7 | 10.8 | 2.6 | 5.2 |
| France | 2.6 | 6.3 | -0.1 | 10.9 | -1.1 | 3.7 |
| Netherlands | 4.1 | 24.0 | -2.1 | 9.8 | 1.8 | 7.5 |
| Russia | 25.1 | 18.7 | -4.2 | 5.4 | -7.8 | 7.5 |
| Japan | 11.7 | 17.1 | 6.8 | -6.7 | -3.3 | 5.1 |
| Canada | 11.2 | 12.4 | 3.8 | 6.5 | 3.2 | 7.4 |
| Belgium | -5.7 | 12.7 | -4.2 | 20.2 | -4.3 | 3.7 |
| China | 32.7 | 32.5 | 25.5 | 7.2 | 16.2 | 22.8 |

*Source:* UN Comtrade, own calculations.

**TABLE 4.1.5 Value of fruit and vegetable imports from Greece for the top ten importers (in million $)**

| | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| USA | 130.1 | 143.8 | 138.6 | 160.9 | 178.0 |
| Germany | 439.4 | 431.8 | 400.7 | 443.3 | 436.1 |
| UK | 177.9 | 201.7 | 169.0 | 191.4 | 204.0 |
| France | 63.9 | 75.4 | 69.9 | 74.9 | 70.6 |
| Netherlands | 94.3 | 119.7 | 110.0 | 120.9 | 116.5 |
| Russia | 143.0 | 197.6 | 265.1 | 256.0 | 186.2 |
| Japan | 9.1 | 12.4 | 14.1 | 14.4 | 11.3 |
| Canada | 30.7 | 38.1 | 36.8 | 37.1 | 40.7 |
| Belgium | 24.9 | 28.2 | 31.5 | 36.5 | 34.5 |
| China | 1.1 | 1.0 | 2.7 | 4.5 | 3.9 |

*Source:* UN Comtrade.

ers are concerned and their rate of change. Tables 4.1.7 and 4.1.8 illustrate the market share of Greece and its rate of change. Germany is the most important export destination of Greek fruits and vegetables, both among the ten largest fruit importers and among all trading partners of Greece. Germany is followed by Russia, the UK and the USA. The average annual rate of change of imports from Greece (for the five-year period 2010-2014) is positive for all ten countries concerned, but it should be noted that in 2014 imports from Greece decreased for seven countries (exceptions are the USA, the UK and Canada). High growth rates of imports from Greece are observed in China (five-year average annual growth rate 39.4%), Russia (22.9%) and Japan (10.6%). It should be highlighted that in China (a very large and growing market) imports from Greece exhibit large fluctuations. Moreover, the Russian embargo seems to have affected Greek exports since the imports of Russia from Greece have dramatically decreased, by 27.4%, in 2014.

The market share of Greece in the top ten fruit and vegetable importers is relatively small. On average (over the five-year period 2010-2014) Greece exhibits the largest market share in Germany (2.2%), Russia (1.9%), the UK (1.4%) and the Netherlands (1%). Although the value of Greek exports of fruits and vege-

**TABLE 4.1.6 Rate of change of the value of fruit and vegetable imports from Greece for the top ten importers**

| | 2010 | 2011 | 2012 | 2013 | 2014 | Average annual rate of change |
|---|---|---|---|---|---|---|
| USA | 9.9 | 10.6 | -3.6 | 16.1 | 10.6 | 8.7 |
| Germany | 5.2 | -1.7 | -7.2 | 10.6 | -1.6 | 1.1 |
| UK | 9.9 | 13.3 | -16.2 | 13.2 | 6.6 | 5.4 |
| France | 3.1 | 18.0 | -7.4 | 7.2 | -5.7 | 3.0 |
| Netherlands | -2.5 | 26.9 | -8.1 | 9.8 | -3.6 | 4.5 |
| Russia | 73.1 | 38.1 | 34.2 | -3.4 | -27.3 | 22.9 |
| Japan | 22.6 | 36.5 | 13.9 | 1.9 | -21.7 | 10.6 |
| Canada | -3.2 | 24.4 | -3.4 | 0.7 | 9.9 | 5.7 |
| Belgium | -25.8 | 13.4 | 11.7 | 15.9 | -5.6 | 1.9 |
| China | -23.4 | -6.4 | 174.9 | 65.0 | -13.1 | 39.4 |

*Source:* UN Comtrade, own calculations.

**TABLE 4.1.7 Greek share of fruit and vegetable imports for the top ten importers (%)**

| | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| USA | 0.62 | 0.61 | 0.56 | 0.61 | 0.63 |
| Germany | 2.45 | 2.12 | 2.02 | 2.03 | 2.00 |
| UK | 1.49 | 1.51 | 1.33 | 1.36 | 1.41 |
| France | 0.57 | 0.63 | 0.59 | 0.57 | 0.54 |
| Netherlands | 1.05 | 1.08 | 1.01 | 1.01 | 0.96 |
| Russia | 1.58 | 1.83 | 2.57 | 2.35 | 1.86 |
| Japan | 0.11 | 0.13 | 0.14 | 0.15 | 0.12 |
| Canada | 0.40 | 0.44 | 0.41 | 0.39 | 0.41 |
| Belgium | 0.37 | 0.37 | 0.43 | 0.42 | 0.41 |
| China | 0.03 | 0.02 | 0.04 | 0.06 | 0.05 |

*Source:* UN Comtrade.

tables increased over the five-year period 2010-2014, Greek market shares decreased in most of the top ten importers (Table 4.1.8). Therefore, it seems that Greece cannot take advantage of the growth that these markets exhibit and improve its market share. The efforts of Greece to improve its export performance should be twofold: strengthen its market share in the new and dynamic markets such as Russia, China and Japan and maintain its market share in traditional markets such as Germany, the UK and the Netherlands.

## 4.1.3. Analysis of the Greek exports of fruits and vegetables

In this section the course of Greek exports of fruits and vegetables over the decade 2005-2014 is presented. Fruits and vegetables represent over 35% of agricultural exports,[3] on average, during the decade under examination (Table 4.1.9). In 2014 fruit and vegetable exports corresponded to 39.7% of agricultural exports. As shown in Table 4.1.9 the global economic crisis be-

3. As agricultural products are defined, the 0,1 and 4 single-digit classification of the Standard International Trade Classification (SITC rev. 3).

**TABLE 4.1.8 Rate of change of the Greek share of fruit and vegetable imports for the top ten importers**

| | 2010 | 2011 | 2012 | 2013 | 2014 | Average annual rate of change |
|---|---|---|---|---|---|---|
| USA | 7.8 | -2.0 | -7.5 | 8.1 | 3.6 | 2.0 |
| Germany | 2.3 | -13.5 | -4.8 | 0.3 | -1.1 | -3.4 |
| UK | 3.9 | 1.8 | -12.1 | 2.2 | 3.9 | -0.1 |
| France | 0.5 | 11.0 | -7.3 | -3.4 | -4.7 | -0.8 |
| Netherlands | -6.3 | 2.4 | -6.1 | 0.0 | -5.3 | -3.1 |
| Russia | 38.3 | 16.4 | 40.1 | -8.4 | -21.1 | 13.0 |
| Japan | 9.8 | 16.6 | 6.6 | 9.1 | -19.0 | 4.6 |
| Canada | -12.9 | 10.6 | -6.9 | -5.5 | 6.5 | -1.6 |
| Belgium | -21.3 | 0.6 | 16.6 | -3.6 | -1.3 | -1.8 |
| China | -42.3 | -29.3 | 119.1 | 54.0 | -25.2 | 15.2 |

*Source:* UN Comtrade, own calculations.

**TABLE 4.1.9 Value of the Greek fruit and vegetable exports (in billion $), rate of change and share**

| Year | Exports in billion $ | Rate of change | % of agricultural exports |
|---|---|---|---|
| 2005 | 1.34 | 19.3 | 35.7 |
| 2006 | 1.51 | 12.1 | 36.1 |
| 2007 | 1.79 | 18.6 | 38.7 |
| 2008 | 2.25 | 25.8 | 38.2 |
| 2009 | 1.97 | -12.4 | 36.4 |
| 2010 | 2.12 | 7.8 | 38.8 |
| 2011 | 2.28 | 7.2 | 37.5 |
| 2012 | 2.28 | 0.1 | 38.6 |
| 2013 | 2.47 | 8.3 | 39.0 |
| 2014 | 2.43 | -1.7 | 39.7 |

*Source:* UN Comtrade, own calculations.

comes apparent in 2009 when the Greek exports of fruits and vegetables declined significantly by 12.4%. During the next four years (2010-2013) Greek exports of fruits and vegetables increase at a slower pace compared to the year before the economic crisis (2005-2008), while in 2014 exports decrease again by 1.7%. The average annual export rate of change for the decade 2005-2014 is 8.5%, while the average annual export rate of change for the five-year period 2010-2014 is 4.3%. Compared with its main competitors (Spain, Italy and Turkey) Turkey seems to perform better than Greece, the average annual export growth rate of Turkey is 8.7% over the decade 2005-2014 and 7.3% over the five-year period 2010-2014. On the contrary, Greece, compared to Italy, exhibits higher growth rates of exports of fruits and vegetables (the average annual export growth rate of Italy is 6.1% over the decade 2005-2014 and 3.9% over the five-year period 2010-2014). Compared to Spain, Greece exhibits a higher annual export growth rate over the decade 2005-2014 and a lower annual export growth rate over the five-year period 2010-2014 (the average annual export growth rate of Italy is 5.3% over the decade 2005-2014 and 4.9% over the five-year period 2010-2014). In contrast with Greece, none of the

**FIGURE 4.1.1**
**Annual rate of change of fruit and vegetable exports of Greece, Spain, Italy and Turkey**

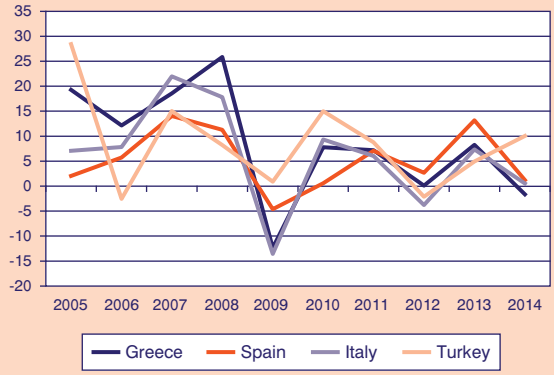



**TABLE 4.1.10 Share of Greek exports of fruits and vegetables to the top ten export destinations**

| | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| Germany | 21.8 | 20.3 | 19.0 | 20.5 | 19.6 |
| UK | 8.4 | 8.8 | 7.7 | 7.9 | 8.3 |
| Russia | 4.2 | 5.6 | 8.5 | 7.4 | 5.0 |
| USA | 5.6 | 5.7 | 5.7 | 6.3 | 7.0 |
| Bulgaria | 4.6 | 5.3 | 5.3 | 5.8 | 5.8 |
| Romania | 5.9 | 6.0 | 4.5 | 4.8 | 4.9 |
| Italy | 5.6 | 5.0 | 4.4 | 4.4 | 5.1 |
| Netherlands | 4.8 | 4.8 | 4.1 | 4.2 | 3.8 |
| Poland | 3.8 | 3.6 | 3.3 | 3.7 | 3.6 |
| France | 2.8 | 3.0 | 3.0 | 3.0 | 2.9 |

*Source:* UN Comtrade.

**TABLE 4.1.11 Greek market share in the top ten export destinations**

| | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|
| Germany | 2.45 | 2.12 | 2.02 | 2.03 | 2.00 |
| UK | 1.49 | 1.51 | 1.33 | 1.36 | 1.41 |
| Russia | 1.58 | 1.83 | 2.57 | 2.35 | 1.86 |
| USA | 0.62 | 0.61 | 0.56 | 0.61 | 0.63 |
| Bulgaria | 22.85 | 28.46 | 31.83 | 30.39 | 25.80 |
| Romania | 10.12 | 11.50 | 10.27 | 12.85 | 11.38 |
| Italy | 2.20 | 1.95 | 1.84 | 1.72 | 1.95 |
| Netherlands | 1.05 | 1.08 | 1.01 | 1.01 | 0.96 |
| Poland | 2.93 | 2.86 | 2.56 | 2.86 | 2.35 |
| France | 0.57 | 0.63 | 0.59 | 0.57 | 0.54 |

*Source:* UN Comtrade, own calculations.

three countries discussed in this section showed a decline in exports in 2014. Figure 4.1.1 illustrates the annual rate of change of fruit and vegetable exports of Greece, Spain, Italy and Turkey.

Germany is by far the largest export destination of Greek fruits and vegetables (20% of exported fruits and vegetables goes to Germany). Table 4.1.10 presents the percentage of Greek exports of fruits and vegetables that goes to the top ten export destinations (ranking is based on the sum of exports during the period 2010-2014). As shown in Table 4.1.11 Greece has a significant market share only to the two Balkan countries (Bulgaria and Romania), in the remaining countries under consideration the Greek market share is low. Moreover, the Greek market share decreases in the western and central European countries but it increases in the USA, Russia, Bulgaria and Romania during the five-year period 2010-2011.

## 4.1.4. Conclusions

In 2014 Greek exports of both fruits and vegetables and agricultural products have decreased for the first time since 2009. The Russian embargo contributed to the decline of exports but exports to other trade partners declined, too. Preliminary data for 2015 are encouraging despite the capital controls imposed and the fact that the Russian embargo continues. According to provisional data by ELSTAT agri-food exports increased by 15% in the first eleven months of 2015 compared to the first eleven months of 2014.[4]

The economic crisis seems to have undermined the Greek exports of fruit and vegetables. While the Greek market share increases in large and dynamic markets such as the USA, Russia, China and Japan and in neighboring countries such as Bulgaria and Romania, it declines in traditional European markets such as Germany, the UK, Italy, the Netherlands, Poland, France and Belgium. Therefore, the targeting of Greece should be twofold: reinforce its presence in the large and growing markets and retain its market share in the traditional European markets.

4. Press release Panhellenic Exporters Association, 7 January 2016.

# 4.2. Competitiveness of the Greek Economy

*Athanasios Chymis*

## 4.2.1. Introduction

In today's framework of fast-growing international trade, competitiveness has an increasing role. It relates to the productivity of a given country, its exports and, thus, its socioeconomic well-being. Competitiveness, to a large extent, determines the degree of a country's attractiveness to investment (domestic and foreign) and entrepreneurship. Entrepreneurship is a concept closely related to competitiveness.

For this reason, many international organizations such as the World Economic Forum (WEF), the International Institute of Management Development (IMD), the World Bank (WB), the Global Entrepreneurship Monitor (GEM), etc., publish indices on competitiveness and entrepreneurship. In this short review of Greek competitiveness I use the widely accepted Global Competitiveness Index (GCI) published by the WEF. This particular index is one of the most comprehensive indices regarding both the number of countries included (140) and the variety of variables it takes into consideration (more than 100).

## 4.2.2. Competitiveness: definition and importance

According to the WEF, competitiveness is defined as "the set of institutions, policies, and factors that determine the level of productivity of an economy, which in turn sets the level of prosperity that the country can earn" (WEF, 2015). This means that productivity, which has a major impact on a country's wealth, depends on competitiveness, which, in turn, is determined by institutional and political factors.

As the most recent WEF report (2015) points out, institutions are a key factor in enhancing competitiveness. Well-functioning markets are a necessary condition to improve competitiveness but institutions are the cornerstone for a well-functioning market. Good institutions increase the adaptive ability of an economy to changes and they boost innovation. Competitive economies are more resilient to crises and they can better adapt to a changing environment.

In the current conjuncture, there is uncertainty at a global level regarding the prospects of economic growth. This uncertainty is mostly fueled by the recent slowdown of emerging markets, tensions and conflicts at a geopolitical level, as well as the consequent humanitarian crisis. On the positive side, WEF refers to the information and communication technologies (ICT) which lead to new entrepreneurial models and a new industrial revolution. ICT is the major vector for a long-term growth (WEF, 2015).

WEF notes that empirical literature shows that the differences in the levels of prosperity among countries are attributed to the differences in productivity. Consequently, enhancing productivity should be a major concern of policy makers around the globe. WEF annual competitiveness reports have exactly this purpose –to provide a guide for each country for the necessary reforms in order to increase productivity competitiveness and, ultimately, socioeconomic well-being.

Productivity is simply defined as the market value of production within a specific time (i.e. one hour, one year, etc.) by the average worker. It is closely related to the Gross Domestic Product (GDP) since this is the total production of the whole economy (all workers) within one year. In Greece, due to low productivity, workers devote more time working than the average worker in high-income OECD countries, while their product is of lower market value (Chymis, 2015). As a result, Greek per capita GDP remains at lower levels than most of its counterparts (see Diagram 4.2.2).

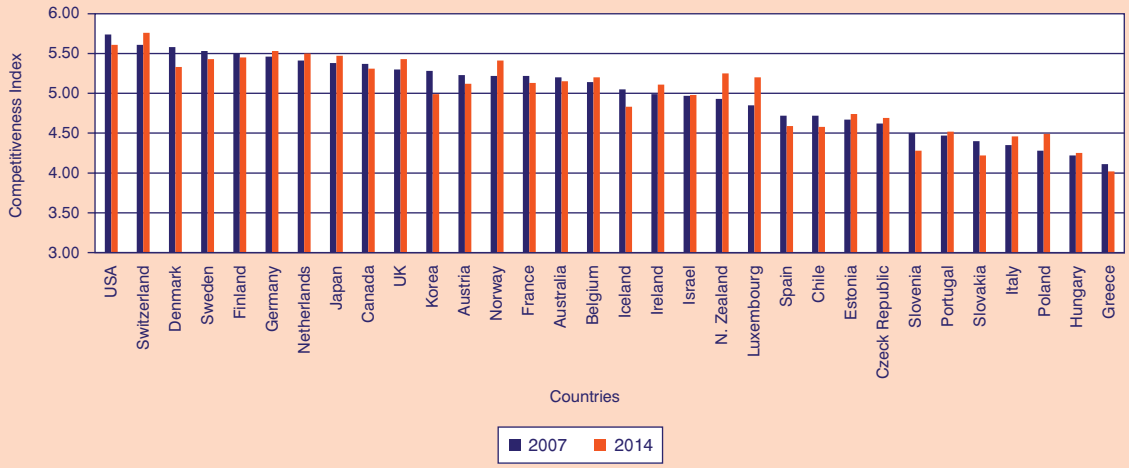
## 4.2.3. Greece compared with other OECD countries

As already mentioned, WEF annually publishes the Global Competitiveness Report (GRC), which includes most of the world's countries. Data collection is based, in part, on other international organizations but, mostly, on surveys of executives in each country. It collects data for more than 100 (114, in the 2015 edition) indicators (variables) which are divided into 12 main pillars: Institutions, Infrastructure, Macroeconomic environment, Health and primary education, Higher education and training, Goods market efficiency, Labor market efficiency, Financial market development, Technological readiness, Market size, Business sophistication and Innovation.

These 12 pillars are divided into three basic sub-indices: Basic requirements (includes the first four pillars), Efficiency enhancers (the next six pillars), and Innovation and sophistication factors (the last two pillars). Depending on the stage of development of each country, WEF applies different weights to each pillar in order to calculate the final competitiveness index. Greece, like all OECD high-income countries, is at the

**GRAPH 4.2.1**

**Global Competitiveness Index for the OECD high-income countries for the years 2007 and 2014**




*Source:* Global Competitiveness Index (WEF, 2008, 2015). By descending order of 2007 values.

stage of innovation-driven development. Most indices are expressed in a 7-point Likert scale as well as the final competitiveness index. One (1) is the lowest performance and seven (7) the highest.[1]

Graph 4.2.1 presents the GCI of the 32 OECD high-income countries.[2] Note that each year's report contains data of the previous year. So, the 2015 report reflects the situation in 2014. The graph compares data of the years 2007 and 2014 in order to illustrate changes between the current situation and the year before the crisis.

From the graph, it is clear that Greece ranks last among the 32 OECD high-income countries. In 2007 the GCI was 4.11 while in 2014 it went down to 4.02. However, as shown later, the worst score was in 2011, at 3.86, which means that in the last three years there has been some improvement. From the 32 countries, 17 have a better score in 2014, while 15 have a worse score. The greatest improvements were by New Zealand, Luxembourg, Norway, Switzerland and Poland.

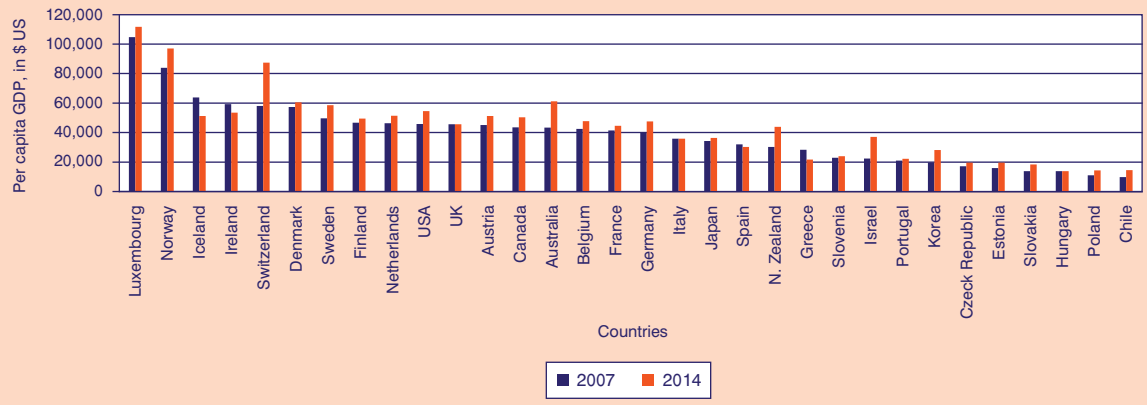
As mentioned earlier, competitiveness is closely related to productivity and, consequently, per capita GDP. Graph 4.2.2 depicts the per capita GDP (in current prices and $US) of the OECD high-income countries for the years 2007 and 2014. Note that part of the per capita GDP growth in some countries may be attributed to currency exchange rate changes between 2007 and 2014. Moreover, per capita GDP values of the graph have not taken into consideration the purchasing power parity. This means that, for example, the very high per capita GDP in Switzerland or Norway could be mitigated, to some extent, due to the high cost of living in these countries compared to other countries such as Greece, Portugal or Spain.

While Greece ranks last among the 32 OECD high-income countries regarding competitiveness (see Graph 4.2.1), this is not the case regarding the per capita GDP. It ranked 26$^{th}$ in 2014 and 22$^{nd}$ in 2007. This is not so bad given the magnitude of the current crisis. However, the fact that countries such as Portugal (with a similar crisis) and Slovenia (which joined the EU in 2004 and the EMU in 2007) overtook Greece should awaken us. All stakeholders and social partners in Greece should come together and decide what reforms we need to implement and what development path we want to take. Portugal, between 2007 and 2014 and despite the crisis, had a per capita GDP increase of 5.3%, Slovenia for the same period had a 4.7% increase, while Greece had a decrease of 23.4% (always in $US value). Israel and Korea, two countries that overtook Greece in the ranking, had a dramatic in-

1. For more information the reader can see the publicly available reports, such as the last one (2015), at: http://www3.weforum.org/docs/gcr/2015-2016/Global_Competitiveness_Report_2015-2016.pdf

2. The 32 countries of the group "OECD high-income countries" are: Australia, Austria, Belgium, Canada, Chile, Czech Republic, Denmark, Estonia, France, Germany, Greece, Hungary, Iceland, Ireland, Israel, Italy, Japan, Korea, Luxembourg, the Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Slovenia, Spain, Sweden, Switzerland, Finland, the United Kingdom and the United States.

**GRAPH 4.2.2**
**Per capita GDP in OECD high-income countries in current $US prices**




*Source:* Global Competitiveness Index (WEF, 2008, 2015). By descending order of 2007 values.

crease in per capita GDP of 64.6% and 42.3%, respectively. Other economies with strong growth were Switzerland (50.6%), Chile (46.5%), N. Zealand (44.9%), Australia (41.3%), the Slovak Republic (33.2%), Poland (30.2%), Estonia (24.1%), the USA (19.1%), Sweden (17.8%), Germany (17.3%), Canada (15.9%), Norway (15.6%), etc.

Except Greece, which had the largest per capita GDP decrease, only four other countries had a decrease: Iceland (-19.7%), Ireland (-9.9%), Spain (-5.7%) and Italy (-0.14%). However, all four economies have a much higher per capita GDP than Greece and are still way ahead despite their recessions.

## 4.2.4. Evolution of the competitiveness index in Greece

The competitiveness index was constructed in order to compare countries. In this context it is more meaningful to refer to the ranking of a country rather than the absolute score of the index itself. Indeed, saying for example that Greece scored 4.11 in 2007, 3.86 in 2011 and 4.02 in 2014 does not offer as much information as if we say that Greece ranked 67$^{th}$ among 134 countries in 2007, 96$^{th}$ among 144 countries in 2011 and 81$^{st}$ among 140 countries in 2014.

Table 4.2.1 shows Greece's ranking with regard to the total index, its main three sub-indices as well as its 12 pillars for the period 2007-2014. It is clear that for a country which belongs to the group of the OECD high-income countries such rankings are not satisfactory at all and do not promise positive developments in the near future. Greece ranked very low and lagged far behind all its counterparts already in 2007 and even long before. These low rankings should have alerted policy makers about the unsustainable level of affluence Greece enjoyed all these years before the crisis.

It is true that the economic crisis negatively affected the macroeconomic environment and the financial market but already in 2007 both, and especially the macroeconomic environment, were not in good shape, as the rankings reveal (Table 4.2.1). Moreover, Greece ranked very low for Institutions, Goods market efficiency, Labor market efficiency as well as most of the other pillars. These rankings clearly do not reflect an economy which ranked —regarding the per capita GDP— as high as 22$^{nd}$ among the 32 OECD high-income countries.

## 4.2.5. Conclusions-Policy recommendations

Table 4.2.1 is eloquent regarding issues that Greece must improve in order for the economy to get back on a growth path. Starting from Basic Requirements (Institutions, Infrastructure, Macroeconomic environment and Health and primary education) it becomes clear that Institutions in Greece are the big patient. Infrastructure is in better shape but there is room for improvement, particularly in the transport sector and networks (ports-railroad and road connections). The Macroeconomic environment remains very fragile mostly due to the high debt, while Health and primary education, although in good condition, rank much lower than Greece's OECD high-income counterparts.

**TABLE 4.2.1 Evolution of Greek rankings with respect to the Global Competitiveness Index for the period 2007-2014**

| | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 |
|---|---|---|---|---|---|---|---|---|
| Total countries | 134 | 133 | 139 | 142 | 144 | 148 | 144 | 140 |
| **Global Competitiveness Index** | **67** | **71** | **83** | **90** | **96** | **91** | **81** | **81** |
| A) *Basic requirements* | *51* | *56* | *67* | *80* | *98* | *88* | *76* | *74* |
| 1. Institutions | 58 | 70 | 84 | 96 | 111 | 103 | 85 | 81 |
| 2. Infrastructure | 45 | 47 | 42 | 45 | 43 | 38 | 36 | 34 |
| 3. Macroeconomic environment | 106 | 103 | 123 | 140 | 144 | 147 | 135 | 132 |
| 4. Health and primary education | 40 | 41 | 40 | 37 | 41 | 35 | 41 | 41 |
| B) *Efficiency enhancers* | *57* | *57* | *59* | *65* | *69* | *67* | *65* | *62* |
| 5. Higher education and training | 38 | 43 | 42 | 46 | 43 | 41 | 44 | 43 |
| 6. Goods market efficiency | 64 | 75 | 94 | 107 | 108 | 108 | 85 | 89 |
| 7. Labor market efficiency | 116 | 116 | 125 | 126 | 133 | 127 | 118 | 116 |
| 8. Financial market development | 67 | 83 | 93 | 110 | 132 | 138 | 130 | 131 |
| 9. Technological readiness | 59 | 53 | 46 | 47 | 43 | 39 | 39 | 36 |
| 10. Market size | 33 | 34 | 39 | 42 | 46 | 47 | 49 | 52 |
| C) *Innovation and sophistication factors* | *68* | *66* | *73* | *81* | *85* | *81* | *74* | *77* |
| 11. Business sophistication | 66 | 66 | 74 | 77 | 85 | 83 | 74 | 74 |
| 12. Innovation | 63 | 65 | 79 | 88 | 87 | 87 | 79 | 77 |

*Source:* Global Competitiveness Index (WEF, 2008, 2015).

Regarding the sub-index of Efficiency enhancers, Goods market efficiency and Labor market efficiency, despite the measures that have been taken during the last years, they are in dire need of improvement. Financial market is more the victim (result) of the economic crisis than the cause. Technological readiness' relatively good ranking is a positive sign. However, the country lacks the ability to capitalize on this due to weaknesses in the Innovation and sophistication factors. Specifically, with respect to the Capacity for innovation, Government procurement of advanced tech products and, University-industry collaboration in R&D indices, Greece ranks 111th, 133rd and 110th, respectively.[3]

Investment is the critical factor for the development of the Greek economy. Investment is the only solution to job and wealth creation and —coupled with innovation— productivity increase. In order for investment (both domestic and foreign) to flow in Greece there is one major issue that has to be addressed: uncertainty. Unless measures are taken to remove uncertainty that deters potential investors and entrepreneurs from operating in Greece, the amount of new investment that takes place each year will remain at the persistently very low levels of the last two decades. For this reason some specific recommendations follow.

- The pillar of Institutions is one of the fundamental pillars. A less time consuming and more efficient legal framework, more property rights protection, drastic reduction of public money waste, more transparency in government policymaking, less regulatory and bureaucratic burden are some of the key indicators.
- The pillars of Goods market and Labor market efficiency are also very important for the creation of a stable, business friendly environment. Specifically, the tax system needs major simplification as well as some degree of stability. Ever-changing tax rates only create uncertainty and make business planning impossible. Tax rate reduction will positively affect the stifled economy. Salaries and wages, particularly in the public sector, need to be connected to the employees' productivity. This will offer a strong incentive for productivity increases,

3. The reader can access all 114 indicators at the site provided in footnote 1 (page 183 of the Report).

while it will help the economy to retain and to attract talent, two sub-indices in which Greece ranks very low, 111st and 131st, respectively. It is a shame for Greece to produce a large number of scientists (as the relative sub-index of Tertiary education enrollment shows, ranking 1st) who have to migrate to find a decent job.

- As already stated, innovation is internationally considered as a major driver of growth. Even though Greece ranks high (6th) in the Availability of scientists and engineers, Capability for innovation needs considerable improvement and Government procurement of advanced tech products should increase in order to boost public sector productivity. Least but not last, University-industry collaboration can be strengthened as this can offer a partial solution to universities' funding problems, help reduce unemployment and increase innovation and productivity.

## 4.2.6. Bibliography


Chymis, A. (2015). "Competitiveness: its role in Development", *Greek Economy*, 13 (January), pp. 33-41 [in Greek].

World Economic Forum (2015). *Global Competitiveness Report 2015-2016*. Available at: http://www3.weforum.org/docs/gcr/2015-2016/Global_Competitiveness_Report_2015-2016.pdf as well as other WEF reports since 2008.

# 4.3. Natural gas networks and market: Developments and prospects

*Theodore Tsekeris, Vassilis Lychnaras*

## 4.3.1. Current situation in the natural gas transport system

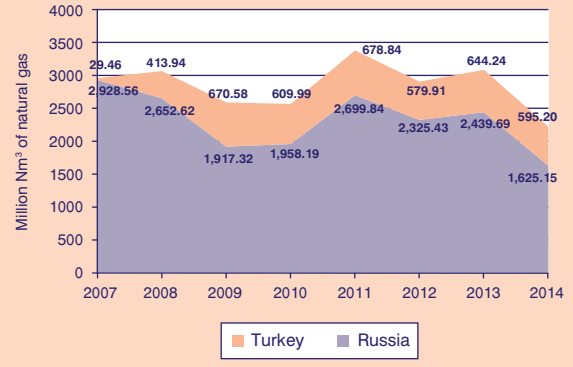
Natural Gas (NG) was introduced in Greece in 1996 and its transport system has been developed in parallel to other European countries. Emphasis is placed by the relevant EU policy on creating an integrated market (European Parliament, 2009), with an interoperable natural gas network connected with neighboring countries by pipelines (from Northern Africa and the Caspian Sea) and importing Liquefied Natural Gas (LNG) by ships. The National Natural Gas System (NNGS or ESFA) is composed of:

a) The central high-pressure NG pipeline (512 kilometers long) from the Greek-Bulgarian border (Sidirokastro station, with a design capacity of 662,200 Normal m$^3$ per hour or Nm$^3$/h), up to Attiki, and a second land entry point at the Greek-Turkish border, Kipoi station, Evros (with a design capacity of 856,114 Nm$^3$/h). Figure 4.3.1 depicts the evolution of the amount of NG imports via these two land entry points per country of origin.

b) High-pressure NG network branches (947 kilometers long), with main terminal stations (in Athens, Thessaloniki, Larisa, Volos and elsewhere) and other (medium- and low-pressure) branches for distribution to industrial and household consumers, with extensions to other regions, such as Anatoliki Makedonia-Thraki, Kentriki Makedonia, Thessalia, Viotia (Inofyta, Antikyra), Korinthos and Arkadia (Megalopoli).

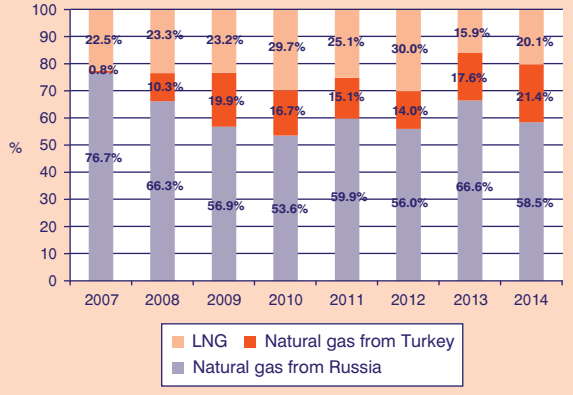
c) The LNG terminal station in Revythousa, operating since 2000, with a design gasification capacity of 519,514 Nm$^3$/h, taking also into account the capacity of the mainland entry station in Agia Triada, Megara. This station reinforces the NG market competition and supply security, as it promotes the diversification of the NG sources and routes into the country, and does not depend on the operating conditions of upstream NNGS.

**FIGURE 4.3.1**
**Natural gas imports (except LNG) per country of origin, 2007-2014**




*Source:* Own processing of data from DESFA.

**FIGURE 4.3.2**
**Import shares (%) of natural gas, including LNG, 2007-2014**




*Source:* Own processing of data from DESFA.

The country imports NG mainly through pipelines and, to a smaller extent, by special tanker ships transporting LNG to and from Revythousa (Figure 4.3.2). In 2014, 59% of the total amount of NG imports came from Russia[1] and 21% from Turkey, while 20% arrived in the form of LNG from Algeria (76%), Norway (14%) and Spain (10%). The NNGS is integrated with the cross-border metering stations, operational and maintenance centres, and other surface facilities for pressure regulation and flow control (DESFA, 2015a).

1. However, it is noted that, due to reduced consumption of NG originating from Russia in 2014, compared to the forecast of the initial contract, DEPA compensated Gazprom with $36 million, as the result of a 'take or pay' penalty clause. (Source: http://energypress.gr/news/depa-symfonia-me-gazprom-gia-tis-ofeiles-take-or-pay-toy-2014).

## 4.3.2. Review of the natural gas market in Greece

Natural gas is considered as a friendlier fuel for the environment, compared to lignite, and it is necessary to support the development of renewable energy sources in the electricity sector. These are the main parameters that introduce gas power production units in the Greek energy market. In general, the use of NG, as an alternative fuel for electricity production and industry, as well as for households and transport, has a positive effect on the energy security and stability of the country. On the other hand, Greece mainly imports NG to cover its needs. For this reason, the use of the specific fuel increases the energy dependency of the country and has a negative impact on the energy security in periods of international crises.

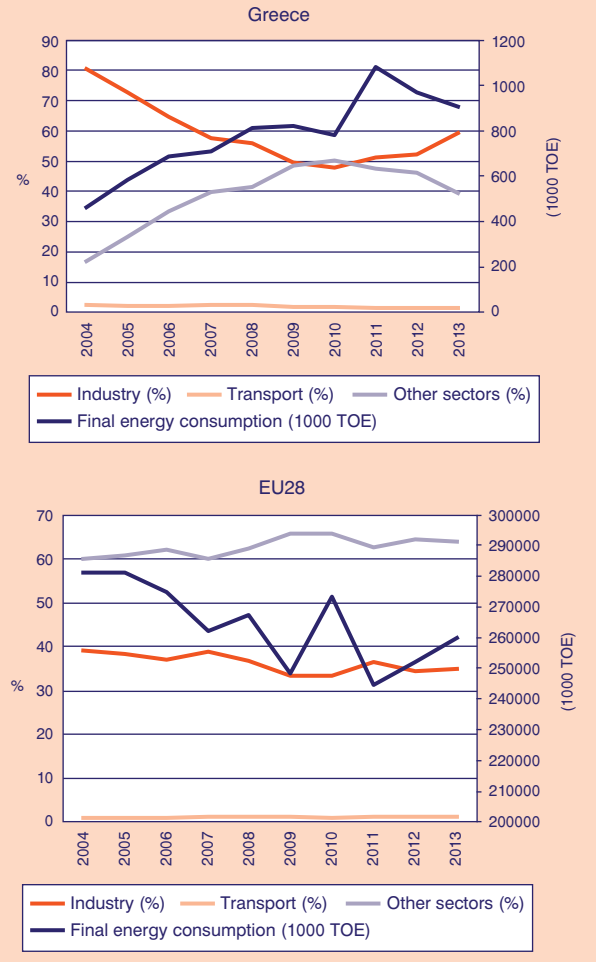
According to the latest available Eurostat data, the use of NG in Greece shows an important increase during the last years. Total gross inland consumption increased from 1.7 million tonnes of oil equivalent (MTOE) in 2000 to 3.9 MTOE in 2011. After 2011, there was a decrease in consumption, while, in 2013, the total gross inland consumption reached 3.2 MTOE (Eurostat, 2015). Regarding the development of gas final consumption, Figure 4.3.3 presents this figure as a total and as a percentage share by sector, for the decade 2004-2013. The final energy consumption increased until 2011, decreasing thereafter.

More particularly, until 2007-2008, industry, especially the newly established gas-fired power production units, was the main consumer. Meanwhile, the consumption of other sectors (including households) increased in 2009-2010, while the share of industry and other sectors was about 49% each. After 2011, a significant decrease in the consumption of other sectors took place, while industry consumption remained stable. Because of this and the decrease in total consumption, the share of industry increased, while the share of other sectors decreased. In 2013, industry represented 59% of the final consumption, the other sectors represented 39%, while the use of gas in the transport sector was negligible. In the EU28 countries, during the period 2004-2013, 63% of the final gas consumption, on average, comes from industry and 36% from other sectors.

Nevertheless, the above figures are indicative and can only be used for comparison between EU countries. They cannot always be considered as representative of the Greek market, because their categorization is not detailed and accurate. In any case, electricity production covers the main use of NG in Greece. More specifically, for example, according to the quarterly report of the NNGS Operator (DESFA), for the 3rd quarter of 2015, 39.5% of NG was consumed by the Power Production Corporation (PPC) and another 31.5% from the Independent Power Producers. This means that more than 70% of NG is used for electricity production. Additionally, about 22% was consumed by industry and only 7% by households (DESFA, 2015b). As mentioned, Greece covers its needs for gas via imports. Figure 4.3.4 presents the quantities and the values of gas imports and exports. It is obvious that exports are negligible compared to imports. Natural gas imports reached a peak in 2008 and 2011-2012. After 2013, the imported quantity was reduced.

As regards the average import price of NG, the Regulatory Authority for Energy (RAE) of Greece is ob-

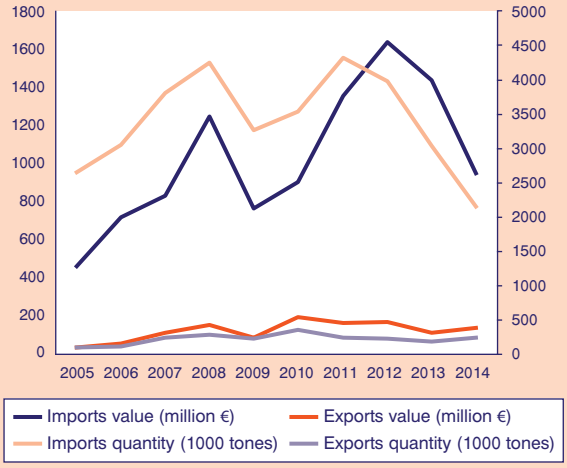
**FIGURE 4.3.3**
**Final energy consumption of gas as a total (right axis) and as a share by sector (left axis), 2004-2013**




*Source:* Eurostat, Energy Statistics, Simplified energy balances - annual data, http://appsso.eurostat.ec.europa.eu/nui/show.do?dataset=nrg_100a&lang=en

ligated to collect and process the data required in order to calculate and publish the Weighted Average Import Price (WAIP) of NG in the NNGS of Greece, on a monthly basis. The development of the average price is presented in Figure 4.3.5. It is important to notice that the average price in 2014 decreased by 11%, compared to the price in 2013, and the average price in the first nine months of 2015 decreased by 12%, compared to the average price in the first nine months of 2014. The downward trend of the NG prices is mainly due to the continuous decrease of the international oil prices.

**FIGURE 4.3.4**
**Gas balance of trade in Greece, value in million € (left axis) and quantity in thousand tonnes (right axis)**

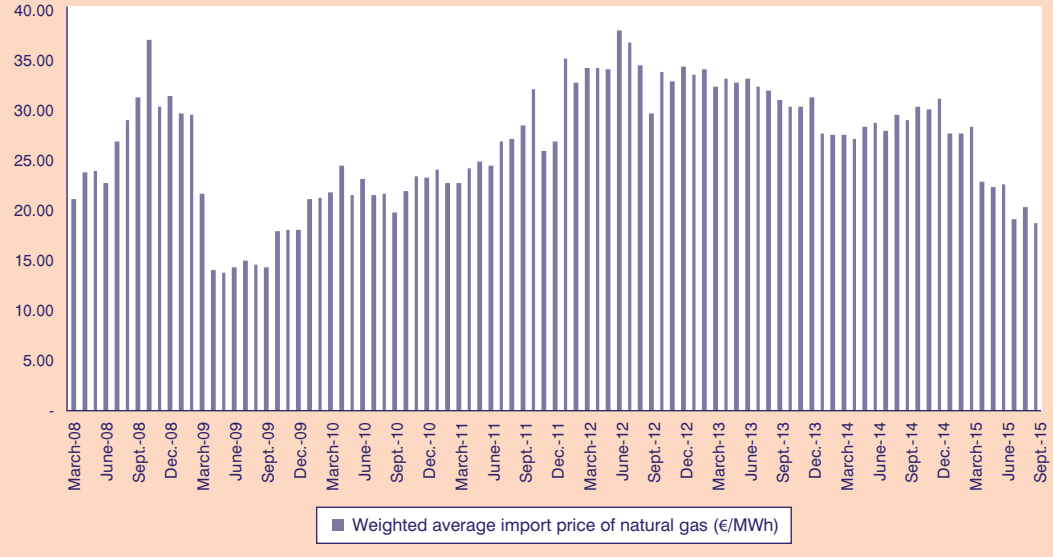



*Source:* Eurostat, "Energy Statistics, EU trade since 1988 by SITC", http://ec.europa.eu/eurostat/web/international-trade/data/database#

## 4.3.3. Prospects for natural gas logistics networks

The NG logistics networks in Greece are expected to be considerably expanded, based on DESFA's (2015a) Development Study for 2016-2025, DESFA's investment plan and the new natural gas systems scheduled to be constructed and to operate within the country, according to the Public Gas Corporation (DEPA), in areas outside the jurisdiction of existing Gas Supply Companies (EPA), either as new EPA or as extensions of current ones (particularly in regions of Northern Greece and Eastern Central Greece). In addition, the role and connectivity of Greece within the international NG transport networks is predicted to increase, as part of the EU Southern Gas Corridor, with the construction (by 2020) and operation of the Trans-Adriatic Pipeline (TAP), from Azerbaijan and Turkey to Northern Greece and, then, to Albania and Italy, through the Adriatic Sea. This pipeline will be connected with the NNGS in Thessaloniki (Nea Mesimvria) and Komotini, thus, contributing to the development of a wider interconnector pipeline network in the Balkan countries (e.g., the in-

**FIGURE 4.3.5**
**Weighted average import price of natural gas (€/MWh)**




*Source:* RAE, "Publication of the weighted average import price (WAIP) of natural gas in Greece", December 2015, http://www.rae.gr/site/en_US/categories_new/gas/market/wholesale_gr.csp

terconnector pipeline IGB from Komotini to Bulgaria) up to Central Europe.

The energy sufficiency and NG export possibilities of Greece could be reinforced through the exploitation (by the Greek-interest Energean company in collaboration with DEPA) of the gas field in Kavala (with an estimated storage capacity of 1 billion $m^3$). The total gas storage capacity of the NNGS is also expected to significantly increase after the second upgrading of the Revythousa station (from 2017). The recent licensing (from the Ministry of Environment and Energy - YPEKA) for the construction of an offshore LNG import facility in the area of Alexandroupoli will improve the feeding capacity of the NNGS and will create a new NG export gateway from Greece to the South-Eastern Europe markets. Prospects are further broadened through the plans for transporting NG from the field in the area of Cyprus, by special tanker ships or by pipeline (the so-called EastMed), with interconnections to neighboring countries (Israel, Egypt) and a possible extension to mainland Greece.

The aforementioned developments and prospects in the NG logistics networks will create new or expand existing activities in the sectors of energy and transport and related categories, especially with regard to small-scale applications of LNG usage. First, there are expectations for increased use of LNG fuel (as more ecological and lower cost than conventional fuel) in shipping[2] and road transport. More specifically, the penetration of clean vehicle technologies and alternative vehicle fuels (such as LNG) constitute priorities for achieving the goals of the EU Green Paper, moving towards a green (eco-friendly) economy and successfully reaching the targets of reducing environmental pollution and greenhouse emissions.

In the maritime transport industry, there is an increase of the LNG fuel usage and the size of the fleet of vessels (tanker ships) transporting LNG. LNG transport is regarded as the most rapidly evolving sector of global shipping and, during the last years, has attracted considerable investment from the Greek shipping community. It is noted that half of the LNG tanker ship orders worldwide come from Greek companies (Piraeus Bank, 2013). Especially, in 2013, the Greek-owned fleet amounted to 9.1% of the world liquefied gas shipping fleet, with 140 vessels, 14 of which are used for LNG transport, while the number of new ships is expected to significantly rise.

The country should exploit the comparative advantages of the Greek-owned fleet and its geographical position for developing an LNG bunkering network for vessels moving across its maritime zone up to Cyprus, within the EU environmental policy framework of reducing sulphur emissions in the Mediterranean basin (from 2020). The services of such a network might be offered within seaport facilities, floating barges and pipelines, in island regions like Crete and Rodos. It is stressed that Greece is located along some of the most important maritime LNG transport corridors (from/to the Suez canal, the Black Sea and the Gibraltar Strait), including those between Qatar-USA (world's busiest route), Qatar-Europe (world's second busiest route), Algeria-(South-Eastern) Europe, Egypt-Europe, etc.

Moreover, there are expectations for increased road and coastwise LNG transport demand to serve various consumers. The planned facilities for LNG truck loading (in Revythousa) will allow the road transport of natural gas to regions where the NNGS is not yet developed, like in western mainland Greece. In addition, the development of small ship bunkering facilities in Revythousa and the subsequent coastwise ship bunkering (in Piraeus) will help to provide energy input to power generation units on Greek islands and (partly) substitute the use of petroleum, and will feed LNG storage facilities of industries and small distribution networks in coastal areas.

### 4.3.4. Conclusions

Natural gas is considered to be an environmentally friendly fuel and, at the same time, necessary for the development of renewable energy sources in electricity generation, generally contributing to the energy security and stability of the country. These factors have led to its introduction and evolution in the Greek energy market. On the other hand, Greece is mainly dependent on NG imports and, therefore, its use increases the country's energy dependency, probably leading to pressure on the energy market and energy security, specifically in times of international crises. Regarding the use of NG in Greece, the basic consumption comes, mainly, from electricity power plants and, secondly, from industry and the domestic sector.

Greece should exploit the current prospects in the NG logistics networks, to support the achievement of its strategic objectives with respect to energy self-sufficiency and stability, and its upgrading as an interna-

2. Projects related to the introduction of LNG in the Greek coastwise and short-sea shipping refer to Archipelago-LNG and POSEIDON MED.

tional trade hub. This upgrading refers both to the creation of a natural gas transhipment hub in Southern Europe and the Eastern Mediterranean, and the development of an export and transit hub, particularly in northern Greece. Specifically, Kavala might constitute a hydrocarbon trading hub (for gas storage and forwarding services), while Alexandroupoli could develop international cargo and gas transit services, by use of combined transport operations with pipeline, seaport/maritime and railway services from/to neighboring countries (Bulgaria and Turkey).

In addition, the role of the port of Thessaloniki in the energy transport market can be reinforced with the development of an NG storage and distribution centre and its incorporation within the gas pipeline networks of the wider region, in parallel with those of oil distribution. The specialization of northern Greece's seaports could be expanded to encompass related economic activities in the trade and manufacturing sectors, such as those of special ship bunkering, repair and maintenance. Finally, the Greek shipping community could promote the incorporation of the country within the global LNG maritime transport networks, possibly in collaboration with large energy companies.

## References


European Parliament, 2009, "*An Assessment of the Gas and Oil Pipelines in Europe*", European Parliament's Committee on Industry, Research and Energy, Brussels.

Eurostat, 2015, "*Energy Statistics, Gross inland energy consumption by fuel type",* http://ec.europa.eu/eurostat/tgm/table.do?tab=table&init=1&language=en&pcode=tsdcc320&plugin=1 (last accessed on 7/1/2016).

DESFA, 2015a, *Development Study 2016-2025*, DESFA, Athens.

DESFA, 2015b, "Communication Pipeline" Newsletter, 3rd Quarter 2015, DESFA, Athens http://issuu.com/desfa/docs/desfa_agwgos_c-2015_f_web.

Piraeus Bank, 2013, *LNG Tanker Ships*, Sectoral Studies, No. 20, Economic Analysis and Market Division, Piraeus Bank Group, Athens.

# Assessment of the impact from changes in the heating oil excise duty on consumption and state revenues

*Vassilis Lychnaras*, Elisavet I. Nitsi*, Christos Triantopoulos**

## 1. Introduction

Heating oil is a basic commodity for households. According to 2014 data, about 2.8% of the average annual income of Greek households was consumed for heating, while in 2012 the same share was 3.9%. Therefore, the final consumer price of heating oil is a major factor influencing household expenditures. On the other hand, a great part of the final price of fuel is taxes, mainly excise duty and VAT. At the same time, excise duty and VAT on fuels are considered as important revenue for the state. Therefore, any policy decisions taken about the level of the excise duty on heating oil should result from rational planning and thorough analysis of the positive and negative effects on consumption, revenues and the burden of households. The present article aims to investigate the impact on consumption and revenues of possible changes to the excise duty on heating oil from the current level of 230 euros per kilolitre.

More specifically, the change in excise duty leads to a different level of the selling prices of heating oil and this impacts state revenues in two ways. First, the revenue from the excise duty itself changes, while, at the same time, there is an impact on the revenue from VAT, as the VAT is charged on the reduced or increased price after the change of excise duty. However, the increase or decrease of the final price will cause an opposite change in consumption that will reduce the above effects on state revenues. Considering this, and taking into account the unfavorable economic situation of the country, the logical question to be explored is whether (a) a reduction in the excise duty that will originally reduce tax revenues (both for VAT and excise duty) can be compensated by the expected increase in demand and (b) an increase in the excise duty that is expected to lead to an increase in tax revenue will eventually be offset by the fall in consumption? Of course, the final result will also depend on other factors, such as international prices, weather conditions, income, etc.

The analysis is performed on a monthly basis and more specifically for the winter period October-April, when heating oil is used. The analysis period starts from October 2008 until April 2015 and includes 7 winter periods (49 months in total). The specific period covers the economic crisis of the country, and the effects on consumption and tax revenues are considered. Regarding the factors that affect the demand for heating oil, this work is focused on the most important of these factors, taking also into account the availability of required data.

The rest of the paper is structured as follows: Section 2 presents and analyses the evolution of the legal framework and the related policies. Section 3 presents the development of heating oil consumption and analyses the identifying factors of demand. Section 4 documents the evolution of state revenue from the excise duty on heating oil. Section 5 describes the econometric model of demand and presents the analysis and the results. Section 6 concludes.

## 2. The legal framework of the excise duty on heating oil

The imposition of an excise duty on fuel is one of the fiscal policy instruments whose dimensions transcend the narrow fiscal limits. In particular, the option of imposing an excise duty on fuels is based on (a) the need to reduce external environmental burdens caused by widespread fuel consumption, (b) the rationale of offsetting the private benefits arising from the utilization of public roads and public infrastructure in transport operations (e.g. transportation fuels), (c) the wider negative externalities caused by transportation and traffic (e.g. accidents, traffic problems, etc.), (d) the need to restructure the energy mixture in order to promote alternative and environmentally friendly energy sources (e) the need to reduce energy dependence on fuel imports, and (g) the need to increase tax reve-

* Researchers, Centre of Planning and Economic Research (KEPE).

nues, since in many cases consumption has inelastic characteristics concerning price (Manesiotis and Karavitis, 1991; OECD, 2001; Karavitis, Maniatis and Dantsev, 2012). In terms of international economic cooperation, and especially when it comes to the concept of a common market, as in the case of the European Union (EU), the enforcement and the level of the excise duty on fuel have a dimension of dealing with tax competition among the participating economies.

In this context, and in particular regarding the dimensions related to environmental protection and tax harmonization, the European Commission initiated a reform effort concerning the harmonization of taxation on fuel —including the excise duty on fuel— in the EU member-states, which, although it began in the early 1990s, was completed in 2003 (Directive 2003/96/EC). To this end Greece gradually promoted the harmonization with the EU framework and formed, from 1993 onwards, an analytical framework for the excise duty on fuel. Regarding heating oil, originally, in 1993, the excise duty on heating oil was at a slightly lower level than diesel, while during the period from October-April the excise duty on heating oil was further decreased in order to reduce the cost during the winter season. Then, in 1996, the excise duty on heating oil was equated to that of diesel, maintaining, of course, the provision that during winter the excise duty on heating oil would be decreased to much lower levels, which were frequently regulated with relative amendments (Table 1). Thus, the imposition of the excise duty on fuel was based on the rationale of an initial equation between diesel and heating oil, with the excise duty on heating oil set at considerably lower levels in the winter season.

The above rationale was maintained also after the accession of Greece to the Economic and Monetary Union (EMU), as evidenced in the National Customs Code of 2001 which defined again the excise duty framework (Table 1). Along the same lines as in previous years, in 2003, and following the developments at the EU level, during the winter period the excise duty on heating oil was reduced to 21 euros per kilolitre. This reduction was established in 2005 as part of the incorporation of Directive 2003/96/EC into Greek law, representing (the amount of 21 euros per kilolitre), in fact, the minimum level of taxation pursuant to the aforementioned EC Directive. In addition, always in the framework of the aforementioned EC Directive, in 2005 a parallel increase in the excise duty on heating oil and diesel was institutionalized for the period 2006-2009, according to which the excise duty was set to reach 302 euros per kilolitre by 2009. Also in this framework of increasing the excise duty, the provision for the reduction of the excise duty on heating oil at 21 euros per kilolitre in winter was maintained.

The level of the excise duty on heating oil rose in 2011, when the excise duty on heating oil during the winter period, like the excise duty on kerosene for heating, was set at 60 euros per kilolitre. The important thing, however, is that in the same year there was a provision that by 30/9/2013 the excise duty on heating oil would be equated to 80% of the current (at the time) excise duty on diesel. So, in 2012, both the excise duty on diesel, and the corresponding excise duty on heating oil were equated to the level of 330 euros per kilolitre, which was the lowest level at which the excise duty on diesel should stand, while the upward equalization of the excise duty on heating oil was carried out to combat fuel smuggling.[1] Thus, the exception of the winter season was essentially abolished and the level of excise duty on heating oil remained throughout the year at 330 euros per kilolitre. After two years, in 2014, the special treatment of the winter season for the excise duty on heating oil was re-established, the level of which fell to 230 euros per kilolitre, remaining, however, well above the levels at which it stood before 2012.

The increase in the excise duty on heating oil was accompanied by the establishment of a heating allowance for specific social and income groups, in order to compensate for the significant increase in the excise duty on heating oil. In this context, in November 2012, this allowance was introduced based on income criteria, property criteria and climate zones, which expanded over the next two periods (2013-2014 and 2014-2015) to include more beneficiaries. This trend was interrupted in the period 2015-2016, when the criteria became more stringent and restrictive.

Alongside the provisions regarding the consumption of heating oil by households, either through the special treatment of the winter period or the heating allowance, the legal framework of the excise duty included provisions for hotels as well as for public and private hospitals and welfare institutions, while, with regard to the excise duty on diesel, there was special attention given to agricultural activity. Specifically, as to the latter, an exemption from the excise duty on diesel and a corresponding tax refund to eligible farmers was established in 1996. This concerned a discharge rate which rose from the original 30% on the current excise duty of diesel for agricultural activity to 50% in 2000. From 2003 onwards, the calculation method of the support of agriculture regarding the excise duty

1. For further analysis on fuel smuggling see Mardas (2014).

**TABLE 1 Legal framework of the excise duty on heating oil**

| Law | Gov. Gazette | Description |
|---|---|---|
| L. 1038/1980 | 67/A/1980 | On customs and taxation of oil refineries. |
| L. 1642/1986 | 125/A/1986 | Special oil taxation regime. |
| L. 2127/1993 | 48/A/1993 | The excise duty on heating oil amounted to 60,000 drachmas per kilolitre and the corresponding excise duty on diesel to 68,000 drachmas, while for the October-April period the excise duty on heating oil was limited to 39,000 drachmas per kilolitre. |
| L. 2386/1996 | 43/A/1996 | The excise duty on heating oil was equated to that of diesel at 77,000 drachmas per kilolitre, while for the winter period (October-April) the excise duty on heating oil stood at 42,000 drachmas per kilolitre. |
| L. 2523/1997 | 179/A/1997 | The extent of the winter period, when the excise duty on heating oil was reduced, was limited to November to April. |
| L. 2545/1997 | 254/A/1997 | The excise duty on heating oil was reduced, especially for the winter period of 1997-1998, at 28,000 drachmas per kilolitre. |
| L. 2651/1998 | 249/A/1998 | The excise duty on heating oil, especially for the winter period of 1998 (mid-October)-1999, was reduced to 20,000 drachmas per kilolitre. |
| L. 2753/1999 | 249/A/1999 | The excise duty on heating oil, especially for the winter period of 1999 (mid-October)-2000, was reduced to 6,100 drachmas per kilolitre. |
| L. 2873/2000 | 285/A/2000 | The excise duties on heating oil and diesel stood at 83,000 drachmas per kilolitre, while for the winter period (November-April) the excise duty on heating oil was limited to 42,000 drachmas per kilolitre. |
| L. 2960/2001 | 265/A/2001 | The excise duties on heating oil and diesel stood at 245 euros per kilolitre, while for the winter period (November-April) the excise duty on heating oil was limited to 123 euros per kilolitre. |
| L. 3336/2005 | 96/A/2005 | The excise duties on heating oil and diesel remained at 245 euros per kilolitre, while for the winter period (October-April) the excise duty on heating oil was limited to 21 euros per kilolitre. |
| L. 3483/2006 | 169/A/2006 | Provisions on the increase of the excise duty on heating oil during the period 2006-2009, setting the excise duty at 260 euros per kilolitre in 2006, 276 euros per kilolitre in 2007, 293 euros per kilolitre in 2008, and 302 euros per kilolitre in 2009. |
| L. 3986/2011 | 152/A/2011 | The excise duty on heating oil during the winter period (October to April), like the excise duty on kerosene for heating, was set at 60 euros per kilolitre. Provisions on the equation between the excise duty on heating oil and the excise duty on diesel as well as on the granting of a heating allowance. |
| L. 4092/2012 | 220/A/2012 | Equation between the excise duty on heating oil and the excise duty on diesel –with no exemptions– at the level of 330 euros per kilolitre. |
| L. 4301/2014 | 223/A/2014 | The excise duty on heating oil was limited to 230 euros per kilolitre. |

on diesel was reviewed, equating the excise duty on diesel for agricultural activities with that of heating oil during the winter period, at 21 euros per kilolitre. Thus, the refund farmers received equalled the difference between the respective current excise duty on diesel and the special excise duty of 21 euros per kilolitre. This difference, however, was limited in 2012, when the excise duty on diesel for agriculture increased to 66 euros per kilolitre, and then was limited further in 2015, when the increase in the excise duty to 200 euros per kilolitre was adopted. For 2016, there will be an equation of the excise duty on diesel for farmers to the general excise duty on diesel at 330 euros per kilolitre (from 1.10.2016), abolishing the tax refund process.

The analysis, therefore, of the legal framework of the excise duty on heating oil and diesel indicates the absence of a firm and common philosophy regarding the individual provisions of welfare and social support to groups and business sectors (often subject to privileged treatment), which, taking advantage of social and financial criteria, would be able to strengthen the

target of economic relief, improve social justice in the distribution of the financial/tax burden, but also contribute, in terms of economic efficiency, to the process of economic growth.

## 3. Heating oil: Consumption and defining demand factors

Demand for heating oil is affected by several factors, each one of which affects, to varying degrees, the configuration of the final demand. The key factor is probably the final consumer **price** at which the product is sold. The heating oil sales price is mainly based on the international price of crude oil, the related taxes, and, to a lesser extent, on other charges (process costs, profit margins, other fees, etc.). As indicated in the analysis below, the levels and changes in the international price of crude oil affect the final consumer price of fuel. Often, however, these changes are not that visible to the consumer, as there are fixed charges incorporated in the final price, such as the excise duty, which is one of the two main taxes on fuel. Thus, in cases where there is a downward trend in prices before taxes, the proportionate share of the excise duty in the final price increases and the percentage reduction in the price is lower than the price before tax. The second major tax charge is VAT. The difference in VAT compared to the excise duty on fuel is that VAT is imposed as a percentage and only after the imposition of the excise duty. Therefore, any changes to the pretax price and the excise duty lead to corresponding changes in the VAT tax.

Another important factor affecting the demand for heating oil is the economy and, more particularly, the **disposable income** of households and businesses. At the same time, the energy needs of households and businesses play an important role because of **climatic conditions**. However, one should also take into account both the energy upgrading of buildings, which leads to reduced fuel requirements, and the change in consumer attitudes and possible behavioral change towards a more rational consumption of energy, both for environmental and for economic reasons.

Demand can also be affected by the ability of the consumer to switch to **alternative forms of heating**. Basic alternatives to heating oil include natural gas, electricity (air conditioning, electric radiators, etc.), solid fuels (wood/pellet burners, stoves, fireplaces, etc.), and other less widespread technologies (geothermal, etc.). In some cases, the substitution is complete and permanent, as in the case of natural gas in central heating, while in other cases we may have partial and temporary substitution, as in the cases of electricity and firewood. Nonetheless, in all cases the issue of the price of the competing product plays an important role and so do the possible limiting factors that obstruct substitution ease. Such factors are the high fixed costs for changing the equipment, the difficulty in making a decision regarding central heating change in the case of apartment buildings (Karavitis, Maniatis Ntantsev, 2012), the limitations of the existing natural gas network and some legal constraints, such as those regarding the use of particular types of solid fuel in high population cities.

Thus, particularly in the case of natural gas, the fixed costs for the replacement of central heating equipment are high and constitute a significant disincentive. However, the experience so far has shown that in the areas covered by the natural gas network, there was a shift of consumption towards natural gas in central heating. It should be noted that, as mentioned, such a change is usually permanent. Thus, even during periods when the price of heating oil is competitive, consumers who have invested in the purchase and replacement of equipment find it difficult, if not impossible, to return to the previous state. So there is a permanent loss of market share and, therefore, a permanent movement of the heating oil demand towards lower levels.

At the same time, some further specifics should also be highlighted. The first has to do with the legal link between the price of natural gas and that of crude oil. Any change in international oil prices leads to a corresponding change in natural gas prices, with a time lag. Specifically, the price of natural gas is adjusted quarterly, considering oil prices during the previous six months. The second relates to the possibility of storage of large quantities of heating oil for future use (Karavitis, Maniatis and Dantsev, 2012). Therefore, there is a difference between the heating oil market and heating oil consumption and there are different factors affecting consumption (e.g. weather conditions, etc.) and sales (e.g. price, announcements on changes in taxation, etc.). So, depending on the expectations regarding the course of the price, the consumer has the opportunity to purchase heating oil during the low price period, with the purpose of consumption in the next period of time, when the price is expected to increase.

Finally, **the extent of fuel smuggling** also has an impact on consumption as well as the effectiveness of the relevant legislative framework and response mechanisms. A typical case is the large drop in heating oil consumption when the equation of excise duties in heating oil and diesel was adopted. According to a press release issued by the Minister of Finance on Friday, December 27th 2013, from the overall reduction of

heating oil consumption by 71%, 32 points were the result of the storage of 2012 and smuggling.

Due to the difficulty in gathering reliable and comparable data relating to competitive forms of heating, consumer behavior, smuggling, etc., this study is focused on the analysis of the basic factors which affect demand and, in particular, the final price, like income and weather. The main objective is to export key estimates and simultaneously avoid erroneous conclusions due to the use of data of questionable quality.

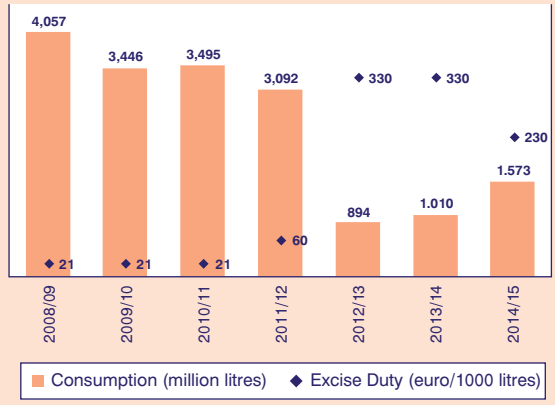
### 3.1. Heating oil consumption

It is common knowledge that the basic heating oil consumption period is limited mainly to the seven months between October of one year and April of the following year. Observing data on heating oil consumption, as recorded by the Ministry of Finance (MoF), it is obvious that in recent years the consumption has fluctuated greatly. One of the main causes of these fluctuations was the major changes in the excise duty, which, together with the impact of changes in international prices and the disposable income of consumers, led to the emergence of unprecedented events. Figure 1 shows the annual consumption of heating oil during the winter periods (October to April) 2008/09 to 2014/15. Also, for comparative purposes, the figure also includes the excise duty applicable to each period.

It should be emphasized that a key reason why the data analysis has been selected to be based on the winter periods from October to April, and not on a yearly basis, is because the excise duty remains stable for these specific periods (as shown in the figure), which facilitates the analysis and the drawing of conclusions. On the contrary, in the course of a calendar year there are periods when the excise duty varies considerably. For instance, in 2012, during the January-April period, the excise duty was 60 euros per kilolitre, while towards the end of the year, from October to December, the excise duty increased to 330 euros per kilolitre.

Figure 1 indicates that there is a relative decline in consumption during the beginning of the economic recession period in the country. More specifically, in 2009/10 consumption decreased by 15% compared to the previous period, and then rose slightly by 1.4%. Also, decline in consumption occurs during the period

**FIGURE 1**
**The development of annual consumption of heating oil, during winter periods (October-April) and excise duty rates**




*Source:* Own processing of data from Ministry of Finance.

2011/12, which is linked to the increase in the excise duty during that period from 21 euros per kilolitre to 60 euros per kilolitre. However, it is obvious that the consumption during the first four periods of the sample is very high. On this note, it should also be stressed that due to the large difference in excise duty between heating oil and diesel, the fuel consumption in these periods probably includes amounts that are linked to smuggling.

Moreover, the decline in heating oil consumption by about 70% in the period 2012/13 is typical. The significant drop in consumption coincides with the increase of the excise duty from 60 euros per kiloliter to 330 euros per kilolitre, which was due to the equalization of the excise duty on heating oil to the corresponding excise tax on diesel. From an overall decrease of 71%, 11.5 percentage points are the result of the price change due to the increased tax, 3.4 percentage points are due to the recession, 23.9 percentage points are due to milder weather and 32 percentage points are the result of 2012[2] storage and smuggling. Finally, a slight increase in consumption, by 13%, occurred between 2013/14, while in 2014/15 the excise duty was reduced to 230 euros per kilolitre and consumption increased by 55% compared to the previous period.

2. A key feature of the heating oil market is the storage capacity for consumption in a subsequent period. In particular, consumers are able to purchase heating oil, not only during the period of direct consumption, but also in prior periods in order to save it for future consumption. Thus, the heating oil market period may be significantly affected by the final price, consumer preferences, and expectations. This fact was strongly evident in April 2012, when there was a sudden increase in sales, due to the anticipated application of the measure of equalization of excise duties on heating oil and diesel. In this case, it seems that consumers purchased heating oil for consumption in the next period and before the expected rise in price.

### *3.2. The development of the prices before and after tax*

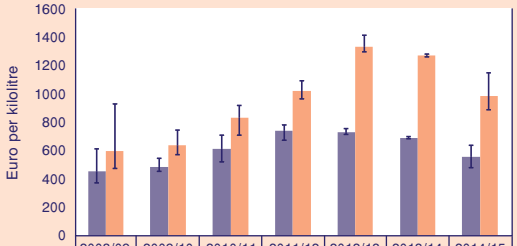
The level of prices of heating oil is probably the most important factor that affects demand. The final consumer price includes the price of the refinery, which mostly reflects international prices, as well as the burden of taxation. Depending on the level of international prices and the level of taxes and other charges, the difference between the price before and after tax varies. So, in periods of low international prices of crude oil and high fixed tax rates (such as excise duty), the share of taxes in the final price is considerably high. Therefore, it is interesting to monitor the evolution of both final prices, and prices before tax. Also, an interesting element is the variance of prices during the analysis period.

Figure 2 presents the evolution of the average prices for the seven winter periods under consideration. In terms of pre-tax prices, there is a continuous increase until 2011/12. The same happens also for the final prices, with the difference, however, that the increase is higher, especially in periods of increased excise duty. Characteristically, for the period 2012/13, the average price before taxes slightly decreased, by 1%, compared to the previous period, while the final price increased by 30% as a result of equating the excise duty between heating and diesel oil. However, during the last period, the prices reduced because of the fall in international crude oil prices. This had a positive impact on prices before taxes, while the reduction of the excise duty led to an even greater reduction of the final price.

Nevertheless, it is important to note that the continuing downward trend of international oil prices during the current period has led to an even higher reduction of heating oil prices. For example, at the beginning of the current period, the heating oil pre-tax price in October 2015 was 444 euros per kilolitre or 838 euros per kilolitre after taxes. On the other hand, the prices recorded for the first week of 2016 were 376 euros per kilolitre pre-tax and 753 euros per kilolitre after taxes, which is significantly reduced compared to the average price of the previous period.

Additionally, it is clear from Figure 2 that there is an important difference between the pre-tax price and the final price. The difference is greater for the periods 2012/13 and 2013/14 because of the higher level of the excise duty. On the other hand, the first three periods are characterized by a particularly low excise duty and for this reason the price difference is small. Finally, it is interesting to observe the variation in prices during the period. We notice that in some periods, for example

**FIGURE 2**
**Evolution of the average prices before and after tax of heating oil, during winter periods (October-April) and variance of prices in periods**




| | 2008/09 | 2009/10 | 2010/11 | 2011/12 | 2012/13 | 2013/14 | 2014/15 |
|---|---|---|---|---|---|---|---|
| Average price (before tax) | 452 | 484 | 614 | 738 | 730 | 690 | 554 |
| Average price (after tax) | 594 | 636 | 828 | 1020 | 1327 | 1269 | 985 |

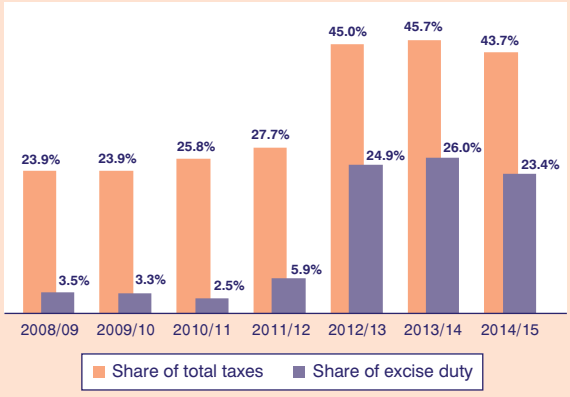
*Source:* Own processing of data from European Commission, Energy, Market observatory & Statistics, *Oil bulletin* (http://ec.europa.eu/energy/observatory/oil/bulletin_en.htm).

2008/09, the variance of the prices is high within the period. Instead, in 2013/14 it appears that the prices were stable. During the last period of 2014/15, prices showed a significant variance, which is mainly due to the continuous downward trend of the international crude oil price.

Focusing on the difference in the price before and after taxes, Figure 3 shows (a) the share of total taxes and charges in the final price of the fuel and (b) the share of the excise duty itself. The data show that in the first four periods, the excise duty is a small percentage of the final price and the tax charge is mainly because of the VAT. On the other hand, for the last three periods, the increased excise duty represents a share of 25% of the final price. Also, the share of total taxes has risen dramatically, reaching about 45%. In this case also, the burden due to the VAT is important. As mentioned above, the VAT tax is calculated after the imposition of the excise duty and, for this reason, the increase in the excise duty leads to a higher increase in the VAT charge.

Regarding the last period, it is worth noticing that despite the reduction of the excise duty from 330 euros per kilolitre to 230 euros per kilolitre, the tax share remained at similar levels compared to the two previous periods. This happened because of the simultaneous reduction in international prices of crude oil, which reduced the pre-tax price of heating oil. In this case, the reduced price and the reduced taxation led to the fall of the final price, but, at the same time, the share of the taxation increased. The same phenomenon is expected in the current period, in where, even if the excise duty remained stable at 230 euros per kilolitre, there

**FIGURE 3**
**The share of taxes at the selling price of heating oil**




*Source:* Own processing of data from European Commission, Energy, Market observatory & Statistics, *Oil bulletin* (http://ec.europa.eu/energy/observatory/oil/bulletin_en.htm).

is still a continuing downward trend in the international prices. Therefore, the share of taxes as a percentage of the final price is expected to be significantly increased. Indicatively, as mentioned above, for prices recorded during the first week of 2016 the percentage of total taxes was 50% of the final price, while the percentage of excise duty reached 30.5% of the final price.

### *3.3. Energy needs of households for heating*

Climatic conditions and especially temperature are the key factors that affect household needs for heating and, by extension, oil consumption. An index that is often used to estimate the energy consumption required for heating buildings, is the heating-degree-days. This index counts the degrees and the days where the outdoor temperature is lower than a basic comfortable temperature. It should be noted that climate variation in the different regions of the country leads to different needs for heating and, consequently, there is considerable heating-degree-days differentiation between regions.

In this work, the heating-degree-days are used as one of the factors that affect energy needs every month. Also, this index is an important indication of the diversification of climatic conditions and needs for heating between periods under consideration. In the context of this work, heating-degree-days were estimated and were comparatively analyzed for four representative areas of Greece (Athens, Trikala, Kilkis and Florina). The calculations of heating-degree-days were based on available data for the daily average temperature, as recorded by the National Observatory of Athens. The estimation was based on the methodology applied by Eurostat, according to which the basic comfortable temperature is 18 °C. Heating-degree-days are calculated as the rounded difference between the average daily temperature and 18 °C, but only for the days where the average temperature is lower than or equal to 15 °C.

The analysis shows the great differentiation between the four regions. Also, in general, in the period 2011/12, before the equation of excise duty between heating oil and diesel, the energy needs for heating were considerably high. On the other hand, 2012/13 and 2013/14 show significantly lower heating needs. It seems that this fact, combined with the increased prices, contribute to the reduction of heating oil consumption. Finally, for 2014/15 the needs for heating increased because of the unfavorable weather conditions. However, the decreased excise duty of heating oil for this period contributed to increased consumption in order to meet demand.

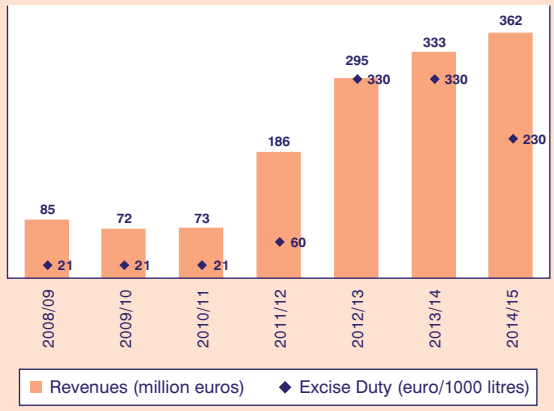
### *3.4. Gross Domestic Product*

Apart from the weather conditions, another factor affecting the consumption of heating oil is the consumers' disposable income. Since the analysis is based on monthly data, disposable income was approximated by the Gross Domestic Product (GDP), which is available on a quarterly basis and, therefore, it becomes easier and certainly more representative to partition it per month. The evolution of the GDP up to 2008 shows an upward trend, reaching 241.2 billion euros, which allows for increased heating oil consumption over the years before the crisis. However, from 2009 and throughout the crisis there has been a significant decline in GDP, resulting in a 26% total decrease in the country's GDP for the period 2009-2014. Only in 2014 the GDP began to stabilize, showing a decrease of only 1.8%, despite the forecasts expecting the country to emerge from the recession. Apart from the changes in heating oil prices, declining consumer income affects heating oil consumption negatively. Especially in the two-year period, 2013-2014, where a higher excise duty was imposed (330 euros per kiloliter), the reduction in consumer incomes accounted for more than 6% annually.

## 4. State revenues regarding the excise duty on heating oil

The data concerning state revenues that derive from the excise duty on fuel are recorded in the State Budget, but there is no distinction between revenues

**FIGURE 4**
**The development of the state revenues from the excise duty on heating oil, during winter periods (October-April) and the excise duty range**




*Source:* Own processing of data from Ministry of Finance.

from the excise duty on heating oil and that of diesel. Also, the effort made by the Ministry of Finance for an independent recording of the excise duty on heating oil revenues shows considerable deviations up to 2010. This is because this particular category also includes revenues from agricultural oil, without a clear distinction of oil revenues used exclusively for heating. Therefore, the present article includes revenue estimations based on monthly consumption quantities and the excise duty applicable in each period. It is considered that this approach leads to reliable revenue estimates.[3]

On this basis, Figure 4 presents the revenue estimates for the periods October-April, while for comparative purposes the levels of the excise duty are marked, as applicable in the corresponding periods. As mentioned above, the analysis is based on the winter period from October to April, during which the excise duty remains stable. However, since state revenues are recorded on an annual basis, it is possible to split the revenues annually.

The main observation resulting from Figure 4 is the continuous increase in state revenues from 2010/11 onwards, due to the increase in the excise duty. More specifically, in 2011/12 when the excise duty increased from 21 euros per kilolitre to 60 euros per kilolitre, there was a significant revenue increase of 150% compared to the previous period, despite the small decline in consumption mentioned above. Accordingly, during the period 2012/13, despite the dramatic drop in sales by 70%, revenues increased by approximately 60%, due to the significant increase in the excise duty. The upward trend in revenues continued in the next two periods. Indeed, in the period 2014/15, despite a reduction in the excise duty at 230 euros per kilolitre, the increase in consumption was proportionally much more significant and eventually, state revenues from excise duties rose by 8.5%.

## 5. Econometric model of heating oil demand

The effect on consumption of changes in the excise duty on heating oil, which directly affects its price, was an estimate of the heating oil demand curve. The key factors affecting the heating oil demand were discussed in the relevant part of the article. Given, however, the limitations of data availability it was not possible to acquire quantitative data for some of the determinants. The statistical data used are monthly and cover the period from October 2008 to April 2015 and apply only to the months there is heating oil consumption, i.e. October to April.

Based on this limitation we proceeded to estimate the following fixed elasticities demand function:

$$lnCons_t = b_0 + b_1\, lnCons_{t-7} + b_2\, lnPrice_t + \\ + b_3\, lnGDP_t + b_4\, lnHDD_t.$$

Where $lnCons_t$ is the oil consumption in month $t$, $lnCons_{t-7}$ is the heating oil consumption in the respective month of the previous year, $lnPrice_t$ is the heating oil price in month $t$, $lnGDP_t$ is the Gross Domestic Product (GDP) in month $t$ and $lnHDD_t$ is the heating-degree-days in month $t$.

Data on heating oil consumption are provided by the Greek Ministry of Finance, heating oil prices are from the statistical database of the European Commission, Energy, Market Observatory & Statistics, *Oil Bulletin*, the GDP is provided by the Hellenic Statistical Authority (*National Accounts*), while the heating-degree-days are the authors' own calculations based on climate data of the National Observatory of Athens.

### *5.1. Analysis - Scenarios*

This article tries to assess the effect on consumption of heating oil and state revenues from a change – positive or negative – in the excise duty of heating oil. Thus, this paper analyses the heating oil demand function based on the main factors that affect it, to (a) assess the level of the demand and (b) estimate the expected changes in state revenues. Specifically,

3. In collaboration with the Ministry of Finance.

first, in accordance with the demand function, as it is discussed in the previous part of the paper, the price elasticity of demand was estimated at **1.06**. Three basic scenarios were examined, where the new price levels were calculated according to changes in the excise duty for heating oil and the relative VAT. The scenarios correspond to (i) a reduced excise duty of 100 euros per kiloliter, (ii) a fixed excise duty of 230 euros per kiloliter and (iii) an increased excise duty of 330 euros per kiloliter. The base scenario was calculated using the current excise duty in order to measure changes in consumption and state revenues for the current period 2015/16, due to international price changes.

Having estimated the price elasticity and other variables, a range of the expected heating oil demand for the period 2015/16 was calculated, based on the factors affecting it. Given the downward trend in world prices and the sharp reduction of the heating oil price in the current period compared to the previous one, the price of the first week of January 2016 was used as the base value, which was the last data available. GDP was set at the level of the 2016 Budget estimation for zero annual change in 2015 that is 3% lower than the corresponding previous period for the last quarter of 2015 and -0.7% annual for 2016. Also, weather conditions were assumed to remain stable compared to the previous period. Finally, based on the estimated demand, the effect on state revenues from the excise duty of heating oil was calculated.

### *5.2. Results*

According to the above assumption, Table 2 presents the estimations for demand, prices and expected change in revenues from a change in excise duty on heating oil for three scenarios examined. In the case where the excise duty falls to 100 euros per kiloliter, it is estimated that the consumer price will fall by 21% in regard to the current price and it will decrease to **593 euros per kiloliter** from **753 euros per kiloliter** of the base scenario. Accordingly, the demand is expected to increase from **60% to 74%** in regard to the consumption of the 2014/15 period. In this case, it is estimated that there will be a small change in state revenues, which might be from negative to positive (from **-28 to 22 million euros)**, but, in any case, with a small impact on the State Budget. As it is shown, the already reduced consumer price, compared to the previous period, combined with the further price reduction due to the excise duty on heating oil, significantly affects in sales, with positive effects on revenues from the excise duty on heating oil.

The second scenario is estimating demand and state revenues, in comparison with the previous year, with

**TABLE 2 Impact assessment of changes in the excise duty on heating oil**

| **Scenarios** | **A** | | **B** | | **C** | |
|---|---|---|---|---|---|---|
| **Excise duty on heating oil (€/KLT)** | **100** | | **230** | | **330** | |
| Estimated average price 2015/16 (€/KLT) | 593.10 | | 753.00 | | 876.00 | |
| Changes in prices | -21% | | 0% | | 16% | |
| Range | **Minimum** | **Maximum** | **Minimum** | **Maximum** | **Minimum** | **Maximum** |
| Estimated consumption (1,000 KLT) | 2,518.2 | 2,729.3 | 1,954.7 | 2,054.1 | 1,664.7 | 1,739.2 |
| Changes in consumption | 60% | 74% | 24% | 31% | 6% | 11% |
| Estimated revenues from excise duty on heating oil (million €) | 251.8 | 273.0 | 449.6 | 472.4 | 549.3 | 573.9 |
| Difference in revenues from excise duty on heating oil (million €) | - 109.9 | -88.8 | 87.9 | 110.7 | 187.7 | 212.2 |
| Estimated changes in revenues from VAT due to changes in excise duty on heating oil (million €) | -47.0 | -47.0 | 0 | 0 | 36.2 | 36.2 |
| Estimated changes in revenues VAT due to changes in consumption | 129.0 | 157.8 | 66.1 | 83.4 | 18.5 | 33.5 |
| Differences in revenues from VAT | 82.0 | 110.8 | 66.1 | 83.4 | 54.7 | 69.7 |
| Total differences in government revenues | **-27.9** | **22.0** | **154.0** | **194.1** | **242.4** | **281.9** |

the same level of excise duty on heating oil, but taking into account the reduced sales price due to decreased world prices. On that basis, an increase in consumption is estimated from **24% to 31%**, given last year's weather conditions and all other assumptions made for the analysis, which will bring significant increases to the revenues both from the excise duty on heating oil and from VAT. As a result, it is possible to have higher state revenues from **154 - 194 million euros**. Finally, it is worth examining a scenario where the excise duty on heating oil increases to 330 euros per kiloliter. In this case, a significant increase in price is expected at about 16% compared to the hypothesis of the analysis and amounts to **876 euros per kiloliter**. However, it is worth mentioning that this price is still lower than the average price of the 2014/15 period, when the price was 985 euros per kiloliter. As a result there was an increase in demand from **6% to 11%** compared to the previous year and therefore a) an increase in state revenues from the excise duty on heating oil and VAT, due to the higher excise duty and b) an increase in revenue due to higher consumption. Finally, given the assumptions of the analysis, it is estimated that total state revenues might increase **from 242 to 282 million euros** relatively to revenues raised in the 2014/15 period.

In any case it should be noted that the above estimates for demand and state revenues are based on two assumptions. The first assumption concerns the weather conditions, where it is assumed that they will be the same as the 2014/15 period and, consequently, it is assumed that households will have the same heating needs. To draw comprehensive conclusions, different scenarios on heating-degree-days were examined, which were based in previous periods with different climate conditions and, therefore, there is a differentiation in the results to some extent. Consequently, the real outcome depends on the weather conditions in the period under examination.

The second assumption is about the base price that was used in the analysis, which is very low in the current period. Indicatively, current price levels correspond to those of the period 2010/11, where the burden of the excise duty was 21 euros per kiloliter. Therefore, the results obtained for state revenue is very favorable compared to the data of 2014/15, but the fact that they are based on very favorable current prices should not be overlooked. If the same scenarios were considered with a base price of the average price of the 2014/15 period, then completely different conclusions are drawn. More specifically, in this case, with a reduced excise duty of 100 euros per kiloliter, the results will show losses on the order of 170-193 million euros, while for an increased excise of 330 euros per kiloliter, revenues would range from 32-68 million euros, due to reduced demand.

## 6. Conclusions

The analysis and the results show that changes in state revenues from a possible change in the excise duty on heating oil depend, also, on other important factors such as international oil prices and the heating needs of households, based on weather conditions. It should be kept in mind that in recent years there have been significant changes in the demand for heating oil, probably due to factors such as: (a) the previous shift of consumers to competing forms of fuel, which in many cases is permanent, (b) the rational use of energy by consumers for environmental, economic and other reasons, (c) the reduced disposable income, (d) the reduction of smuggling, after equalizing the excise duty on heating oil, etc.

However, the results, given the current low level of prices, are particularly favorable for the state revenues. According to the analysis, with the current level of excise duty of 230 euros per kiloliter, an increase in tax revenues from heating oil is expected, a fact that has been proven by the evidence so far. Respectively, a strong reduction in excise duty does not seem to lead to significant losses of state revenues, while an increase might possibly raise revenues, without any strong negative impact on consumption. This occurs, mainly, due to the reduced final selling price of heating oil in our country, because of the downward trend of international prices. It should, of course, be noted that a reduced price before taxes, given the fixed tax charges, leads to a growing percentage of tax contribution to the final price.

Before any political decision concerning changes in the level of the excise duty on heating oil can be made, the above-mentioned conclusions should be taken into account, while a detailed analysis should be made in order to avoid negative effects in both state revenue and households in case of an increase in international prices. Moreover, in the case of a reduction in excise duty on heating oil, it should be kept in mind the possibility of negative effects due to smuggling fuel, since significant differences between the excise duty of heating and diesel fuel will occur. The support for both consumers and markets should be based on targeted actions in order to support the most vulnerable groups and the regions with the highest energy needs as well as the sectors that display a relatively higher importance for the Greek economy, which will generate maximum multiplier effects on the national economy.

## References


1. Karavitis, N., Maniatis, G. and S. Danchev (2012), *Equating the Excise Duty Rates on Heating and Diesel Oil*, Foundation for Economic and Industrial Research (IOBE), Athens. (in Greek)
2. Manesiotis B. and N. Karavitis (1991), *The harmonization of fuel and liquor taxation*, Foundation for Economic and Industrial Research (IOBE), Athens. (in Greek)
3. Mardas, D. (2014), *Fraud and smuggling of fuels: Policy Measures*, Study for the Small Enterprises' Institute (IME) of the Hellenic Confederation of Professionals, Craftsmen and Merchants (GSEVEE). (in Greek)
4. OECD (2001), *An Overview of Green Tax Reform and Environmentally Related Taxes in OECD Countries*, Organization for Economic Cooperation and Development, Paris.

# Recent developments in the Western Balkans: Economic outlook and geopolitical challenges

***Ritsa Panagiotou****

## 1. Introduction

The Western Balkan countries are facing one of the most challenging periods since the end of the tumultuous 1990s. The difficulties and challenges facing the region are evident on several fronts and are testing the limits of these fragile states, which have not yet fully consolidated their political and economic transitions. The fallout from the crises in the Eurozone —and especially Greece— continues to negatively affect the region's economies, their prospects for growth, their capacity for reform, and, consequently, their EU accession prospects. The increasingly negative international environment for EU enlargement —characterised by a growing "enlargement fatigue" in the EU and a distinct "evaluation fatigue" in the Western Balkans— has been exacerbated by new external factors, the most crucial of which is the escalating refugee crisis. The unprecedented flow of refugees through the region has pushed the already weakened Balkan countries to new limits and placed a serious strain on the stability and resources of the region.

With political and economic reforms backsliding, the stalling of the EU accession process has led to disenchantment with the prospect of "Europe": the EU's hitherto undisputable role as an "anchor" of stability and as an incentive for reform is slowly losing its credibility and appeal for some of these countries. Crucially, as the EU begins to lose its allure, a shift in the geopolitical balance in the region is taking place, as Russia is poised to reclaim its position as an important player in the region. Russia's resurgent policy envisages capitalising on the Western Balkan countries' disenchantment with the EU, to cultivate stronger economic, political, and diplomatic links and develop a stronger presence in crucial areas such as energy and infrastructure investment.

## 2. Bleak economic conditions, as fallout from Greece continues

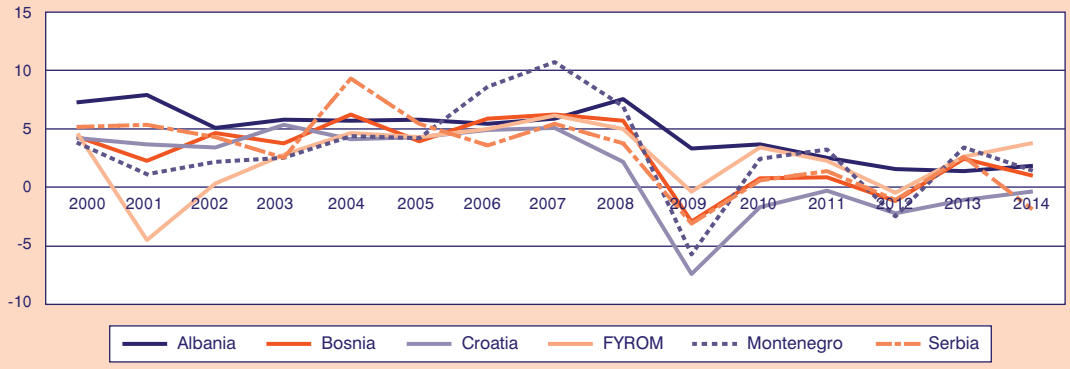
The economic crisis hit the Balkan region just as it was consolidating the progress it had made after emerging from years of war, political instability and painful economic reform programmes. For most countries in the region, the period 2003-2007 was one of the strongest in more than a decade, with annual real GDP growth averaging about 6%, while the region also received large inflows of FDI in that period (Institute for International Finance, 2009). Due to the global financial crisis, the economic slowdown in EU countries —where more than half, and in some cases up to two thirds or three quarters of many Balkan countries' exports are destined— adversely affected components of Balkan economies, such as manufacturing output, employment, foreign currency reserves, and national trade deficits. A contraction of exports —for example, Croatian exports fell by 15 percent and Bulgarian exports by 22.5 percent— combined with a decreased influx of Foreign Direct Investment triggered the first symptoms of the crisis in the region by the last quarter of 2008. By the middle of 2009, the effects on the financial sector were being felt more strongly, particularly with a slowdown in foreign bank lending activities (Bastian, 2008).

Therefore, since late 2008, all the Western Balkan countries have experienced contracting GDPs, rising unemployment rates, falling industrial outputs, declining rates of FDI, growing current account and trade deficits, and a significant decline in remittances. For example, in 2009 remittances accounted for 15.9 percent of Albania's GDP, but by 2014 remittances had fallen to 8.5 percent of GDP (World Bank, 2016). The mild economic recovery in 2010-11 was interrupted by the escalation of the Eurozone and the Greek sovereign debt crises, which directly contributed to a second recession in most Western Balkan countries in 2012-13 (Murgasova, 2015).

The crisis has had an extremely negative impact on Foreign Direct Investment in the region, where important sectors attracting FDI include energy, banking and finance, telecommunications, real estate, retail trade and industrial production (Bartlett and Prica, 2013). The most important investors include Austria, the Netherlands, Germany, Belgium, France, Russia, Italy, Spain and Greece (especially before the crisis). In 2007, FDI represented 21.8 percent of GDP in Montenegro, 13.5 percent in Bosnia-Herzegovina, 12.6 percent in Kosovo, 8.5 percent in FYROM and 8.2 percent in Croatia. Over the past few years many European companies cancelled new projects and some even withdrew capital that had been invested in short-term projects. Similarly, some large-scale privatisations were cancelled due to the low purchase prices that were offered (EBRD, 2015).

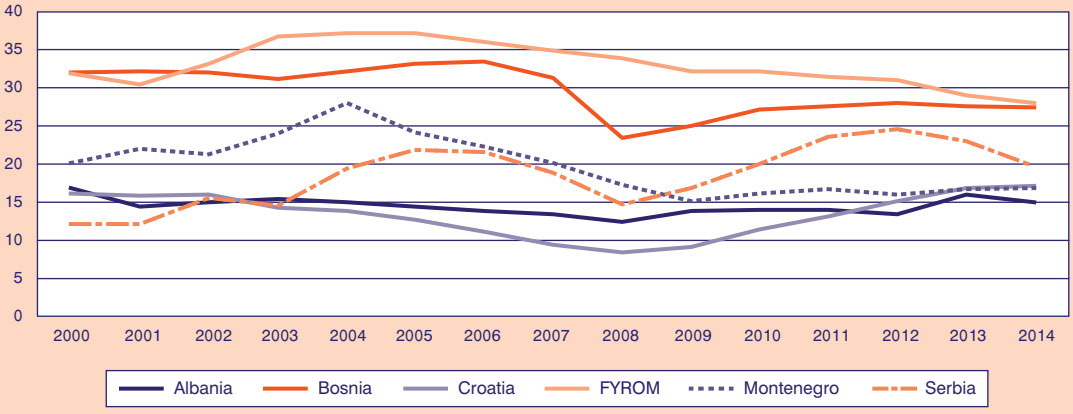
* Senior Research Fellow, Centre of Planning and Economic Research (KEPE).

**FIGURE 1**
**GDP growth rates, Western Balkans**



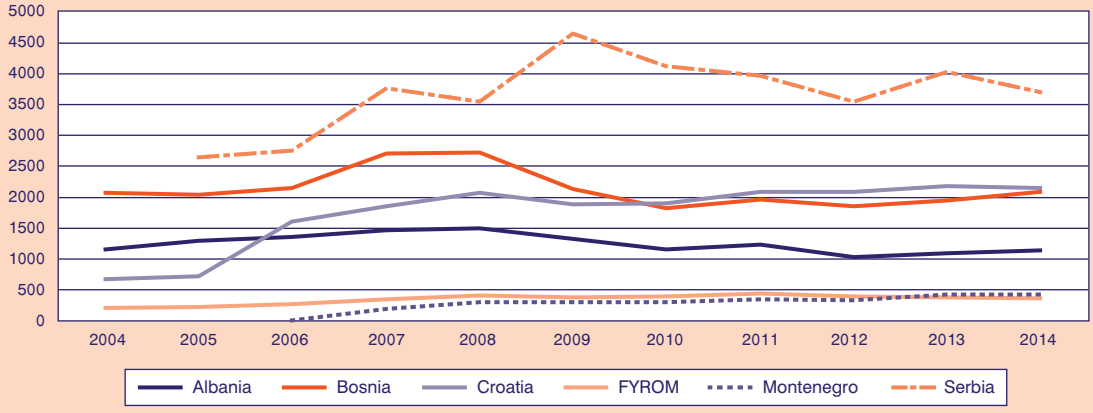

*Source:* IMF, *World Economic Outlook*, October 2015.

**FIGURE 2**
**Unemployment rates, Western Balkans**




*Source:* IMF, *World Economic Outlook*, October 2015.

**FIGURE 3**
**Inward remittance flows, Western Balkans ($US mn)**




*Source:* World Bank, *Migration and Remittances Factbook*, 2016.

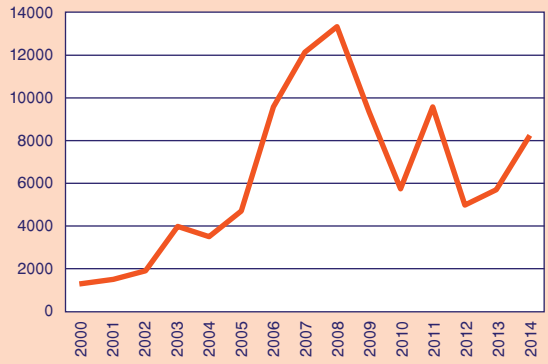
The negative repercussions of the Greek crisis on the Western Balkan economies continue to be very important and have a tremendous impact on the entire region's economic growth, political stability and even EU prospects. Due to the interdependence between Greece and the countries of the region, contagion from the Greek crisis over the past few years has been particularly evident in the sectors of trade and banking, as well as in the declining inflow of remittances and Foreign Direct Investment. Moreover, as Greece is also very involved in Bulgaria and Romania (particularly the banking sectors), the negative impact of the Greek crisis on these countries has also spilled over into the Western Balkan economies.

Greece had been a major investor in the region during the period 2003-2008. By 2008, almost 4,000 Greek companies had invested in the region, helping create about 200,000 jobs. Albania, Serbia and FYROM are the most vulnerable to negative spillover through reduced FDI flows, as Greece has been a dynamic investor in these countries over the past fifteen years. In 2008, just before the crisis started unravelling, Greek FDI accounted for 34 percent of total investments in Albania and 15 percent in Serbia. In the case of FYROM, Greece had been consistently among the top five investors in the country during the past decade, averaging over 17% of total FDI (Panagiotou, 2013).

Greek banks have been particularly active and have invested heavily in the Balkans over the last few years, buying local banks and expanding their balance sheets, particularly in high-growth areas like consumer and mortgage lending (Bastian, 2003). Seven major Greek banks – including the National Bank of Greece, EFG Eurobank, Piraeus Bank and Alpha Bank – have established a network of around 20 subsidiaries in the region, with around 1,900 branches employing approximately 23,500 people. By 2008, Greek banks had accumulated a significant market share in the region, accounting for around 30 percent of total banking assets in Bulgaria and FYROM, 25 percent in Albania, 15 percent in Serbia (where three out of 10 banks are Greek) and 17 percent in Romania (MacDonald, Hope and Bryant, 2010).

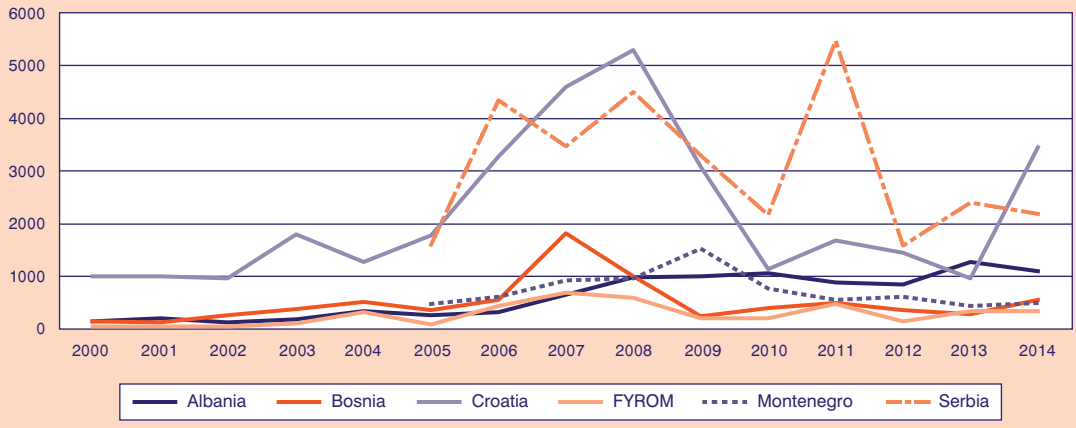
After 2009, widening spreads on Greek sovereign debt led to increased funding costs for Greek banks; faced with such a liquidity squeeze, Greek banks started withdrawing their funds from their operations in the Balkans. Consequently, Greek banking sector claims declined by 18% in Serbia and by 25% in Romania and Bulgaria in the two years before December 2011

**FIGURE 4**
**Total FDI flows, Western Balkans ($US mn)**




*Source:* UNCTAD, *World Investment Report*, 2015.

**FIGURE 5**
**Total FDI flows, by country ($US mn)**




*Source:* UNCTAD, *World Investment Report*, 2015.

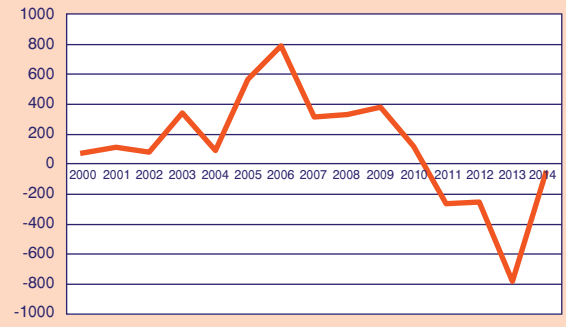
(EIU, 2012). This liquidity retreat not only disrupted the financial sectors in the region, but also had a large impact on the local economies, given that all of these countries have bank-based financial systems where much of the borrowing activity is made through banks rather than equities or corporate bonds (Deutsche Bank, 2012).

The situation deteriorated sharply in 2015, due to increased uncertainty in Greece (as a third bailout was being negotiated), a lack of confidence in the Syriza government, bank closure, capital controls, the uncertainty linked to the outcome of the referendum, etc. In May 2015, the IMF warned that some Southeast European countries would be further affected by a worsening situation in Greece, mostly through banking links.

Given these countries' high level of exposure to Greek banks, in recent years central banks in the region have put in place measures to try to insulate Greek banks' local subsidiaries from their parent institutions. For example, most of the Greek banks in the region now operate as separate entities registered under local law and subject to local bank regulations, including liquidity requirements, which limits their exposure to financial risks threatening the parents banks (Assenova, 2015). In Bulgaria, which is the most exposed country to the Greek crisis, the Bulgarian National Bank (BNB) mandates that Greek banks maintain higher deposits with the central bank and restricts the amount of funds that can be transferred from local subsidiaries to their parent bank in Greece. Also, the BNB does not allow subsidiaries to raise funds from their parent bank or hold Greek government bonds. For example, before the Bulgarian branch of Alpha Bank was sold to Postbank (the Greek Eurobank) on July 17, 2015, all parent bank assets were cleared from its balance sheet at the request of the BNB. Alpha Bank Bulgaria reduced its liabilities to its parent bank by two billion leva ($1.1 billion), which were reportedly recorded as assets of the branch through a deal in 2012. The transaction also reduced the share of Greek banks on the Bulgarian market to under 20 percent.

In FYROM, the National Bank (NBRM) monitors daily all transactions between Greek banks and their local entities. On June 29, 2015, FYROM imposed temporary limits on capital outflows to Greece in an attempt to avoid risks to its financial stability. In addition, the central bank in Skopje instructed local banks to withdraw deposits and loans from banks based in Greece. Similarly, the National Bank of Serbia (NBS) increased monitoring and limited transactions of the local Greek-owned lenders with their parent banks in order to avoid spillover effects from the Greek crisis (SEENews, 13 July 2015).

**FIGURE 6**
**Greek FDI flows to the Balkans (€ mn)**




*Source:* Bank of Greece.

Banks in the region have strong capital-adequacy ratios to protect depositors and ensure the stability of the financial system. Capital-adequacy ratios range from 20 percent in Serbia and Bulgaria and 17 percent in Romania to 13 percent in FYROM, well above the international requirement of 8 percent (EIU, 2015). In several countries, the minimum capital-adquacy ratios prescribed by central banks for Greek-owned banks are higher than for other lenders. For example, in Albania the minimum capital adequacy requirement of 12 percent was raised to 14 percent for Greek-owned banks; the capital-adequacy ratio of the three Greek lenders operating in the country is 17 percent.

Despite the measures taken by Greece's Balkan partners to insulate the financial sector from the Greek crisis, the risk of contagion —in the form of panic and bank runs by customers— still remains high. In recent years several locally owned banks have collapsed in Serbia and Bulgaria. In June 2014, Corporate Commercial Bank (CCB), Bulgaria's fourth largest lender, collapsed when depositors rushed to withdraw their money, alerted to a corruption scheme in the bank; depositors had to wait until December to recover their savings, guaranteed up to €100,000.

## 3. EU enlargement stalls, democratization and reforms in the region slow down

Albania was granted candidate status in June 2014 and Serbia's accession negotiations were launched in January of the same year. Aside from this, little progress has been made in the Western Balkan EU accession process over the past few years. The "enlargement fatigue" that set in after the unprecedented rounds of enlargement during the period 2004-2007 has been exacerbated by the extremely unfavourable international envi-

ronment: the continuing Eurozone and Greek crises, the rise of Euro-scepticism, enduring recession in several EU states, as well as new challenges such as the refugee crisis and the spectre of terrorism in Europe, have created a widespread sense of insecurity throughout the Union. This insecurity inevitably pushes EU policymakers to focus more on domestic political and economic issues, with enlargement moving down as a priority on the agenda. Thus, the prospect of Western Balkan accession appears more and more remote, as has been confirmed by the EU leadership's announcement of a five-year "enlargement freeze" (EU, 2015).

In this climate, the accession of the Western Balkan countries into the EU is an extremely unpopular prospect for a large segment of the European population. According to Eurobarometer 83 (published in Spring 2015), 49 percent of the surveyed population of the EU-28 is *opposed* to the idea of further enlargement. The numbers vary from country to country: the newer members (from the 2004 and 2007 enlargements) were less opposed to further enlargement (with Romania leading with a 15 percent opposition rate, followed by Lithuania and Bulgaria with 24 percent), while the older members' opposition rates were much higher. In Austria and Germany 71 and 67 percent of the population, respectively, opposed further enlargement, while France and Luxembourg followed with 64 and 63 percent (Eurobarometer 83).

The EU's "enlargement fatigue" is matched by the Western Balkans' intense "evaluation fatigue": the increasingly negative international environment, coupled with the inevitable drawing out of the accession process, has resulted in the erosion of popular support for EU accession in the Western Balkans, as the population of these countries is increasingly disenchanted and finds it more difficult to maintain enthusiasm for the convergence process (Kmezic and Bieber, 2015). As the EU begins to lose its appeal, the commitment to economic and political reform in the region is severely weakened and often lapses. Across the region the political discourse has become increasingly illiberal, anti-democratic and nationalist. Elections in Kosovo in 2014 brought a prolonged political crisis and institutional deadlock, while the fairness of the election in FYROM was criticized by the OSCE and the opposition has refused to recognize the results. The implementation of the EU-facilitated 2013 Agreement between Serbia and Kosovo has essentially been halted, as the two parties have been unable to resolve their differences on key power-sharing provisions of the Agreement, such as the Association of Serb Municipalities, and Northern Kosovo continues to witness sporadic violence. Crucially, in some countries, the political leadership is seeking other short-term foreign policy options and is looking to other global actors in the region and elsewhere. For example, Serbia is relying on Russia for help and solidarity on the Kosovo issue and for economic support, while Albania and Bosnia are looking to Turkey for political support, investment and mediation (Oxford Analytica, 2012).

The tensions that emerged during the commemoration of the Srebrenica massacre in July 2015 proved that strain in the former Yugoslav Republics is still high and remains a challenge to progress in the region. The Srebrenica massacre remains an open wound for the whole region, and especially Bosnia-Herzegovina. Milorad Dodik, President of Republika Sprska (within the federal state of Bosnia-Herzegovina), refuses to recognise Srebrenica as genocide (despite the fact that the EU has done so). Furthermore, Dodik —with Moscow's support— advocates a separation of Republika Sprska from Bosnia-Herzegovina, stating that it is a "concentration camp for the Serbian people" (BiEPAG, 2015).

Thus, as EU accession stalls and the commitment to reform faulters, the region is increasingly characterized by institutional paralysis, poor governance, popular protests, corruption, limited progress on judicial reform, opaque elections, nationalist tensions and socio-economic grievances. All these new realities pose serious threats to the stability and future of the region.

## 4. Russia's resurgent influence in the region is felt

Another crucial development in the region is the resurgence of Russian policy and involvement in the Balkans. Russia has invested considerable time and resources attempting to strengthen and consolidate its influence in the Balkan region in recent years. It has been successful on many fronts, and Russia's economic, diplomatic and political influence in the Balkans is greater than at any point since 1991: after being marginalized during the Balkan wars of the 1990s, Russia is once again an important player in the region. Russia's objectives are to stop Western Balkan integration into the EU's sphere of interest, to prevent Montenegro, Bosnia and FYROM from joining NATO, to regain a foothold in Southeast Europe, which would allow it to have easier access to the Mediterranean and Adriatic Seas, and to redress the balance of power in what had traditionally been an area of intense Russian strategic importance. Serbia, Montenegro, Bulgaria and Republika Srpska are traditional allies of Russia with strong cultural, religious, historical and economic links.

Crucially, Russia is currently capitalizing on the Western Balkan countries' disenchantment with the slow

EU accession process and growing anti-European sentiment, as well as the West's reluctance to invest in the region due to extremely negative economic conditions, slow reforms and corruption. In this context, Russia's most important instruments of influence in the region include energy, investment and political diplomacy.

Russia is by far the dominant oil and gas supplier in the Balkans, where all countries remain heavily dependent on imports to meet demands. The delivery of natural gas, infrastructure projects and Russian investment in these countries increase Russia's influence there. For example, Serbia covers more than 75 percent of its needs with Russian natural gas. Russia's position as the dominant energy supplier has been entrenched through downstream-asset acquisitions and new bilateral partnerships, with Russian companies emerging as major owners of assets, partners in joint ventures, and developers of new infrastructure (Bieri, 2015). Private and state-owned Russian companies now enjoy a significant stake in the energy sectors of several Balkan countries: Gazprom acquired the majority stake in Serbia's state oil company, while in Bosnia-Herzegovina the Russian state-owned oil company Zarubezhneft has achieved a strategically significant presence in the oil sector through its presence in Republika Srpska. Russian companies are also very active in the energy sectors of Croatia and Bulgaria.

As far as investment is concerned, with the Eurozone in crisis and with Greek FDI in the region shrinking dramatically, the Balkan countries have become more open to offers of investment and financial support from other countries, such as China and Russia. Russia has become Montenegro's largest investor, with as much as 32% of enterprises currently under Russian ownership. Russian presence is particularly evident in the real estate, tourism and leisure sectors, with one third of all tourists in Montenegro coming from Russia. Russian investment is also very strong in the sectors of food and drink, banking, agriculture and transport. Russia has invested heavily in the modernization of the Serbian rail network and the purchase of new Russian-made rolling stock; the project is underwritten with an $800 million loan from Russia (Clark and Foxall, 2014).

Finally, as far as diplomatic influence and security are concerned, Russia is rekindling traditional political ties based on shared ideological, religious, historical and cultural affinities with countries of the region. Russia's main partner in the Western Balkans is Serbia: the close connection between the two countries can be traced back to the role of the Czarist Russian Empire as the protector of all Slavic peoples. More recently, Russia's political support for Serbia in the Kosovo conflict has been of crucial importance. The decision by Russia —a permament member of the UN Security Council with veto power— not to recognise Kosovo's declaration of independence in 2008 was a keystone in this dispute. The desire to merge the predominately Serb areas of Northern Kosovo with Serbia was briefly given new impetus by Russia's annexation of Crimea in 2014. However, as this would directly jeopardise Serbia's EU prospects, the Serbian government did not pursue this policy line.

Russia's influence in the security arena includes a recently-signed agreement with Serbia's Armed Forces on technical cooperation, which intends to modernize Serbia's army through equipment purchases. In September 2015, Serbian military forces joined Russian and Belorussian military forces in a joint exercise —called Slavic Brotherhood— in Russian territory. The European Commission reacted immediately, stating that such initiatives "send the wrong signal" at a time when Serbia is working on its European orientation and credentials and pursuing EU membership; the EU Commission "expects Serbia to act in conformity of obligations derived by the EU integration process". Finally, the western countries' appeal to impose sanctions on Moscow was not followed by Serbia, on the grounds that the Russian Federation and Serbia have signed a strategic agreement that the Serbian leadership did not want to violate.

Russia's growing economic and political influence in the Balkans and its continued attempts to capitalise on increasing anti-EU sentiment and disenchantment with the enlargement process has caused great concern within the EU. Crucially, the new developments have prompted calls by European leaders such as Italy's Matteo Renzi, Slovakia's Miroslav Lajcak and Sweden's Carl Bildt for a European re-engagement. In this context, the Berlin Process was launched in 2014 to confirm continuing European interest in the region despite ongoing difficulties, and to rekindle Western Balkan interest in the EU. Moreover, German Chancellor Angela Merkel visited the region in July 2015 to assure aspiring EU members, Albania, Serbia and Bosnia-Herzegovina, that their integration will not be derailed by the unfavourable international conditions and the financial troubles in Greece.

## 5. The impact of the refugee crisis

The explosion of Europe's worst refugee crisis since World War II and the inability to find a sustainable solution has tremendous implications not only for Europe as a whole, but for the Balkan region particularly. Ac-

cording to the UN refugee agency UNHCR, the "Western Balkans route" is by far the most used gateway into the European Union for the several hundreds of thousands of refugees and migrants entering the bloc this year (euractiv, 2015). Half a million refugees have arrived in Greece this year, hoping to travel through the Balkans to reach Austria, Germany, Sweden and other north European countries. Close to 300,000 have crossed the Western Balkans into the EU between January and September 2015, versus just 8,000 for the same period in 2014, according to EU border agency Frontex. They enter via Greece to FYROM, Serbia, Bosnia, Albania, Montenegro and Kosovo; more than 6,000 made this journey on a daily basis in the autumn of 2015 (Tcherneva and Wesslau, 2015).

However, for lack of a better and more sustainable policy, fences are being erected and borders are being closed in many countries of destination. Hungary first started blocking refugees from entering —completing a razor-wire barrier in August— then Croatia and Slovenia followed suit. In mid-September 2015, FYROM declared a state of emergency after being overwhelmed by the volume of refugees entering from Greece, closing the border for three days as police used stun grenades to stop people from breaking through. Denmark and Sweden have imposed new border checks aimed at stemming the inflow of migrants and refugees (Huskic, 2015).

The EU's response to the crisis has been less than satisfactory. With five summits on migration having been held already, decisions have been made but few steps have been taken towards implementing them (Dimitriadi, 2015). Moroever, the summits have not addressed crucial issues such as how to help guard borders along the Balkan route, how to pay for additional refugee shelters and registration centres, and how to relocate refugees who are stuck in the Western Balkans. This humanitarian crisis has pushed the already weakened Western Balkan countries to new limits and has placed a serious strain on the stability and resources of the region, as most of the Western Balkan states struggle to cope and to ensure the orderly management of the refugee flow (Heisbourg, 2015). A greater influx of refugees could further disrupt the fragile balance between the countries in the region and could be highly destabilizing and destructive, as the uncontrolled flow has generated new tensions and exacerbated pre-existing ones.

## 6. Conclusions

These are tumultuous and challenging times, not only for the Western Balkans but for the greater region and for Europe as a whole. The ongoing economic crisis in Greece and Europe continues to have an important impact on the Balkan economies, their prospects for growth and reform, and their EU accession prospects. As EU accession stalls and the commitment to reform weakens, the region is increasingly characterized by institutional paralysis, poor governance, opaque elections, and nationalist tensions. The escalating refugee crisis has added an extra burden to the already difficult situation, stretching the limits and the resources of the region.

Solutions for coping with this volatile situation cannot come only from the Western Balkan countries themselves. The Western Balkans must take responsibility for the aspects that they can control, such as recommitting to economic, political and institutional reforms, democratisation, fighting corruption, bilateral reconciliation, and staying on course with the EU convergence criteria. However, as far as other important sources of instability and tension are concerned, the burden needs to be shared. For example, sustainable, proactive solutions need to be put forward for the refugee crisis: shutting down the borders to the EU is not an acceptable solution, and will just leave hundreds of thousands of refugees trapped in the Western Balkans, with extremely serious repercussions. Also, despite the obvious difficulties, EU accession prospects need to be kept alive, and the process needs to be re-activated and re-energised. It is the only way to keep the Western Balkan countries engaged and committed to any sort of reform process. Finally, the EU needs to take Russia's renewed presence in the Balkan region very seriously, and recognise it as a game-changer that could dramatically alter the geopolitical balances in the region. The prospect of impoversihed and isolated Balkan countries drifting away from Europe, turning inwards or towards Russia, will create a totally different geopolitical reality as well as the future of the region, and potentially, of Europe as a whole.

## References


Assenova, M. (2015): "The Greek Crisis: Financial and Political Risks to the Balkans", *Eurasia Daily Monitor*, 12 (137) 22 July.

Bartlett, W. and I. Prica (2013): "The Deepening Crisis in the European Super-periphery", *Journal of Balkan and Near East Studies*, 15 (4).

Bastian, J. (2008): "'Cry wolf' no more: external anchors and internal dynamics in the Western Balkans", *Journal of Southeast European and Black Sea Studies*, special issue, *Europe's Unfinished Transitions: the Convergence-Divergence Debate Revisited*, 8 (4).

Bastian, J. (2003): "Banking on Southeast Europe: financial sector reform amidst regional volatility", *Journal of Southeast European and Black Sea Studies*, 3 (1).

BiEPAG (2015): "Removing Obstacles to EU Accession: Bilateral Disputes in the Western Balkans", *Policy Brief*, Balkans in Europe Policy Advisory Group.

Bieri, M. (2015): "The Western Balkans between Europe and Russia", *CSS Analyses in Security Policy*, Centre for Security Studies, no. 170, March.

Clark, D. and A. Foxall (2014): *Russia's role in the Balkans: Cause for Concern?,* Russian Studies Centre, *The Henry Jackson Society for Democracy, Freedom and Human Rights*, June.

Deutsche Bank (2012): "Western Balkans: bumps on the road to EU accession", *Current Issues: Emerging markets*, August 24.

Dimitriadi, A. (2015): "Burden sharing, where art thou?", *European Council on Foreign Relations*, 11 November.

EBRD (2015): *Transition Report 2015-16, Rebalancing Finance*, European Bank for Reconstruction and Development.

EIU (2015): "Greek crisis: what impact on Balkan neighbours?" Economist Intelligence Unit, 30 June.

EIU (2012): "Balkan economies: mostly miserable" Economist Intelligence Unit, June.

EU (2015): *EU Enlargement Strategy*, European Commission, November.

Euractiv (2015): "Western Balkans route still preference of most refugees", 5 November.

Heisbourg, F. (2015): "The Strategic Implications of the Syrian Refugee Crisis", *Survival: Global Politics and Strategy*, 57 (6), December 2015-January 2016.

Huskic, S. (2015): "Fortress Europe and Western Balkans as its soft underbelly", *Paper Series*, European Fund for the Balkans, September.

Institute for International Finance (2009): *Capital flows to emerging market economies*, January.

Kmezic, M. and F. Bieber (2015): "Western Balkans and the EU: Beyond the Autopilot mode", Policy Brief, Balkans in Europe Policy Advisory Group, April.

MacDonald, N., K. Hope and C. Bryant (2010): "Balkan banks wary of Greek retreat", *Financial Times*, March 18.

Murgasova, Z. (2015): "The Western Balkans, 15 years of Economic Transition", *Regional Economic Issues, Special Report*, International Monetary Fund, May.

Oxford Analytica (2012): "Enlargement loses priority in euro-crisis", October 26.

Panagiotou, R. (2013): "The Greek Crisis as a Crisis of EU Enlargement: How will the Western Balkans be Affected?", *Journal of Southeast European and Black Sea Studies*, 13 (1).

Tcherneva, V. and F. Wesslau (2015): "Refugee road to nowhere: the Western Balkans", *European Council on Foreign Relations*, 30 October.

UNCTADstat (2015): *General Country Profiles*, United Nations Conference on Trade and Development.

UNCTAD (2014): *World Investment Report 2014,* United Nations Conference on Trade and Development.

World Bank (2016): *Migration and Remittances Factbook*.

# The effects of the Greek bonds exchange program (PSI+) and the impaired provisions for the systemic banks' equity

***Yannis Panagopoulos*, Ioannis Peletidis*****

## 1. Introduction

The purpose of this article is to classify and record the effects of the PSI+ (Private Sector Involvement) and the provisions of impaired loans on the profitability and, consequently, on the structure of the four (4) systemic Greek banks' equity, which now constitute 90% of the banking system. More specifically, we are examining the effects on equity of the two most important factors of the banks' assets which are: the trading book (in the Greek case the PSI+ of the period 2011-2012) and the provisions of the impaired loans for the entire period of economic crisis (2008-2015).

As it is well known, the banks' profitability result, which constitutes the most crucial element for the banks' capital adequacy, is derived from both the trading (e.g. bonds, treasury bills, etc) and the loans (different categories of loans) portfolios. This is the way, as it is mandated by the Basel II (2006) and, later, by the Basel III (2011 & 2015),[1] that the stability and viability of the banking system is secured.

In this article we are trying to reveal, at least in the period of economic crisis, the role and the consequences of the PSI+ and the increasing provisions of the impaired loans for the systemic banks' profitability and therefore the capital structure of the Greek banking system.

## 2. The banks' capital structure (2007-2015)

In Table 1 we report the summation of the four (4) systemic banks' equity in Greece.[2] These banks are: Ethniki, Alpha Bank, Eurobank and Piraeus Bank. Our presentation commences from 2007, which is a year before the beginning of the international economic crisis, and ends in 9/2015.

Although the Greek economic crisis —in terms of GDP growth— actually commences from 2009 (-4.35% of the real GDP), in terms of the aggregated banks' equity the crisis effect became visible only in 2011. However, in the previous years a substantial fall in the aggregate profitability of the systemic banks is visible from Table 1. More analytically, from 3.7 billion euro in 2007 (Column 3, Table 1) it diminishes to 1.1 billion euro in 2009 and then, in 2010, accumulated losses to 0.2 billion euro appear, due to the provisions of impaired loans, which turned out to be seven times bigger than those of 2007, as a percentage of the total loans portfolio (see Annex 1).

As we can see from the data, the year 2011 was a turning point for the banking system of Greece because it coincides both with the peak of the economic recession (-9.15% of the real GDP) and with the Greek bonds exchange program (PSI+). These two factors negatively affected the systemic banks' accumulated profits. Thus, accumulated profits of 7.1 billion euro in 2010 became accumulated losses of 20.5 billion euro in the next year (2011). We further observe that in 2012, the banks' financial situation deteriorates further and as a consequence the systemic banks' total equity reaches -4.0 billion euro. The same year (2012), the accumulated losses reached -25.0 billion euro which can be mainly attributed to PSI+, as it is reported in the aggregate financial statements, for both 2011 and 2012, but also to the economic recession of those years. More specifically, the size of the recession in 2012 was -7.25% while the accumulated recession, from 2007 to 2012, reached 26.1%. Consequently, this level of recession clearly affected the impairment provisions of the non-performing loans (NPL) of the four systemic banks.

In the following year (2013) the Greek banking system was reinforced by a recapitalization which, as we can see in Table 1, was reported in the aggregate *Common Stocks Surplus* account (Column 2, Table 1). Through this recapitalization and the mergers and acquisitions that took place in that year, the total equity of the systemic part of the Greek banking system increased by almost 33.3 billion euro.

* Senior Research Fellow, Centre of Planning and Economic Research (KEPE).

** Economist-former Deputy Director, Center of Entrepreneurship, Emporiki Bank.

1. According to the Basel III mandates, there is a discrete relationship between the capital equity and the weighted (according to the embedded risk) categories of the loans portfolio. For an analytical presentation of the aforementioned relationship, see BCBS (2015, Annex).

2. An analytical presentation of the aforementioned relationship is available upon request.

**TABLE 1 The summation of systemic banks' capital structure** *(Million €)*

| | Common Stocks (1) | Common Stocks Surplus (2) | A. Profits/ (A. Losses)* (3) | Sum** (4) | Preferred Stocks (5) | Total equity (6) |
|---|---|---|---|---|---|---|
| **2007** | 7038.8 | 4901.7 | 5007.5 | 17174.9 | 2848.5 | 21171.8 |
| **2008** | 7372.3 | 4709.8 | 3744.2 | 15455.6 | 3000.4 | 19525.0 |
| **2009** | 9927.8 | 6111.5 | 7154.0 | 21589.7 | 2694.1 | 25729.1 |
| **2010** | 10537.9 | 7605.5 | 7110.5 | 22029.6 | 2200.5 | 26057.0 |
| **2011** | 9557.2 | 10476.1 | -20471.7 | -430.9 | 1420.1 | 648.4 |
| **2012** | 9553.2 | 10488.1 | -25046.0 | -3010.3 | 1191.9 | -4085.5 |
| **2013** | 10202.6 | 32864.8 | -13986.8 | 28012.3 | 1713.0 | 29307.6 |
| **2014** | 12487.3 | 36993.5 | -17784.1 | 30033.0 | 1804.0 | 31798.8 |
| **2015*** ** | 12486.3 | 36994.5 | -25552.6 | 25083.7 | 950.0 | 26682.4 |

*Source:* Balance sheet of the four banks.

* A: Accumulated profits or losses.

** The columns (1-3) do not necessarily sum up to column (4) because they contain some further elements like, for example, currency differences of the consolidated Balance sheets, etc.

*** Data are available up to 30/9/2015.

Finally, as we can see from Column 3 in Table 1, during the last two years (2014 & 2015) the accumulated profitability of the banking system deteriorates again. This situation compelled the European Central Bank (ECB) to ask for a new reassessment of the Greek banks' financial condition, which led to the decision for a new recapitalization at the end of 2015.

## 3. The consequences of the Greek bonds exchange program (PSI+: Private Sector Involvement)

The private sector participation in the Greek bonds exchange program (known as PSI+) was decided in the Eurozone's summit of October 26, 2011 and was approved by the same council on February 21, 2012. The aim was to lift and re-profile the Greek debt. The council's proposal was directed to the holders of the Greek bonds and to the lenders of the Greek utilities tied with collaterals of the Greek State. More analytically, each of the aforementioned bonds or specific loans was exchanged with:

- Twenty (20) new titles of bonds of different durations, between 11 and 30 years, issued by the Greek State with a nominal value of 31.5% of the corresponding values of the old (exchanged) bonds
- Two (2) new titles of bonds of one- and two-year duration correspondingly issued by the European Financial Stability Facility (EFSF) and with a nominal value of 15% of the old (exchanged) bonds and, finally,
- One (1) new title of bond issued by the Greek State which renders an interest rate similar to the nominal value of the newly issued bond and is linked with the GDP performance of the country.

In accordance with the aforementioned exchanges of bonds, the final redemption reached the 53.5% of the exchanged bonds.

The Greek systemic banks decided to participate in this program of exchange of old bonds and loans with these new titles. The implementation of this proposed exchange began in February 2012 and was completed in the following two months (March and April). However most of the financial losses were reported in the Income Statements of the previous year (2011). The reason for such retrospective behavior, on behalf of the systemic banks, is because they recognize that most of the financial losses belong to 2011. The magnitude of these losses is derived from the difference between the accounting value of the selected (old) bonds and loans and the present value of the new titles owned by the banks.

The consequences were not similar for all banks. It is obvious that those with the biggest bond portfolios suffered the greatest financial losses. Those losses reached almost 28 billion euro for the four systemic banks, as we can see in Annex 1, for the two consecutive years of 2011 and 2012. From this amount of money we do not count any tax exemptions, which operate as a benefit for the banks and can be calculated (subtracted) in equal proportions during the holding —of these new bonds— period by the banks.

As a result of the aforementioned events, in the *cash flow* row of Annex 1 we observe that the systemic banks presented total financial losses of -28 billion euro in 2011 and -5.97 billion euro in 2012. This outcome leads to a strong reduction in the total banks' equity, from 26.1 billion euro in 2010 to 0.6 billion euro in 2011, and cumulative losses of 4.1 billion euro in 2012. This deterioration of the total banks' equity engineered a number of actions which included bank mergers and acquisitions, adjustments of bank liabilities and, finally, recapitalization with the participation of the Financial Stability Fund and a number of private equity investors, which helped in securing the long-term viability of the systemic part of the banking system. Thus, in 2013, the sum of total equity capital reached 29.3 billion euro.

## 4. The history and the consequences of the impaired provisions

In this section of the paper we will present some necessary definitions related to the terminology used for the accounting elements contained in Annex 1.[3] The reason we do this is to help the reader better understand the financial problems of the systemic banks' portfolios, which emerged during crisis.

With the term "loans" we define the financial elements of the assets side of a bank which are under a concrete timetable of repayment ("agreement") between the bank and the debtor. This "agreement" is written and signed by both parties. In the category "private borrowers/debtors" we classify the issuers of mortgage loans, consumer loans, credit cards and loans to the SMEs. In the category "enterprise debtors" we classify the borrowers from medium and large companies of the private and public sector as well as the borrowers from the public sector. We define "performing" as a loan that does not carry any kind of obligation (e.g. interest rate or capital or any kind of delay). The term "collateral" defines an asset or right owned by the debtor which becomes the property of the financial institution, in the event of a debtor's default, to mitigate the losses of the banks. Additionally, the term "provisions for impairment losses" is calculated when the estimated future recovery receipts from the loan (in present values) is less than the initially calculated future values. "The recovered amount" is estimated by the banks in case of a debtor's future default and incorporates the total amount of money to be received from future loan repayment plus the amount derived from the liquidation of the client's collaterals.

The term "impaired loans" refers to those loans which embed "provisions of impairment". Those provisions are calculated on an individual and aggregated basis. More specifically, the "private borrowers" are calculated collectively while the "debts of enterprises" are calculated individually. The "impaired loans" are considered as NPLs. In this last category we also classify the NPLs with a delay greater than 90 days or NPLs which are under clearance by a judical decision.

The "cumulative provisions for impairments" are calculated as the sum of each year's "provisions for impairments" and are dependent by the quality of each bank's loan portfolio. The (cumulative) provisions are reduced either through receipts from loans which were already written off or from any remaining values of such write-offs. Additionally, each year "provisions for impairments" are subtracted at the profit-loss statement account of the bank. Finally, it is worth mentioning that the term "provisions" signifies potential and not real future losses for the banks.

After the aforementioned definitions regarding to the terminology of the bank's accounting elements, we proceed to the discussion of the Annex 1 spreadsheet.

Commencing from 2007, when no recession existed in the Greek economy and the country was still in economic growth (6.80% in nominal and 3.30% in real terms of GDP), we infer that from the summation of the pre-provision loan portfolio of the systemic banks (160.75 billion euro) the "provision for impaired loans"[4] measured

3. In Annex 1 we consolidate some selected parts from the Income Statement of the Consortium of the systemic Greek banks with the exception of the National Bank of Greece (NBG). In the case of NBG we used data from the bank only. This exception was decided because the Income Statement of the bank represents better the Greek economic reality since a big part of the loan portfolio of the NBG Consortium is produced abroad (34.3%, from the Finansbank). For comparability reasons we also report here that the corresponding percentage of the international activity of the other three Consortiums are: Piraeus, 10.2%, Eurobank, 17.3% and Aplha Bank, 16.1%.

4. Impaired loans: loans that contain the risk of being defaulted and therefore are under provision of impaired losses.

about 5.23 billion euro. These "provisions" were distributed among the "private borrowers" with 2.31 billion euro and the "enterprise debtors" with 2.93 billion euro. In percentage terms, the "provisions of impaired loans" reached 3.26% of the sum of the pre-provision loan portfolios of the systemic banks. Moreover, the percentage regarding the "private borrowers" was 1.44% while the percentage regarding the "enterprise debtors" was 1.81% of the sum of the pre-provision loan portfolios.

From this year (2007) onwards the Greek economy gradually entered an economic recession (+4.10% in nominal but -0.27% in real terms of GDP in 2008) and, at the same time, the banking system adopted the Basel II framework. As a consequence of the recession we gradually observed the deterioration of the aforementioned banking indices. For example, in 2008, despite the substantial increase in the sum of pre-provision loan portfolios of the systemic banks (at 205.04 billion euro), we encountered a relatively small increase in the impaired loans. More analytically, the total amount of the "impaired loans" increased to 7.46 billion euro which was distributed between the "private borrowers" with 3.87 billion euro and the "enterprise debtors" with 3.61 billion euro. However, the percentages of the aforementioned "provisions" with respect to the total pre-provision loan portfolios of the systemic banks were only 1.89% for the "private borrowers" and 1.76% for the "enterprise debtors". Consequently, the "accumulated provisions" were slightly increased in 2008, to 4.35 billion euro or 2.12% of the total pre-provision loan portfolios of these banks.

The situation became explosive in 2011, which is the peak of the economic recession (-8.42% in nominal and -9.15% in real terms of GDP), for the "provisions of impaired loans". More analytically, as we can see in Annex 1, from the summation of the pre-provision loan portfolios of the systemic banks (196.96 billion euro) the "provision for impaired loans" now measured about 42.2 billion euro. Those "provisions" were distributed between the "private borrowers" with 16.15 billion euro and the "enterprise debtors" with 26.08 billion euro. In percentage terms, the sum of the provisions of impaired loans reached 21.44% of the total pre-provision loans of the systemic banks. Additionally, the percentage of the "private borrowers" reached 8.20% and the percentage of the "enterprise debtors" 13.24% of the sum of the pre-provision loans.

Finally, the "accumulated provisions for the credit risk" increased in 2011, reaching the 13.1 billion euro or 6.65% of the total pre-provision loans portfolio of these banks.

Furthermore, there is an observable deviation, concerning the behavior of the "private" and the "enterprise" provisions for impaired loans, during those years of the Greek crisis. More specifically, the provisions for impaired loans for the "enterprises" were immediately and substantially increased from 2010 to 2011 while the provisions for impaired loans for the individuals ("private debtors") were increased a couple of years later (2012 and 2013). Moreover, from that year (2013) onwards the latter exceeded the former. This evolution, regarding banks' liquidity, represents the marginal conditions under which firms operate in Greece. This is not, however, the case for the individuals ("private borrowers") who historically reveal problems of lagging loan repayment as the economic crisis deepens, unemployment grows and deposits reduce.

As we can see from Annex 1, in 2014, the economic recession diminished (-1.62% in nominal and +0.65% in real terms of GDP) but the situation of the financial indices of the systemic banks deteriorated. More analytically, from the enlarged[5] sum —with respect to 2011— of pre-provision loan portfolios of these banks (239.47 billion euro) the "provisions for impaired loans" increased to 94.5 billion euro. Those provisions were distributed among the "private borrowers" with 48.7 billion euro and the "enterprise debtors" with 45.8 billion euro. In percentage terms, the sum of the "provision of impaired loans" reached 39.48% of the sum of the pre-provision loans of the systemic banks. Additionally, the percentage of the "private borrowers" reached 20.34% while the percentage of the "enterprise debtors" was 19.10% of the sum of the pre-provision loans.

Finally, the "accumulated provisions for the credit risk" increased in 2014, reaching the 47.11 billion euro or 19.67% of the total pre-provision loan portfolios of the systemic banks.

## 5. The estimated future of the systemic banks' capital structure

As already reported, in 2014 the "provisions for impaired loans" amounted to 94.54 billion euro. Taking into consideration that, first, in 2014 the reported "provisions for impaired loans" amounted to 47.76% of the total "provisions for impaired loans" and that the collaterals —which were linked with those loans— were

5. The pre-provision loan portfolios enlargement of the systemic banks was basically derived from the 2013 mergers and acquisitions of smaller banks.

almost of the same percentage (51.54%), we can infer that at least in 2014 the systemic banks did not require any further recapitalization. Despite this relative balance evolution regarding the financial position of the banking system, the economic deterioration of 2015,[6] as it was also underlined in Panagopoulos & Peletides (2015), lead the system to a new recapitalization, which was completed in December 2015.

Consequently, the long-term evolution of the total systemic banks' equity will depend on the way the Greek banking system manages the problem of the excessive NPLs. Therefore, the appearance of the distressed funds in the Greek economy and the possibility of re-selling those NPLs to these funds should be regarded neither as a panacea nor as a disaster because it carries both positive and negative elements.

On the side of positive elements, for the systemic banks, we record that an important proportion of those problematic NPLs will be transferred, with a discounted price, to those funds as a trade off for some immediate liquidity, which is necessary for the banking system to repay its short-term obligations (like the repayment of ELA, currently amounting to almost 70 billion euro). Additionally, through this liquidity, there is some possibility to finance even a small amount of "healthy" loans (mainly enterprises) for boosting economic growth. Another positive element is that since all these funds are located abroad and they have access to the international markets they might help to re-engineer the real estate market of Greece. However, there is also the disadvantage that by transferring the NPLs to these funds, the systemic banks will face a serious reduction in their loan portfolios.

A negative element of this NPL re-selling process, from banks to distressed funds, is that these kinds of funds are often focused on specific categories of loans like mortgage loans, loans which are covered with collaterals from commercial estates or loans linked with particular sectors of the Greek economy with some investing interest, like the touristic enterprises. Another negative element of this re-selling process is the different estimations that may exist between the banks and the funds concerning the price of collaterals which accompany the NPLs. More analytically, the lack of liquidity, on behalf of the systemic banks, offers an advantageous negotiating position for the funds, which can lead to excessively high discounted values of the re-selling NPLs. Such an event could create new substantial financial losses for the banks, beyond the existing "provisions of impaired loans", which can lead to the need for a new recapitalization of the banking system.

## 6. Concluding comments and some policy proposals

The aim of this article is the analytical presentation of the two main financial elements that affected the profitability and, consequently, the structure of the four systemic banks' equity, which constitute 90% of the Greek banking system's equity. These two financial elements are: the bonds exchange program of the Greek State (the PSI+) and the impaired provisions which are mainly related to the NPLs for the entire economic crisis period (2008-2015).

As we analyzed before, the PSI+ of the 2011-2012 periods created some "lump sum" financial losses in the systemic banks' profitability which was mainly reported in 2011 and amounted to almost 27 billion euro, while in 2012 the financial losses were restricted to 1.1 billion euro. Moreover, the accumulated provisions —from 2007, when the international financial crisis commenced— of impaired loans reached 47.1 billion euro in 2014. Adding up the "written off" loans of the same time period (2007-2014), which amount to 10.9 billion euro, we end up with 58 billion euro (excluding the effects from PSI+ and from any other recovered payments).

Additionally, the accumulated value of the existing collaterals was almost 48.7 billion euro for 2014. Taking into consideration that in this year the corresponding accumulated value of the "provisions for impaired loans" amounted to 47.11 billion euro, we can infer that for 2014 the Greek banking system presents an almost equal proportional balance between NPLs, on one side, and accumulated provisions and collaterals, on the other.

Nevertheless, the deteriorating situation in the Greek economy in 2015 leads us to a new recapitalization of banks. This unfortunate evolution compels us to consider the necessity of some new proposals for a more permanent solution regarding the systemic banks' equity issue. Thus, we make some proposals that could

6. According to the existing non-assessed estimations, the NPLs of the systemic banks, for 2105, are expected to be over 100 billion euro. This amount is expected to also increase the "provision for impaired loans", the "accumulated provisions", etc. Such a deteriorating evolution for the NPLs is advocated from the estimated economic recession of 2015 (KEPE: -0.2%, y-o-y). Finally, it is important to mention, that the financial position of the systemic banks was seriously worsened when they were compelled to use ELA for their financial support, instead of the ECB, during the first semester of 2015.

be adopted as the way for improving the performance of the loan portfolios and consequently the systemic banks' equity. We therefore suggest:

- The immediate return to economic growth
- The registration of the severe income restrictions regarding the law of NPLs repayment process
- The careful and well-organized sell-off of mortgage loans to the distressed funds in relative fair values.

More analytically, concerning the economic growth we should underline that there is historically a clear correlation between the Greek banking system and the real economy. Therefore the recovery of the real GDP, initially through some Foreign Direct Investments (FDI), will operate as the first step for a series of parameters that could positively influence the banks' equity performance. More specifically, an increase in the real GDP will a) help the repayment of the NPLs (through the improvement of economic activity and through the decrease of unemployment) removing, this way, any future need for a new recapitalization of the banking system and b) create the presuppositions for the registration of new "healthy" loans in the banks' portfolios.

For the legal framework that examines and defines the NPLs it is necessary to set some severe income-scaling limitations, regarding the loan regulations, in order to avoid any enterprise and/or private borrower who, although they can pay their debts, try to operate as "free riders" and escape from their obligations. Usually these are cases where banks' clients expect either favorable treatment from the State regarding their loans, or are speculating that the banks will not proceed to any house auction, fearing the reaction of the society.

Finally, the international experience of the distressed funds and their ability to cooperate with domestic banks on the careful and effective NPLs management can contribute to the revocability and collectability of those loans. Such an outcome would be beneficial for both funds and banks.

## References

### *In Greek*

Annual Financial Statements and Annual Reports of the systemic banks (2007-15).

Panagopoulos, Y. and Peletides, I. (2015), "The evolution of the common equity of the Greek banking system", vol. 23, *Greek Economy*.

### *In English*

Basel Committee on Banking Supervision (2015), "Basel III: Monitoring Report", Basel: Bank for International Settlements, March.

Basel Committee on Banking Supervision (2011), "Basel III: a global regulatory framework for more resilient banks and banking systems", Basel: Bank for International Settlements, June.

Basel Committee on Banking Supervision (2006), "International converging of capital measurement and capital standards: a revised framework (the comprehensive version)", Basel: Bank for International Settlements, June.

## ANNEX 1 The PSI+ and the NPL analysis of the systemic banks (summation) (Sums in billion euro)

| Year | 2007 | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | The value of collaterals by the loans categories 31/12/2014 |
|---|---|---|---|---|---|---|---|---|---|
| **Total amount of loan portfolios** | | | | | | | | | |
| Pre-Provisions aggregate loans portfolio | 160.754.247,00 | 205.039.567,00 | 208.876.070,00 | 209.687.262,00 | 196.956.847,00 | 196.553.617,00 | 245.861.067,00 | 239.472.758,00 | 141.384.693,00 |
| **Retail** | | | | | | | | | |
| Performing and non-impaired loans | 68.065.782,00 | 77.397.763,00 | 78.688.544,00 | 72.928.912,00 | 57.900.515,00 | 53.284.419,00 | 56.596.437,00 | 56.220.272,00 | 41.649.379,00 |
| Less than 90 days of delay and non-impaired | 10.362.474,00 | 14.712.366,00 | 12.788.274,00 | 14.228.758,00 | 14.166.399,00 | 13.680.870,00 | 15.009.586,00 | 13.181.862,00 | 10.743.804,00 |
| More than 90 days of delay and non impaired | 560.964,00 | 881.841,00 | 1.074.853,00 | 1.408.067,00 | 1.628.141,00 | 2.312.282,00 | 3.532.175,00 | 1.321.647,00 | |
| Impaired loans | 2.308.797,00 | 3.867.108,00 | 6.824.108,00 | 10.110.489,00 | 16.154.205,00 | 25.132.157,00 | 47.116.836,00 | 48.700.253,00 | 25.584.490,00 |
| **Corporate, SME's and public sector enterprises** | | | | | | | | | |
| Performing and non-impaired loans | 68.897.893,00 | 94.324.959,00 | 93.871.584,00 | 90.124.157,00 | 68.021.462,00 | 58.699.655,00 | 67.095.826,00 | 64.767.328,00 | 33.397.841,00 |
| Less than 90 days of delay and non-impaired | 6.879.972,00 | 9.546.110,00 | 9.313.631,00 | 11.273.196,00 | 10.763.034,00 | 10.387.489,00 | 11.812.167,00 | 6.923.239,00 | 6.867.308,00 |
| More than 90 days of delay and non impaired | 746.097,00 | 702.702,00 | 921.465,00 | 1.383.879,00 | 2.244.937,00 | 4.008.256,00 | 6.256.023,00 | 2.511.919,00 | |
| Impaired loans | 2.932.268,00 | 3.606.718,00 | 5.393.611,00 | 8.229.804,00 | 26.078.154,00 | 29.048.489,00 | 38.442.017,00 | 45.846.238,00 | 23.141.871,00 |
| Total amount of accumulated impaired loans' provisions | 950.970,00 | 2.169.912,00 | 2.939.702,00 | 3.847.033,00 | 6.269.506,00 | 7.359.894,00 | 6.760.726,00 | 9.931.938,00 | |

## ANNEX 1 (continued)

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Total amount of provisions for credit risk (Total accumulated provisions for inpaired loans) | 3.185.821,00 | 4.345.926,00 | 5.821.176,00 | 8.233.448,00 | 13.091.692,00 | 21.274.964,00 | 39.878.981,00 | 47.108.751 (45.152.007) |
| Total losses from impaired bonds issued by the Greek state and loans on public utilities (PSI+) | 0,00 | 0,00 | 0,00 | - | -26.974.005,00 | -1.068.141,00 | 0,00 | 0,00 |
| Receipts of residuals from write off loans | 1.047.190,00 | 1.055.497,00 | 1.544.488,00 | 1.519.577,00 | 1.481.529,00 | 1.319.021,00 | 616.557,00 | 2.272.669,00 |
| Amount of provisions used to writte off loans | 43.648,00 | 70.323,00 | 80.557,00 | 52.628,00 | 87.221,00 | 38.309,00 | 55.322,00 | 39.433,00 |
| Profit (loss) of the year | 3.248.137,00 | 2.002.020,00 | 1.095.691,00 | -212.004,00 | -28.031.560,00 | -5.970.737,00 | 4.929.383,00 | -3.879.702,00 |
| Index of accumulated provisions divided by the aggregate loans portfolio | 1,98% | 2,12% | 2,79% | 3,93% | 6,65% | 10,82% | 16,22% | 19,67% |
| Index of accumulated provisions divided by the aggregate impaired loans portfolio (ratio of accumulated provisions for impaired loans to total impaired loan portofolio) | 60,79% | 58,15% | 47,65% | 44,89% | 31,00% | 39,27% | 46,61% | 49,83% (47,76%) |
| Ratio of impaired loans to the aggregate loan portfolios | 3,26% | 3,65% | 5,85% | 8,75% | 21,44% | 27,57% | 34,80% | 39,48% |
| Ratio of impaired retail loans to the aggregate loan portfolios | 1,44% | 1,89% | 3,27% | 4,82% | 8,20% | 12,79% | 19,16% | 20,34% |
| Ratio of impaired company loans to the aggregate loan portfolios | 1,82% | 1,76% | 2,58% | 3,92% | 13,24% | 14,78% | 15,64% | 19,14% |

*Source:* Annual Financial Statements and Annual Reports of the systemic banks.

*Note:* The National Bank of Greece is presented as a bank and not as a Consortium and therefore does not include any subsidiary bank and particularly Finasbank.

# The impact and the evolution of investment psychology in the Greek stock market

*Fotini Economou**

## 1. Introduction

The question of how psychological factors affect investment behavior is bound to attract research interest, especially in periods of economic crisis, when sentiment is more likely to affect rational decision making. Empirical research has revealed several market anomalies which traditional financial theory cannot account for. Furthermore, studying market participants' behavior and emotions may provide explanations for observed securities mispricing.

This paper examines the impact of investment psychology on the Athens stock exchange for the years 2004 to 2015 (a period that features both strongly rising and sharply declining returns). The Athens stock exchange is a small market[1] which generally exhibits high volatility and low trading volume. As such, it provides an interesting setting for analysis. In June 2015, the imposition of capital controls and trading suspension undoubtedly affected investor sentiment. However, it is not known to what extent and in what direction. The key research question this paper aims to answer is whether and how investment behavior affects the Athens stock exchange during crises and under special circumstances, and whether market participants' behavior has changed over time, testing for different stock market periods.

To this end we examine herd behavior employing the approach of the cross sectional deviation of the individual securities returns. Herd behavior is one of the most important behavioral biases. It refers to imitation that leads to convergence of actions.[2] According to Christie and Huang (1995), this kind of behavior is more likely to occur during crisis periods, when investors often overlook their personal beliefs and follow market trends, usually in a state of fear.

This phenomenon is observed both among retail investors and professional portfolio managers. A number of reasons have been proposed. These are classified in the international literature as:

(a) Rational/intentional when market participants who lack adequate and reliable information (e.g., retail investors) or want to safeguard their reputation and relative market ranking (e.g., professional portfolio managers and financial analysts) choose to imitate others (Scharfstein and Stein, 1990; Devenow and Welch, 1996; Economou et al., 2015b).

(b) Irrational/psychological. For example, Keynes (1936) states that investors may imitate others in times of uncertainty due to sociological factors, and Erb et al. (2015) maintains that following the majority provides psychological security.

(c) Spurious when investors share common information or adopt commonly known investment strategies (Bikhchandani and Sharma, 2001; Gavriilidis et al., 2013).

Herd behavior raises questions about stock market efficiency, while the presence of correlated transactions limits diversification benefits. On several occasions, herd behavior across stock markets may also reduce international diversification benefits and expose investors to risks that are difficult to hedge (Economou et al., 2011). In our case, the empirical study of herding is useful for understanding the Greek stock market over time, the psychology of market participants, as well as investment strategies formation.

The rest of the paper is structured as follows: Section 2 provides a brief review of empirical findings from the international literature. Section 3 describes the methodological approach. Section 4 presents the empirical results. Section 5 supplies the conclusions, along with useful comments about the Athens stock exchange.

## 2. Short literature review

The last decade has witnessed an impressive increase in studies investigating the existence and effects of herd behavior in financial markets, acknowledging this behavioral bias as crucial for understanding investment psychology over time and across international markets. We look into the studies that employ the same methodological approach with the one adopted in this paper for the sake of comparability.

* Research Fellow, Centre of Planning and Economic Research (KEPE).

1. The market value of the Athens stock exchange has shrunk in recent years, accounting for 0.04% of the global market capitalization (in US dollars) in November 2015 (0.08% in December 2014) down from 0.37% in December 2004, according to data from the World Federation of Exchanges members.

2. For an extensive review on alternative definitions see Bikhchandani and Sharma (2001); Hirshleifer and Teoh (2003), and Spyrou (2013).

The empirical results in the literature are mixed and largely dependent on the period and market under examination. Although the findings are not in complete agreement, by and large herd behavior is more likely to occur in developing stock markets, where market conditions (i.e., limited information and disclosure, low trading volume, etc.) facilitate herding (Kallinterakis and Kratunova, 2007). However, there are also cases of strong herd behavior in developed markets in which the dissemination of information shapes public opinion and facilitates imitation (Chen, 2013). Moreover, crisis periods attract research interest and uncover the role of emotion. Emotion is something that should be taken into account in the investment decision making process, as well as in asset valuation models and portfolio selection.

Empirical findings regarding the US market, the largest, most developed, mature and important international stock market, do not confirm, in most cases, the presence of herd behavior (Christie and Huang, 1995; Chang et al., 2000; Gleason et al., 2004; Ben-Saïda et al., 2015; etc.). In fact their findings are consistent with rational models. On the other hand, the US market affects herding behavior in other international stock markets (Chiang and Zheng, 2010). It should also be noted that when testing for different sub-periods or market conditions, herd behavior can be identified even in the US market. For example, Galariotis et al. (2015) report that the US investors follow the herd on days with important macroeconomic announcements.

The Chinese stock market has also attracted research interest in view of the investment shift in emerging markets. The findings support the presence of herd behavior when taking into account different periods and market conditions (Tan et al., 2008; Chiang et al., 2010; Yao et al., 2014).

In addition, recent international studies provide empirical findings of herd behavior for many developed and developing markets (Chiang and Zheng, 2010; Economou et al., 2011; Chen, 2013; Mobarek et al., 2014; Economou et al., 2015a). These studies provide a basis for useful comparisons and conclusions regarding the functioning of the markets, and possible interactions in cross-market herding transmission.

Studies about the Greek stock market have also documented the presence of herd behavior during the 1999-2000 bubble (Caporale et al., 2008) and strong cross-market herding with other Southern European countries (Italy, Spain, Portugal) (Economou et al., 2011). These studies do not cover the period of the recent Greek economic crisis, which constitutes an interesting research setting on its own. This paper fills this gap using the latest available data and similar methodological approach for comparison purposes, as well as modifications that provide original empirical findings, insights and conclusions.

## 3. Methodology and data

The literature is dominated by two methods of herd behavior investigation. The first one is based on recorded professional portfolio managers' transactions (Lakonishok et al., 1992; Wermers, 1999; Sias, 2004). The second is based on the examination of individual securities' returns (Christie and Huang, 1995; Chang et al., 2000; Hwang and Salmon, 2004), and to the extent that it can perform with daily publically available observations, is better suited for capturing the volatile nature of investment psychology.

In this paper we employ the second method of the cross-sectional dispersion of the individual asset returns, which was originally proposed by Christie and Huang (1995) and Chang et al. (2000). Since then it has been widely used for many stock markets and with many variations to better capture the phenomenon.

According to rational asset pricing models, the relationship between the cross-sectional dispersion of returns and market returns is a positive linear relationship taking into consideration the different sensitivities of individual securities to market performance.[3] In the presence of herd behavior this relationship is negative or at least increasing at a decreasing rate (Chang et al., 2000).

The cross sectional average absolute deviation of individual stock returns (Cross Sectional Absolute Deviation - CSAD) relative to the market return is calculated as follows:

$$CSAD_t = \frac{1}{N}\sum_{i=1}^{N}\left|R_{i,t} - R_{m,t}\right| \quad (1)$$

where $R_{i,t}$ is the return of stock $i$ on day $t$, $R_{m,t}$ is the market return on day $t$ and $N$ is the number of all listed stocks on day $t$.

The model of Chang et al. (2000) estimates the relationship between cross-sectional dispersion and market returns, and is structured as follows:

$$CSAD_t = \alpha + \gamma_1\left|R_{m,t}\right| + \gamma_2 R_{m,t}^2 + \varepsilon_t. \quad (2)$$

3. See Chang et al. (2000) for the mathematical proof.

A negative and statistically significant coefficient $\gamma_2$ is sufficient to identify herd behavior.

In order to examine for possible herding asymmetries on days with positive (rising) or negative (downward) market performance, an additional model is estimated using a dummy variable, according to Chiang and Zheng (2010); Chiang et al. (2010); Economou et al. (2011) and Mobarek et al. (2014), as follows:

$$CSAD_t = \alpha + \gamma_1 \left(1 - D^{up}\right) \left|R_{m,t}\right| + \gamma_2 D^{up} \left|R_{m,t}\right| + \\ + \gamma_3 \left(1 - D^{up}\right) R_{m,t}^2 + \gamma_4 D^{up} R_{m,t}^2 + \varepsilon_t \quad (3)$$

where $D^{up} = 1$ when the market return on this day is positive, and 0 otherwise.

Moreover, we test for potential asymmetric results regarding investor sentiment. The best available proxy for the Greek stock market on a daily basis is the implied volatility index, KEPE GRIV, a so-called "fear index".[4] To this end, a new dummy variable is used. It takes the value 1 on days that the index takes values higher than the previous 30-day moving average (a presumed signal of high investor uncertainty for the expected short-term course of the market), and 0 otherwise. A similar approach was employed by Economou et al. (2015a), using the well-known Chicago Board of Exchange implied volatility index (CBOE VIX) to capture investor sentiment (fear/uncertainty), and estimating the model on the rising and declining days of the index across the individual Euronext markets (Belgium, France, Netherlands, Portugal). In the present paper regarding the Greek stock market, the relevant domestic index is employed. The index is constructed like the CBOE VIX and reflects the expected future short-term volatility of the Athens stock exchange.[5] In this case the model is structured as follows:

$$CSAD_t = \alpha + \gamma_1 \left(1 - D^{GRIV}\right) \left|R_{m,t}\right| + \\ + \gamma_2 D^{GRIV} \left|R_{m,t}\right| + \gamma_3 \left(1 - D^{GRIV}\right) R_{m,t}^2 + \\ + \gamma_4 D^{GRIV} R_{m,t}^2 + \varepsilon_t . \quad (4)$$

Last but not least, in order to better capture the impact of the Greek debt crisis in the stock market we construct another model which employs a dummy taking the value 1 from 08/09/2011 until the end of the period under examination. The structural break was endogenously derived via the Quandt-Andrews Breakpoint Test.[6] Interestingly, this break point coincides with August 8, 2011, i.e., "Black Monday" for the stock markets, the day that followed the (first in history) US downgrade by international rating agencies. This model is structured as follows:

$$CSAD_t = \alpha + \gamma_1 \left|R_{m,t}\right| + \gamma_2 R_{m,t}^2 + \\ + \gamma_3 D^{crisis} R_{m,t}^2 + \varepsilon_t . \quad (5)$$

All model results are re-estimated taking into account the volume of individual securities, given the limited liquidity of the Greek stock market. To this end we calculate the volume weighted market return and cross-sectional dispersion. It is the first time the volume-weighted approach is employed for the Greek stock market.[7] Though the need to take trading volume into account when carrying out such analyses has been stressed in the international literature, it is often neglected (Spyrou, 2013).

The data used for the empirical analysis were the daily percentage log returns and the trading volume of all companies that were listed (active) in the stock market on any given day during 2/1/2004 - 21/12/2015.[8] This way we avoid the (so-called in international literature) survivorship bias. Furthermore, the sample used for each stock is restricted to days with recorded transactions. This means that apart from holidays, days with zero returns resulting from zero transactions are also omitted, thus treating the thin trading problem of the Greek stock market, which could have significant repercussions on the estimates (see Kallinterakis and Lodetti, 2009). The number of stocks in the sample is variable, ranging from 73 to 336. The data were derived from the Thomson Reuters Datastream. Moreover, historical data series of the implied volatility index (KEPE GRIV) were used from 2004 in order to capture investor sentiment and define the relevant dummy variable in equation (4).

4. The index was constructed by KEPE in cooperation with the University of Patras and Professor K. Siriopoulos and the available data from 2004 cover the whole period under examination.

5. See Economou (2014) for a comparative presentation of the KEPE GRIV index with relevant international indices.

6. Though not endogenously defined, an alternative break point (May 5, 2010, following the announcement of Greece entering into the EU Support Mechanism) was also examined for robustness using the Chow Breakpoint Test. The empirical results for alternative sub-periods provide similar conclusions. However, they are not presented in the paper in the interest of brevity.

7. Trading volume weighting has been previously used only for the stock market of Montenegro by Kallinterakis and Lodetti (2009).

8. The most recent available data at the time of writing the paper.

**TABLE 1 Descriptive statistics for the Greek market (2/1/2004-21/12/2015)**

| | With equally weighted market return | | With volume-weighted market return | |
|---|---|---|---|---|
| | *CSAD* | $R_m$ | *CSAD* | $R_m$ |
| Mean | 2.7627 | -0.0266 | 3.5450 | 0.1443 |
| Median | 2.5866 | 0.0541 | 3.2551 | 0.3015 |
| Maximum | 9.9672 | 10.0654 | 18.3011 | 17.3836 |
| Minimum | 1.2513 | -16.8640 | 1.3939 | -18.3833 |
| Standard deviation | 0.9656 | 1.5748 | 1.4919 | 2.9575 |
| Observations | 2,962 | | 2,962 | |

*Notes: CSAD* is the cross-sectional average absolute deviation of the stock returns and $R_m$ is the market return.

## 4. Empirical results

The basic descriptive statistics of the sample are supplied in Table 1, both for the traditional approach of the equally weighted market return, and the volume-weighted approach. The sample covers a wide period and consists of 2,962 daily observations. It should also be noted that the standard errors of all estimates are properly adjusted for heteroskedasticity and autocorrelation, according to Chang et al. (2000).

Table 2 reports the estimation of the Chang et al. (2000) model (2) for 2/1/2004 - 21/12/2015 using two alternative approaches to calculate the market return and cross-sectional dispersion. According to the results there is no evidence of herding for the entire period, since coefficient $\gamma_2$ is negative but not statistically significant. Using the volume-weighted approach, coefficient $\gamma_2$ is positive and statistically significant. It should be noted that the volume-weighted adjusted $R^2$ is considerably higher than its equally weighted counterpart. This finding applies to almost all the estimates that follow (Tables 3-6). Adjusted $R^2$ levels are close to those reported in the international literature.

The absence of herd behavior for the entire period does not mean that herding does not or cannot appear in specific sub-periods or under different market conditions. Initially, we examine the possible asymmetry of investor behavior on rising and declining market days. Table 3 presents the estimation results for model (3). Both $\gamma_3$ and $\gamma_4$ coefficients are negative, but not statistically significant. At the same time, there is no evidence of herding asymmetry under the approach that takes into account trading volume.

Another possible asymmetry concerns investor sentiment. Table 4 examines the same relationship on days which investor uncertainty about the expected short-term market course over the next 30 days is higher than the previous 30-day moving average. In this case there is evidence of herding on days with high levels of uncertainty about the course of the market. Under these conditions it is easier for the herd to form and investors to follow public opinion or the market trend irrespective of their personal beliefs. On the other hand, the volume-weighted approach results do not support the presence of herd behavior.

**TABLE 2 Estimation of the Chang et al. (2000) model**

| | With equally weighted market return | With volume-weighted market return |
|---|---|---|
| $\gamma_0$ | 2.2896** | 2.8398** |
| (p-value) | 0.00 | 0.00 |
| $\gamma_1$ | 0.4360** | 0.2531** |
| (p-value) | 0.00 | 0.00 |
| $\gamma_2$ | -0.0028 | 0.0203** |
| (p-value) | 0.52 | 0.00 |
| Adj-$R^2$ | 23.96% | 40.28% |

*Notes:* Estimation of the model:
$CSAD_t = \alpha + \gamma_1 |R_{m,t}| + \gamma_2 R^2_{m,t} + \varepsilon_t$, where $CSAD_t$ is the cross-sectional average absolute deviation of the stock returns on day $t$ and $R_{m,t}$ is the market return on day $t$. The estimation refers to the period 2/1/2004-21/12/2015.

Symbol ** denotes statistical significance at the 1% level.

**TABLE 3 Examination of possible asymmetries in rising and declining market days**

| | With equally weighted market return | With volume-weighted market return |
|---|---|---|
| $\gamma_0$ | 2.2838** | 2.8521** |
| (p-value) | 0.00 | 0.00 |
| $\gamma_1$ | 0.4075** | 0.2763** |
| (p-value) | 0.00 | 0.00 |
| $\gamma_2$ | 0.4798** | 0.2079** |
| (p-value) | 0.00 | 0.00 |
| $\gamma_3$ | -0.0005 | 0.0151** |
| (p-value) | 0.90 | 0.00 |
| $\gamma_4$ | -0.0074 | 0.0289** |
| (p-value) | 0.28 | 0.00 |
| Adj-$R^2$ | 24.03% | 40.62% |

*Notes:* Estimation of the model: $CSAD_t = \alpha + \gamma_1\left(1-D^{up}\right)\left|R_{m,t}\right| + \gamma_2 D^{up}\left|R_{m,t}\right| + \gamma_3\left(1-D^{up}\right)R^2_{m,t} + \gamma_4 D^{up} R^2_{m,t} + \varepsilon_t$, where $CSAD_t$ is the cross-sectional average absolute deviation of the stock returns on day $t$, $R_{m,t}$ is the market return on day $t$ and $D^{up} = 1$ when the market return is positive on day $t$ and 0 otherwise. The estimation refers to the period 2/1/2004-21/12/2015.

Symbol ** denotes statistical significance at the 1% level.

**TABLE 4 Examination of possible asymmetries relative to investor sentiment**

| | With equally weighted market return | With volume-weighted market return |
|---|---|---|
| $\gamma_0$ | 2.2876** | 2.8443** |
| (p-value) | 0.00 | 0.00 |
| $\gamma_1$ | 0.4322** | 0.2323** |
| (p-value) | 0.00 | 0.00 |
| $\gamma_2$ | 0.4774** | 0.2892** |
| (p-value) | 0.00 | 0.00 |
| $\gamma_3$ | 0.0014 | 0.0299** |
| (p-value) | 0.60 | 0.00 |
| $\gamma_4$ | -0.0131* | 0.0103* |
| (p-value) | 0.04 | 0.03 |
| Adj-$R^2$ | 24.22% | 41.54% |

*Notes:* Estimation of the model: $CSAD_t = \alpha + \gamma_1\left(1-D^{GRIV}\right)\left|R_{m,t}\right| + \gamma_2 D^{GRIV}\left|R_{m,t}\right| + \gamma_3\left(1-D^{GRIV}\right)R^2_{m,t} + \gamma_4 D^{GRIV} R^2_{m,t} + \varepsilon_t$, where $CSAD_t$ is the cross-sectional average absolute deviation of the stock returns on day $t$, $R_{m,t}$ is the market return on day $t$ and $D^{GRIV}$ is a dummy variable that takes the value 1 on days when the implied volatility index is higher than its previous 30-day moving average. The estimation refers to the period 2/1/2004-21/12/2015.

Symbols **, * denote statistical significance at the 1% and 5% level, respectively.

Table 5 focuses on the Greek crisis period and reports the annual estimates of coefficient $\gamma_2$ according to model (2) from 2010 to 2015 using the two approaches. The only case in which the coefficient is negative is in 2015, though it is not statistically significant. Since 2015 was an extraordinary year in several respects, we take a closer look at the data: from 2/1/2015 to 26/6/2015 and 3/8/2015 to 21/12/2015 (i.e., before the imposition of capital controls, and after the reopening of the Athens stock exchange). As $\gamma_2$ turns out negative and statistically significant, we find evidence of herding following the reopening of the Athens stock exchange.

Previous studies (e.g., Caporale et al., 2008) mention the strong presence of herd behavior in the Athens stock exchange during 1999-2000 bubble, so we estimate coefficient $\gamma_2$ for the years 1999, 2000 and 2001. The coefficients are negative, statistically significant and quite higher in magnitude vis-à-vis 2015, approaching -0.0587, -0.0346 and -0.0113, respectively. It seems that in Greece herd behavior tends to occur in extreme stock market periods, but with lower intensity in the recent period. When taking trading volume into account the phenomenon disappears from the crisis years entirely, even from the second half of 2015.

To further examine the impact of the crisis on investment behavior in the Greek stock market, we turn to model (5). It is a variant of model (2) with a dummy variable for the Greek crisis period. The empirical results reveal herd behavior since $\gamma_2$ is negative and statistically significant, but not during the crisis. Coefficient $\gamma_3$, which refers to the crisis period, is positive, greater than $\gamma_2$ in absolute terms, and statistically significant. This finding is consistent with previous studies that document a greater impact of sentiment on stock prices during non-crisis periods (Cooper et al., 2004; Chung et al., 2012; Hudson and Green, 2015). It appears that during crises prices are mostly determined by fundamentals rather than emotion. Indeed, according to Hudson and Green (2015), the impact of

**TABLE 5 Estimation of the Chang et al. (2000) model from 2010 to 2015**

| | With equally weighted market return | | | With volume-weighted market return | | |
|---|---|---|---|---|---|---|
| | $\gamma_2$ | p-value | Adj. $R^2$ | $\gamma_2$ | p-value | Adj. $R^2$ |
| 2010 | 0.0244** | 0.00 | 49.12% | 0.0334** | 0.00 | 14.00% |
| 2011 | 0.0013 | 0.92 | 23.64% | 0.0253 | 0.14 | 26.16% |
| 2012 | 0.0010 | 0.94 | 36.67% | 0.0273** | 0.00 | 48.40% |
| 2013 | 0.0006 | 0.98 | 25.44% | 0.0427** | 0.00 | 46.37% |
| 2014 | 0.0160** | 0.00 | 40.78% | 0.0135** | 0.00 | 39.35% |
| 2015 | -0.0028 | 0.30 | 48.07% | 0.0250** | 0.00 | 66.59% |
| 2/1-26/6/2015 | 0.0624** | 0.01 | 53.99% | 0.0265** | 0.00 | 54.46% |
| 3/8-21/12/2015 | -0.0106* | 0.02 | 47.65% | 0.0090 | 0.46 | 75.49% |

*Notes:* Estimation of the model: $CSAD_t = \alpha + \gamma_1 |R_{m,t}| + \gamma_2 R^2_{m,t} + \varepsilon_t$, where $CSAD_t$ is the cross-sectional average absolute deviation of the stock returns on day $t$ and $R_{m,t}$ is the market return on day $t$.

Symbols **, * denote statistical significance at the 1% and 5% level, respectively.

**TABLE 6 The impact of the Greek crisis on herding estimations**

| | With equally weighted market return | With volume-weighted market return |
|---|---|---|
| $\gamma_0$ | 2.2304** | 2.7815** |
| (p-value) | 0.00 | 0.00 |
| $\gamma_1$ | 0.5483** | 0.3507** |
| (p-value) | 0.00 | 0.00 |
| $\gamma_2$ | -0.0593** | -0.0187 |
| (p-value) | 0.00 | 0.15 |
| $\gamma_3$ | 0.0669** | 0.0365** |
| (p-value) | 0.00 | 0.00 |
| Adj-$R^2$ | 31.04% | 44.85% |

*Notes:* Estimation of the model: $CSAD_t = \alpha + \gamma_1 |R_{m,t}| + \gamma_2 R^2_{m,t} + \gamma_3 D^{crisis} R^2_{m,t} + \varepsilon_t$, where $CSAD_t$ is the cross-sectional average absolute deviation of the stock returns on day $t$, $R_{m,t}$ is the market return on day $t$ and $D^{crisis}$ is a dummy variable that takes the value 1 from 9/8/2011 to 21/12/2015. The estimation refers to the period 2/1/2004-21/12/2015.

Symbol ** denotes statistical significance at the 1% level.

sentiment is more pronounced in strongly upward periods characterized by optimism. Last, in line with the results of models (2) - (4), the estimates that take into account trading volume do not indicate the presence of herd behavior. This can be interpreted as evidence in support of herd behavior, attributed to stocks with low trading volume, the effect of which is eliminated via the volume weighted approach.

## 5. Conclusions

This paper looks into the investment behavior in the Athens stock exchange studying herd behavior from 2004 to 2015, covering both a long period of prosperity and a long recession. Apart from the traditional methodological approach it also employs an alternative one which takes into account trading volume, and filters out untraded stocks on a daily basis. This point, although often overlooked, is extremely important when considering markets characterized by low trading volume. Failure to address the problem of thin trading may lead to biased estimations in favor of herd behavior.

According to the empirical results for the entire period, there is no evidence of herding in the Greek market. Even though no market performance asymmetries are detected, an interesting finding refers to the asymmetry that occurs regarding investor sentiment. More specifically, there is evidence of herding on days with increased uncertainty about the course of the market, as approximated by the KEPE GRIV index.

Moreover, the empirical results are consistent with findings in the international literature which indicate a rather limited impact of sentiment during crisis periods. This means that under extreme conditions market participants approach investments more rationally, based mostly on fundamental analysis. The only period that

exhibits signs of herd behavior is from August 2015 to December 21, 2015 (latest available data). This is also consistent with the observed asymmetry on days characterized by increased uncertainty. However, the estimate is significantly lower in size (and economic importance) compared to its counterpart from the 1999-2000 bubble period. It is probably reasonable to ask what has changed. Are market participants more rational or is the market more mature? A reasonable answer would have to allow for both elements. Experience, accumulated knowledge, increased information and improved institutional/regulatory framework have all contributed to the result.

Another important finding has to do with the effect of trading volume on model estimation. The empirical results suggest that herd behavior occurs mainly in thinly traded stocks. When volume weighting is taken into account the herding evidence disappears.

Analyses like the one undertaken here are useful for understanding investment behavior and its evolution over time. The emergence of behavioral biases casts doubt on the efficient functioning of the market. It is important that both retail investors and market professionals do not overlook the impact of low trading volume and sentiment, which seems to grow in periods of increased uncertainty. These findings should be taken into consideration in investment strategies formation in order to protect investors from possible unpredictable psychological market effects.

## References


BenSaïda, A., Jlassi, M., & Litimi, H. (2015). "Volume-herding interaction in the American market". *American Journal of Finance and Accounting* 4(1): 50-69.

Bikhchandani, S. & Sharma, S. (2001). "Herd behaviour in financial markets". IMF Staff Papers 47: 279-310.

Caporale, G.M., Economou, F., & Philippas, N. (2008). "Herd Behaviour in Extreme Market Conditions: Evidence from the Athens Stock Exchange". *Economics Bulletin* 7(17): 1-13.

Chang, E.C., Cheng, J.W., & Khorana, A. (2000). "An examination of herd behavior in equity markets: an international perspective". *Journal of Banking and Finance* 24: 1651-1679.

Chen, T. (2013). "Do Investors Herd in Global Stock Markets?". *Journal of Behavioral Finance* 14(3): 230-239.

Chiang, T. C. & Zheng, D. (2010). "An empirical analysis of herd behavior in global stock markets". *Journal of Banking & Finance* 34(8): 1911-1921.

Chiang, T.C., Li, J., & Tan, L. (2010). "Empirical investigation of herding behavior in Chinese stock markets: evidence from quantile regression analysis". *Global Finance Journal* 21: 111-124.

Christie, W.G. & Huang, R.D. (1995). "Following the pied piper: do individual returns herd around the market?". *Financial Analysts Journal* 51: 31-37.

Chung, S.L., Hung, C.H., & Yeh, C.Y. (2012). "When does investor sentiment predict stock returns?". *Journal of Empirical Finance* 19(2): 217-240.

Cooper, M.J., Gutierrez, R.C., & Hameed, A. (2004). "Market states and momentum". *The Journal of Finance* 59(3): 1345-1365.

Devenow, A. & Welch, I. (1996). "Rational herding in financial economics". *European Economic Review* 40(3): 603-615.

Economou, F. (2014). "Fear indices - barometers of global investment psychology: the international experience". *Greek Economy*, KEPE, 4: 27-32. [In Greek]

Economou, F., Gavriilidis, K., Goyal, A., & Kallinterakis, V. (2015a). "Herding dynamics in exchange groups: Evidence from Euronext". *Journal of International Financial Markets, Institutions and Money*, 34: 228-244.

Economou, F., Gavriilidis, K., Kallinterakis, V., & Yordanov, N. (2015b). "Do fund managers herd in frontier markets - and why?". *International Review of Financial Analysis* 40: 76-87.

Economou, F., Kostakis, A., & Philippas, N. (2011). "Cross-country effects in herding behavior: evidence from four south European markets". *Journal of International Financial Markets, Institutions and Money* 21(3): 443-460.

Erb, H. P., Hilton, D. J., Bohner, G., & Roffey, L. (2015). "The minority decision—A risky choice". *Journal of Experimental Social Psychology* 57: 43-50.

Galariotis, E.C., Rong, W., & Spyrou, S.I. (2015). "Herding on fundamental information: A comparative study". *Journal of Banking & Finance* 50: 589-598.

Gavriilidis, K., Kallinterakis, V., & Leite Ferreira, M.P. (2013). "Institutional industry herding: Intentional or spurious?". *Journal of International Financial Markets, Institutions and Money* 26: 192-214.

Gleason, K.C., Mathur, I., & Peterson, M.A. (2004). "Analysis of intraday herding behavior among the sector ETFs". *Journal of Empirical Finance* 11(5): 681-694.

Hirshleifer, D. & Teoh, S.H. (2003). "Herd behaviour and cascading in capital markets: A review and synthesis". *European Financial Management* 9(1): 25-66.

Hudson, Y. & Green, C.J. (2015). "Is investor sentiment contagious? International sentiment and UK equity returns". *Journal of Behavioral and Experimental Finance* 5: 46-59.

Hwang, S. & Salmon, M. (2004). "Market stress and herding". *Journal of Empirical Finance* 11: 585-616.

Kallinterakis, V. & Kratunova, T. (2007). "Does Thin Trading Impact Upon the Measurement of Herding? Evidence from Bulgaria". *Ekonomia* 10: 42-65.

Kallinterakis, V. & Lodetti, M. (2009). "Nonlinearities, Herd Behaviour and Market Illiquidity: Evidence from Montenegro". *Economic Analysis* 42(3-4): 7-17.

Keynes, J.M. (1936). *The General Theory of Employment, Interest and Money*. Macmillan Publications, London.

Lakonishok, J., Shleifer, A., & Vishny, R. W. (1992). "The impact of institutional trading on stock prices". *Journal of Financial Economics* 32(1): 23-43.

Mobarek, A., Mollah, S., & Keasey, K. (2014). "A cross-country analysis of herd behavior in Europe". *Journal of International Financial Markets, Institutions and Money* 32, 107-127.

Scharfstein, D. & Stein, J. (1990). "Herd Behaviour and Investment", *The American Economic Review* 80(3): 465-479.

Sias, R.W. (2004). "Institutional herding". *Review of Financial Studies* 17: 165-206.

Spyrou, S. (2013). "Herding in financial markets: a review of the literature". *Review of Behavioral Finance* 5(2): 175-194.

Tan, L., Chiang, T.C., Mason, J.R., & Nelling, E. (2008). "Herding behavior in Chinese stock markets: An examination of A and B shares". *Pacific-Basin Finance Journal* 16(1): 61-77.

Wermers, R. (1999). "Mutual fund herding and the impact on stock prices". *The Journal of Finance* 54: 581-622.

Yao, J., Ma, C., & He, W.P. (2014). "Investor herding behaviour of Chinese stock market". *International Review of Economics & Finance* 29: 12-29.

# Forthcoming in series KEPE STUDIES

## STUDY 76: Analysis of Greek external trade: Sectoral analysis, comparative advantages, exports and economic growth, 2000-14

(ISBN 978-960-341-112-3)

***Ioanna Konstantakopoulou***

This study examines the external trade of the Greek economy, identifies the sectors or products with strong competitive advantages and the dynamic export sectors, and, finally, investigates the relationship between exports and economic growth.

The study is structured as follows:

In Chapter 2, we provide a descriptive analysis of the Current Account and its components (Trade balance, Services balance, Income balance and Current Transfers balance). Moreover, we study the stylized facts of the Current Account.

In Chapter 3, we study the structure of the export and import of goods. We investigate the export performance and the export coverage ratio at the 2-digit and 3-digit SITC level. Moreover, we detect the most dynamic export sectors or products of the Greek economy. We examine the geographical structure of Greek imports and exports and carry out a detailed study of trade flows in different countries as well as the composition of exports and imports of products to different countries. The statistical data used for our analysis come from EL.STAT. (Hellenic Statistical Authority) and the Comtrade[1] UN (United Nations) for the period 2000-2014. For the analysis by sector, we used data in two-digit and three-digit classification levels according to the Standard International Trade Classification Rev.3 (SITC).

In Chapter 4, we investigate the competitiveness of exports and comparative advantages in the Greek economy. To identify the comparative advantages, we use the index of Revealed Symmetric Comparative Advantage (RSCA), the index of Vollrath, and the Trade Balance Index (TBI). The evaluation of the comparative competitive advantages of the 2-digit and 3-digit SITC sectors of each country is carried out with respect to other Euro area countries, to detect the 2-digit and 3-digitc SITC sectors of each country that are competitive.

In Chapter 5, we investigate the causal relationship between exports and economic growth by examining causality at different horizons. Multi-horizon causality is based on the Dufour and Renault (1998) notion of causality which is an extension of the original definition of Granger (1969) causality and is equivalent to linear predictability at higher forecast horizons. To this end, we use the Dufour et al. (2006) statistical procedure of (p, h) - autoregressions. We use annual data supplied by the World Development Indicators of the World Bank for the period 1960-2014 for the Euro area countries.

Finally, in Chapter 6, we present the results of the study, and the proposals of economic policy.

1. United Nations Commodity Trade Statistics Database (UN-COMTRADE).

## Recent Studies and Reports published by KEPE

### STUDIES

75. J. Cavounidis, I. Cholezas. *Educational and Labour Market Trajectories of Youth of Migrant Origin*. Athens, 2013 (in Greek).
74. S. Papaioannou. *Economic Growth in Greece: Trends and Future Prospects.* Athens, 2013 (in Greek).
73. E. A. Kaditi. *Analysis of the Greek Food Supply Chain.* Athens, 2012.
72. Th. Lianos and J. Cavounidis. *Migration Flows from and to Greece in the 20th Century.* Athens, 2012 (in Greek).
71. A. Koutroulis. *Finance and Economic Growth: The Case of Greece 1960-2005.* Athens, 2011.
70. T. Tsekeris. *Travel Consumption and Market Competition in Greece.* Athens, 2010.
69. I. Reziti. *The Price Transmission Mechanism in the Greek Agri-Food Sector.* Athens, 2010 (in Greek).
68. K. Athanassouli. *The Professional Transition of Graduates from Schools of Philosophy.* Athens, 2009 (in Greek).
67. Kl. Efstratoglou. *Assessment of the Professional Training of the Unemployed in Greece.* Athens, 2009 (in Greek).
66. P.-I. K. Prodromidis. *The Spatial Distribution of Male and Female Employment and Unemployment in Greece.* Athens, 2008.
65. Y. Panagopoulos and Y. Peletides. *Basel II: Description and Consequences for the Banking System.* Athens, 2008 (in Greek).
64. M. G. Arghyrou. *The Effects of the Accession of Greece to the EMU: Initial Estimates.* Athens, 2006.
63. P.-I. K. Prodromidis. *A Regional Analysis of Declared Incomes in Greece.* Athens, 2006.
62. S.K. Spathi. *Comparing Air and Sea Passenger Transportation in Domestic Lines. Econometric Estimation of Demand.* Athens, 2005 (in Greek).
61. C.N. Kanellopoulos, in cooperation with P. Papaconstantinou. *Economic Aspects of Adult Training.* Athens, 2005 (in Greek).
60. Th. Terrovitis. *Production and Use of Information and Communication Technologies in Greece: Impact on the Greek Economy.* Athens, 2005 (in Greek).
59. A. Lampropoulou. *The Greek Agriculture in the Context of Foreign Competition.* Athens, 2005 (in Greek).
58. M.St. Panopoulou. *Technological Change and Corporate Strategy in the Greek Banking Industry.* Athens, 2005.
57. S. Chandrinos in association with K. Altinoglou and A. Pepe. *Evolution of SMEs in Greece. Estimation and Comparability of Efficiency and Flexibility of SMEs and Large Manufacturing Enterprises.* Athens, 2005 (in Greek).

### REPORTS

71. *Liberalization of Professions: Extent and expected effects,* by A. Kotsi, E. Athanassiou, N.C. Kanellopoulos, R. Karagiannis, S. Papaioannou, J. Katselidis. Athens, 2015 (in Greek).
70. *The Economies of the Western Balkans: Transition, Growth and Prospects for EU Accession,* R. Panagiotou. Athens, 2012.
69. *The Equalisation of the Qualifying Age for Old Age Pensions for Females in Greece to the Regime in Force for Males*, by L. Athanassiou, F. Zervou, A. Kotsi. Athens, 2012 (in Greek).

68. *Air Transport and Airports in Greece: Current Developments, Economic Importance and Efficiency,* by Th. Tsekeris and K. Vogiatzoglou. Athens, 2011 (in Greek).

67. *Market Conditions and Competition in the Greek Economy,* by Study Group of KEPE, ed. K. Kanellopoulos. Athens 2011 (in Greek).

66. *Luxury Hotels in Greece: Dynamics and Development Potential,* by N. Vagionis, E. Kasimati, W. Kafouros. Athens, 2011 (in Greek).

65. *Labor Market: Developments and Policy Guidelines,* by K. Kanellopoulos, K. Athanassouli, K. Efstratoglou, G. Panagopoulos, P. Papakonstantinou, P.K. Prodromidis. Athens, 2010 (in Greek).

64. *Wages, Pensionable Time and Working Conditions in the Public and Private Sector,* by K. Kanellopoulos, F. Zervou. Athens, 2010 (in Greek).

63. *Transport and Economy: Contribution, Trends and Prospects in Greece with Emphasis on Surface Transport,* by T. Tsekeris and E. Tsouma. Athens, 2010 (in Greek).

62. *The Greek Commercial Fleet,* by S. Spathi, S. Karagiannis and N. Georgikopoulos. Athens, 2010 (in Greek).

61. *The Social Capital in Greece,* by E. Poupos. Athens, 2010 (in Greek).

60. *The Agricultural Sector in Greece,* by E. Kaditi and E. Nitsi. Athens, 2010 (in Greek).

59. *Size Profile and Labour Market Analysis of Immigration in Greece,* by K. Kanellopoulos, M. Gregou and A. Petralias. Athens, 2009.

58. *The Evolution and Viability of the Greek Pension System,* by F. Zervou. Athens, 2009 (in Greek).

57. *The Economic and Demographic Viability of the Greek Social Insurance System,* by L. Athanassiou, F. Zervou and A. Kotsi. Athens, 2009 (in Greek).

56. *Multilateral Trade Negotiations: Trade in Services,* by V. Notis. Athens, 2008 (in Greek).

55. *FYROM's transition: From Yugoslavia to the European Union?,* by R. Panagiotou, Athens, 2008.

54. *The Development Process and Long Term Trends in Economic Behaviour and Economic Conditions in Greece,* by L. Athanassiou, Athens, 2007 (in Greek).

53. *Tourist Development in Greece and the Mediterranean: A Comparative Analysis,* by N. Vagionis and W. Kafouros. Athens, 2007 (in Greek).

52. *Financing & Insurance of Export Credits,* by Cl. B. Efstratoglou. Athens, 2007 (in Greek).

51. *The Greek Energy Sector: Tendencies and Ascertainment,* by N. Manolas. Athens, 2007 (in Greek).

50. *Minimum Guaranteed Income in EE15 Countries and Possibilities in its Implementation to Greece,* by A. Balfoussias and K. Kotsis. Athens, 2007 (in Greek).

49. *Agricultural Trade between Greece and Selected Balkan Countries: Comparative Advantage and Competitiveness,* by P. Paraskevaides. Athens, 2006 (in Greek).

48. *Vocational Education in Greece: Developments, Problems and Prospects,* by C. A. Karmas. Athens, 2006 (in Greek).

47. *Restructuring and Privatization of the Greek Railways and Ports* by D.Th. Athanassakopoulos. Athens, 2006 (in Greek).

46. *Greek Agriculture on the Eve of the New Conditions and Policy Framework,* by C. Carabatsou-Pachaki in cooperation with P. Tonikidou. Athens, 2006 (in Greek).

45. *Europe and the International Economic Environment in 2005: Recent Developments and Outlook,* by St. Savva-Balfoussias, E. Athanassiou, St. Karagiannis, K. Tsouma. Athens, 2007.

44. *The Systemic Transformation of the Balkan States and the Developments of the Economic Relations with Greece,* by N. Vagionis, W. Kafouros and R. Panagiotou. Athens, 2005 (in Greek).

43. *Recent Developments in the Greek Housing Market,* by St. Himoniti-Terroviti. Athens, 2005 (in Greek).