

## Determinants of Investment Activity: the Case of Greece

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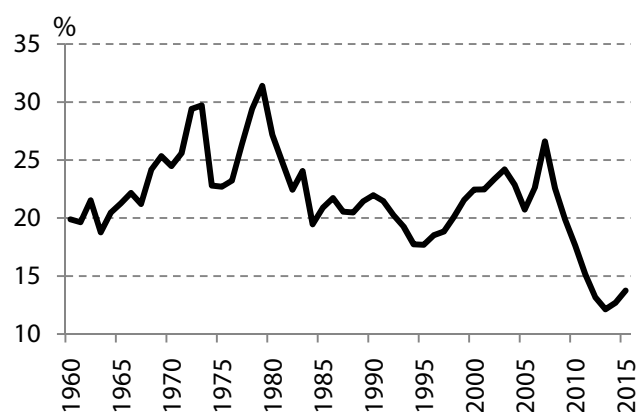
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- Total investment-to-GDP ratio has plunged since 2007 in Greece, with the real capital stock declining for the first time after 50 consecutive years. A real challenge for the Greek economy is the strengthening of its productive capacity through real capital stock increases.
- In this report, we identify factors that affect investment activity in Greece and can boost investment expenditures in the foreseeable future. Our analysis confirms the anticipated positive relationship between investment and output. A sustained 1.0 percentage point increase in per capita output growth would over time lead to a 1.8 percent of GDP increase in the investment rate.
- Other key macroeconomic variables that affect the investment rate in Greece are real long-term interest rates, private credit growth and taxation. Our econometric results reveal a negative and statistically significant relation between the investment rate and real interest rate and changes in corporate taxation. In addition, there is a positive and statistically significant relation between the investment rate and changes in credit to firms.
- Our econometric model is used to perform projections for the investment rate in Greece in the years ahead. The baseline scenario is consistent with an increase of approximately 7.0 pp, from 12.1% of GDP in 2013 to 19.0% of GDP in 2020. If we take into account the latest forecasts of the Second Economic Adjustment Programme for GDP growth in Greece, then our baseline case is translated into a cumulative increase in the level of investment of roughly 90%, i.e. from €22.1bn in 2013 to €42.0bn (at current prices) in 2019.

**Figure 1: Investment-to-GDP ratio in Greece (%), 1960-2015**



Note: The values for the years 2014 and 2015 are AMECO projections.

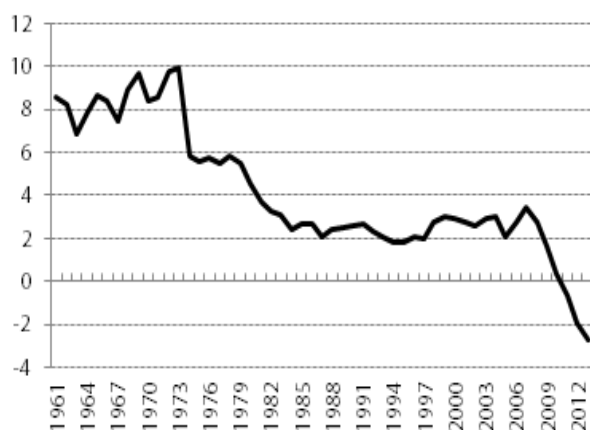
Source: AMECO – The annual macroeconomic database (European Commission, Economic and Financial Affairs).

**Acknowledgments:** I would like to thank Dr. Theodoros Stamatou, Stylianos Gogos and Ioannis Gkionis for useful comments and suggestions.

## 1. Introduction

The Greek fiscal crisis that burst in October 2009 due to the widening public deficits and sovereign spreads in combination with declining external competitiveness has led to a dramatic change in the structure of the Greek economy. Real gross fixed capital formation (investment) has reported its largest cumulative decline as a percent of GDP since 2007. Total investment-to-GDP ratio plunged from 26.6% in 2007 to merely 12.1% in 2013 (Figure 1)<sup>1</sup>, with real capital stock (dwellings, buildings, machinery etc.) of the Greek economy declining for the first time during 2011-2013 after 50 consecutive years of an upward trend (1960-2010). Indeed, according to the AMECO database of the European Commission, the net capital stock of the Greek economy at 2005 prices declined for the first time since 1960 by about 5.3%, cumulatively, during 2011-2013 (Figure 2). That said, a significant risk for the Greek economic recovery is not only the ineffective allocation of its productive resources, but also the weakening of its productive capacity due to the real capital stock decline.

**Figure 2: Net capital stock at 2010 prices**



Source:

1. AMECO – The annual macroeconomic database (European Commission, Economic and Financial Affairs).

Investment activity plays a crucial role in the economic growth of a country. Investment can increase a country's productive capacity, provided that investment expenditure regards durable goods that have comparatively long useful lives and embody the latest technological advances. In addition, changes in investment expenditure can potentially result in shifts in the level of employment and personal income by affecting the demand for capital goods. Although gross fixed capital formation usually represents a substantially smaller fraction of an economy's total expenditure compared to consumption expenditure (Table 1), it is a highly volatile component that causes strong fluctuations to a country's economic activity. According to Keynes (1964), investment is volatile because it is determined by the "animal spirits" of investors (optimism and

pessimism). Furthermore, investment creates new capital goods so it is a very important determinant of an economy's long-run productive capacity, in the sense that a higher investment rate suggests that capital stock is growing rapidly.

**Table 1: GDP components (as of 2013)**

	% of GDP
Household and NPISH final consumption expenditure	72.4%
Final consumption expenditure of general government	17.2%
Gross fixed capital formation	12.1%
Exports of goods and services	29.1%
Imports of goods and services	31.8%
<b>TOTAL</b>	<b>100%</b>

Source:

1. AMECO – The annual macroeconomic database (European Commission, Economic and Financial Affairs).

There are two types of investment, public and private investment, each with a different impact on a country's economic and social conditions. Should the marginal productivity of private investment is higher, then an increase in the size of the public sector at the expense of the private sector could deter an acceleration in economic activity (crowding-out effect), even if total investment as a share of GDP remains unchanged (Majeed and Khan, 2008). Private investment can take many forms, i.e. investment in Research and Development, training of a company's employees or investment in fixed capital stock. This last form of investment is the most important for both the individual firm and the short and long-term economic prospects of the country in which the firm operates (Antonakis, 1987).

The present study aims to examine and identify specific determinants of investment activity in Greece. The paper is organized as follows: The second section includes an overview of investment activity in Greece since 1960. It compares Greece's historical investment behaviour with the respective behaviour of other Euro area countries. The third section provides an analysis of the structure of investment spending in Greece since 1995. The fourth section analyses major determinants of gross fixed capital formation, describing the economic reasoning behind each variable. The fifth section involves a regression analysis so as to quantify the contribution of key macroeconomic variables to investment activity in Greece. Given our econometric model and specific assumptions for the explanatory variables, in the sixth section we perform forecasts for the investment-to-GDP ratio in Greece over the next seven years. Finally, the last section concludes the paper.

<sup>1</sup> According to the European System of Accounts 1995 (ESA 95).

## 2. Investment-to-GDP ratio: the historical background

Figure 1 depicts the five time phases of the evolution of gross fixed capital formation in Greece - as a percentage of Gross Domestic Product (GDP).

**The first time phase** includes the 60s and 70s, during which gross fixed capital investment has been on an increasing trend, following the increasing trend of demand. The accelerating investment as a percent of GDP increased from 19.0% at the early 60s to 31.4% at the late 70s and was accompanied by strong economic expansion, (with an annual average real output growth of 6.6% during 1961-1980). The only exception in the expansionary period of 1960-1980 were the two years after the first oil shock of 1973, during which investment-to-GDP ratio declined by a total of 7.0 pps. It should be noted that these years mark the end of the seven-year period military dictatorship (1967-1974) and the return to democratic rule, so the political turbulence was not in favor of attracting new investments. The rise in inflation in 1973 and 1974 was particularly pronounced, while real output declined by roughly 6.5%.

Other Euro area countries that experienced large increases in their investment-to-GDP ratio during 1960-1980 were Ireland (from 21.4% in 1970 to 27.8% in 1981) and Portugal (from 24.6% in 1970 to 32.9% in 1981). However, Greece reported the largest investment ratio increase, given the expansionary fiscal policy (massive public programs for infrastructure) implemented by the government of military dictatorship over the period 1967-1974 that contributed to a large increase in real economic activity.

**The second phase** begins at the early 80s and ends at mid-90s, a period during which real GDP growth rate slowed to an annual average of only 0.9% in the period of 1981-95, well below that of other European countries. The Greek government began running high fiscal deficits in the mid-70s, which became persistently higher in the early 80s, while public debt rose steadily from about 27.0% of GDP in 1979 to 111.6% in 1993. The significant domestic imbalances, in combination with successive oil price shocks and the abolition of the Bretton Woods fixed exchange rate system, contributed to a severe deterioration of the Greek external economic position, acting as an additional drag on growth. Inflation surged from an annual average of 8.9% during 1961-1980 to an average of 17.8% in 1981-1995,<sup>2</sup> well above the corresponding EU number. The sharp increase in wage inflation resulted in a profit margin squeeze that discouraged businesses from making new investments. Productivity growth in Greece suffered from relatively weak overall investment, with the average annual growth of final investment falling to -2.2% during 1980-94. OECD (1990/91) compares total factor productivity in Greece, Portugal and Spain during the 1980s. The average annual growth of total factor productivity in Greece is reported slightly

negative, while total factor productivity grew by an average rate of 1.3% in Spain and 0.7% in Portugal (Table 2).

Overall, the investment to GDP ratio declined during the 1980s and the first half of the 1990s by roughly 14 percentage points, from the peak of 31.4% in 1979 to 17.7% of GDP in 1995. As is evident in Figure 3, there were other euro area countries too that experienced double digit declines in the investment-to-GDP ratio in the corresponding period, i.e. Finland (from 32.2% in 1975 to 16.3% in 1994), Ireland (from 28.6% in 1979 to 15.1% in 1993) and Portugal (from 32.9% in 1982 to 22.5% in 1994).

**Table 2: Potential Output Growth (Business Sector)**  
Annual percentage change (1980-90)

	Greece	Spain	Portugal
Actual output	1.5	2.8	3.0
Potential output	1.4	3.0	3.2
Capital stock	1.9	3.5	2.9
Labor force	0.9	1.0	0.9
Total factor productivity	-0.1	1.3	0.7

Source:

1. OECD (1990/91).

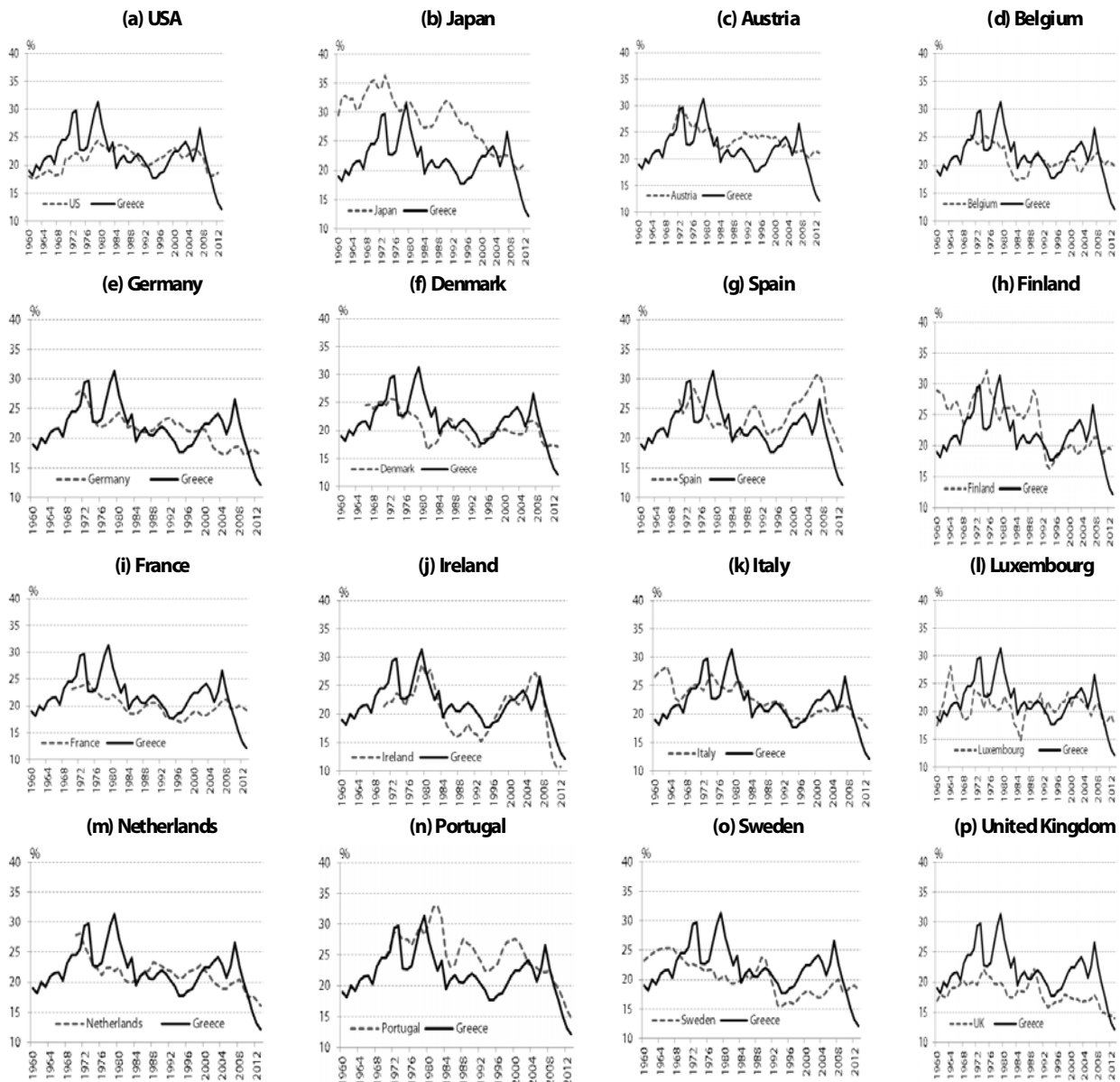
**The third phase** covers the period 1996 to 2007. From a record low of 17.7% of GDP in 1995, investment-to-GDP ratio increased gradually to 26.6% of GDP in 2007, with the annual average growth rate increasing to a level of 3.9% above the EU average. The accelerating economic performance reported in the second half of the 90s was due mainly to a substantial economic policy shift from 1993 onwards. Greece's main target, - especially after 1996 was to achieve the necessary economic convergence with the rest of the European Union countries in order to achieve the participation of the country in the European Common Currency (ECU that later was renamed Euro). Monetary (hard drachma policy) and fiscal policy was progressively tightened, resulted in a significant reduction in inflationary pressures and a downward trend for general government deficit and debt. The convergence of domestic nominal interest rates to the European Monetary Union (EMU) levels has undoubtedly helped investment by lowering cost of capital and improving businesses' cash-flow.

In addition, the liberalization and deregulation of the Greek Banking System that permitted credit institutions to provide loans to meet firms' borrowing requirements for investment,<sup>3</sup>

<sup>2</sup> GDP deflator

<sup>3</sup> The process of the Greek Banking System Liberalization started in the early 1980s in accordance with the similar EU process of the period and ended in 1994 with the implementation of the Council Directive 93/22/EEC (Kostis (1997)).

**Figure 3: Gross Fixed Capital Formation as a % of GDP (US, Japan and EU-15), 1960-2013**



**Note:**

1. For Denmark data start in 1966, while for Austria, Belgium, Germany, Spain, France, Ireland, Netherlands, Portugal data start in 1970.

**Source:**

1. The World Bank.



combined with the elimination of the devaluation risk after the adoption of the Euro in 2001 and the associated stress it exerts on the financial sector (Berg and Borensztein, 2000), led to the reduction of the uncertainty and to higher levels of investment in Greece. At the same time, structural and regulatory reforms that were put into practice to diminish structural rigidities and boost potential output growth had a substantial impact on productivity, improving investment prospects. Last but not least, the economic activity associated with the preparation of the Athens 2004 Olympics has also had a significant impact on investment expenditures in Greece during 2000-2004,

The **fourth time phase** includes the period of the current depression, which started in 2008 and – according to the most recent forecasts – ended in 2013. Gross fixed capital formation as a percent of GDP skyrocketed to 29.0% in the first quarter of 2007 and declined gradually to its most recent trough of 10.4% in the third quarter of 2013. Figure 3 shows that other euro area countries reported large declines in their investment ratios too, on the aftermath of the Global Financial Crisis of 2007-2008 and the Eurozone Sovereign Debt Crisis that began from Greece in late 2009. Global expectations of low demand, rising cost of capital and the uncertainty as to whether some euro area member states were capable of repaying their debts and rescuing their respective banking systems led to an unprecedented plunge in fixed capital investment in Europe. More than six years after the beginning of the financial crisis and the recession, investment-to-GDP ratios are well below their pre-crisis peaks, especially in the most crisis-hit euro area countries, i.e. Greece, Ireland, Portugal and Spain. In particular, Ireland has the most severe investment ratio decline (-16.5 pp), followed by Greece (-14.5pp) and Spain (-13.0pp).

However, Greece has a special role in the development of the European Sovereign Debt crisis. The lack of fiscal consolidation and the blurred picture of its fiscal statistics in late 2009 made the country the primary target of the global risk aversion that followed the 2007-2008 crisis in the US. The lack of the requisite fiscal consolidation measures and structural reforms over the past decade which was characterised by high growth rates, combined with the loss of competitiveness of the Greek economy since EMU entry (Malliaropoulos, 2010) due to high wage and price inflation and the inability of Greece to devalue its currency after joining the euro undermined Greece's credibility. Finally, all these led to the inability of accessing the international markets for servicing the country's debt and to the implementation of the 1<sup>st</sup> and the 2<sup>nd</sup> Economic Adjustment Programmes for Greece under the surveillance of the European Commission, the European Central Bank and the International Monetary Fund. The purpose of both programmes was twofold, to control the fiscal situation of the country and at the same time implement the necessary structural reforms (fiscal, business environment, public sector and institutional reforms) in order to improve the fiscal situation of the country.

Finally, the **fifth phase** starts at the final quarter of 2013 and thereafter, during which the investment ratio started its upward

trend. According to the European System of Accounts 1995 (ESA 95), investment-to-GDP ratio increased by roughly 2.0 percentage points in Q4 2013, from 10.4% in Q3 to 12.4% in Q4. Overall, investment is expected to rise in 2014 compared to 2013 and remain on an upward trend for the subsequent years, as capacity utilization gets back to longer-term levels and the economy grows on a sustainable growth path. In particular, structural reforms<sup>4</sup> aiming at restoring country's competitiveness and ensuring more sustainable growth prospects in contrast to the old consumption-led growth model that was fuelled by external borrowing will help Greece to create a more favourable climate for investment, both foreign and domestic. Indeed, according to the Second Economic Adjustment Programme for Greece (Fourth Review, April 2014), gross fixed capital formation (in current market prices) is expected to increase from 12.1% of GDP in 2013 to roughly 16.5% of GDP by 2018. However, the growth of investments in 2015 might be significantly and negatively affected by:

- The current political uncertainty over the upcoming elections (January 25<sup>th</sup> 2015),
- The expected inability of the current foreign opposition party, if it wins the elections, to achieve the necessary parliamentary majority in order to form a government,
- The conflicting signals of the opposition parties over the continuation of the reforms agenda implementation.

### 3. The structure of investment spending in Greece

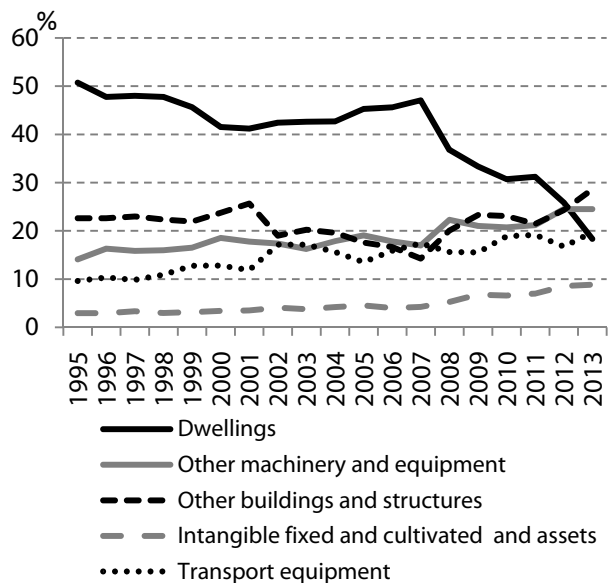
According to the European System of Accounts (ESA 95), gross fixed capital formation consists of six broad asset types: dwellings, other buildings and structures, transport equipment, other machinery and equipment, cultivated assets and intangible fixed assets.<sup>5</sup> Figures 4 and 5 depict the share of each broad asset type in gross fixed investment since 1995 for Greece and for the EU-15, respectively. Greece's investment structure historically has a large volatility, compared to that of the EU-15.

In Figure 4 half of the total gross fixed capital formation in the 1990s in Greece consists of investment in dwellings (50.7% in 1995), compared with a lower dwellings share of roughly 30% in the EU-15. Non-residential construction and civil engineering represented about 22.6% of total investment, followed by metal products and machinery (14.1%), transport equipment (9.6%) and, finally, a small share of intangible fixed and cultivated assets (2.9%). Dwellings share in total investment has been on a downward trend for the subsequent six years and reached 41.2% of total investments in 2001. The 9.5 pp decline was counterbalanced by a broad based increase in the other asset types.

<sup>4</sup> Appendix A provides a brief description of the achievements in the fiscal and structural reforms fronts over the course of the 1<sup>st</sup> and the 2<sup>nd</sup> Economic Adjustment Programme for Greece.

<sup>5</sup> Appendix B describes the changes between ESA95 and the new ESA2010 that became operational in October 2014..

**Figure 4: Structure of Investment in Greece  
(% of total investment), 1995-2013**



**Source:**

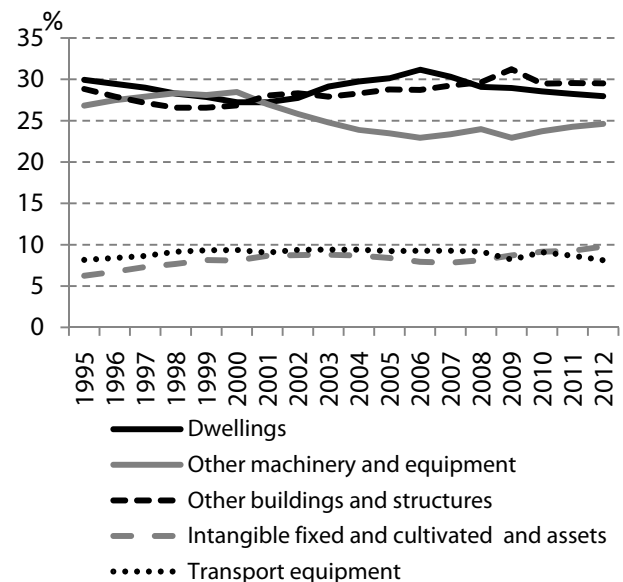
1. AMECO – The annual macroeconomic database (European Commission, Economic and Financial Affairs).

During the following six years, dwellings' share has been increasing and reached its most recent peak of 47.1% in 2007, reporting a 5.9pp increase that was more than double the corresponding increase in the EU-15 (+2.6pps). Transport equipment's share increased by about the same magnitude as dwellings, from 11.9% in 2001 to 17.4% in 2007 (+5.6pps). The asset investment type that experienced a large drop during this period (-11.4pps) was non-residential construction and civil engineering. Examples of this asset type are hotels, warehouses, as well as industrial, commercial, educational and health-related buildings. This category also includes infrastructure assets such as motorways, streets, bridges, harbors, dams and other waterworks, and long-distance pipelines (EIB, 2013).

The structural problems of the Greek economy, combined with the global financial crisis, the Greek fiscal crisis and the deep recession of the 2008-2013 period, have had the most significant negative impact on gross investment in residential construction (dwellings) in Greece. Investment in dwellings actually fell by an astonishing 85.5% cumulatively from 2007 to 2013, when the corresponding decline for the EU-15 was about one fourth of the above-mentioned decline (-21.7%). The construction sector was severely affected in other European countries too mostly after the deflationary pressure caused by the bursting of their real estate price bubbles in 2007-08 (with Ireland and Spain being the two most prominent examples). This large drop in Greek residential construction resulted in a large decline in the dwellings' investment share of 47.1% in 2007 to 18.3% in 2013, i.e. roughly a 29pp decline. The dwellings' investment share for the EU-15 declined by a mere 2.4pp. The 29pps decline in dwellings' share in Greece was partially offset by a 14.3pps increase in non-residential

construction and civil engineering share, a 7.5pps increase in metal products and machinery share, a 4.6pps increase in intangible fixed and cultivated assets share and a 2.3pps increase in transport equipment share.

**Figure 5: Structure of Investment in the EU-15  
(% of total investment), 1995-2012**



**Source:**

1. AMECO – The annual macroeconomic database (European Commission, Economic and Financial Affairs).

Although gross fixed capital formation has shrunk significantly by about €36.4bn in real terms during 2007-2013 (-64.4% cumulatively), the change in the structure of investment spending in Greece over the course of time could prove really challenging for the prospects of the Greek economy. Investment in metal products and machinery in Greece has gradually increased from 14.1% of total investment in 1995 to 24.5% in 2013. Business investment includes both gross investment in machinery, equipment and non-residential construction. Fixed assets in the category of machinery and equipment have shorter economic lives than non-residential buildings and civil engineering and, hence, the stock of such assets is renewed over shorter periods. Furthermore, the technological advances used in non-residential construction and production of machinery and equipment have different capital-to-labor ratios. Typically, the construction sector is much more labor-intensive and this sector's productivity growth is much slower than that in the production of machinery and equipment. Investment in new equipment and software is more technology and innovation intensive, so new capital investment -the purchase of machinery equipment and software by firms- can potentially increase productivity growth and, consequently, national economic competitiveness, boosting long-term economic growth (Stewart and Atkinson, 2013). Capital investment refers not only to the amount of equipment, software and structures in an economy (capital stock) that is considered to be a major driver of economic growth ("neoclassical" theory), but also to acquiring

newer and more productive equipment that could enhance total factor productivity. Hence, the increasing share in physical capital investment in Greece could serve as a major driver of economic growth through technological progress in the years ahead (Stamatiou et al, 2014).

#### 4. Major determinants of gross fixed capital formation

In this section, we provide a brief review of the numerous investment theories, focusing on key macroeconomic variables that have a significant effect on investment behaviour.

##### 4.1 Output growth

One of the most important determinants is the activity level of the economy. Stronger output growth constitutes a vital motivation to invest, reflecting sudden changes in demand or productivity growth, or imperfections in the financial markets [Blanchard and Fischer (1989), IMF (2005)]. Furthermore, the higher the production (GDP) and the gross national income (GNI) of a country are, the more optimistic its organizations' future expectations and confidence are, resulting in increased investment plans [Katona (1946), Shackle (1949, 1955)]. The simplest theory of investment demand is the so-called "Rigid Accelerator Theory", introduced by Clark (1917). Investment is simply proportional to changes in output, assuming that capital stock is always optimally adjusted. Overcoming the hypothesis of capital optimization, Chenery (1952) and Koyck (1954) formulated the "Flexible Accelerator Theory",<sup>6</sup> which has been tested and supported empirically by several studies [Meyer and Kuh (1957), Jorgenson (1963), Jorgenson and Stephenson (1967b)].

All in all, the literature has presented empirical evidence for the impact of output growth on investment decisions. For example, Griliches and Wallace (1965), Bischoff (1969), Jorgenson (1971) have proved that the output of the US economy is one of the main determinants of US investment. Moreover, IMF's World Economic Outlook (2005) suggests that a sustained 1pp per capita GDP growth increase in the industrial countries would over time lead to a 1.6% of GDP increase in the investment rate. According to the same paper, the effect is smaller in emerging markets and equals to 1.1% of GDP. As far as Greece is concerned, Michaelides et al (2005) -who examine the determinants of investment activity in Greece during 1960-1999- confirm IMF's results and find an elasticity of investment with respect to output of 1.6.

<sup>6</sup> Assuming that capital is adjusted towards its desired level by a certain proportion of the discrepancy between desired and actual capital in each period, the "Flexible Accelerator Theory" was transformed into a theory of investment behavior by adding a model of replacement investment and a specification of the desired level of capital.

##### 4.2 Cost of capital

Another determinant of gross fixed investment is the return rate of investment. The cost of capital should negatively affect the level of a firms' private investment that is financed by the local credit market. The literature usually approaches the cost of capital through a real interest rate. Empirical studies have reported a statistically significant negative effect of real interest rate on investment decisions, with investment being inelastic with respect to interest rate (Michaelides et al, 2005). Bischoff (1971a, 1971b), Evans (1967) and Griliches and Wallace (1965) provide evidence for a negative, statistical significant and inelastic relation between cost of capital and investment in the US, IMF (2005) for industrial countries while Mprissimis, Magginas et al. (2002) and Michaelides and Roboli (2005) for Greece. In particular, according to IMF's calculations, a per-cent increase in the cost of capital -measured as the product of the real interest rate and the relative price of capital<sup>7</sup>- would over time lead to a 0.4 per-cent of GDP reduction in the investment rate in the industrial countries. Pelgrin, Schich and de Serres (2002) find similar results for OECD countries.

##### 4.3 Bank credit

There is a large literature that suggests a positive relation between the extent of financial intermediation performed by banks and investment. As described in Loungani and Rush (1995), the basic idea is that some small and medium enterprises (SMEs) are unable to get financing directly by issuing securities on the open market. Consequently, these borrowers are strongly dependent on specific sources of credit such as bank lending, and their borrowing is highly sensitive to the terms on which is available. Shocks or disturbances to the supply of bank credit can deprive firms of investment financing, leading to a decline in the level of gross fixed capital formation. IMF (2005) supports the view that increased availability of credit is associated with higher investment, provided that firms depend partly on external finance. The regression results presented in the IMF's analysis suggest that the effect of an increase in credit on investment is statistically significant but rather modest for industrial and emerging economies during 1972-2004. Although Pelgrin, Schich and de Serres (2002) find a much stronger effect of private credit on business investment for a number of OECD countries during 1970-1995, they do conclude that the size and significance of the coefficient on private credit has diminished since 1995 relative to other measures of stock market developments, a factor consistent with the growing importance of capital markets and sources of financing other than bank loans.

##### 4.4 Taxation

The impact of taxation on investment behavior has long been debated in the academic community, as well as in political circles. Important studies -including Summers (1981), Auerbach

<sup>7</sup> The relative price of capital is investment deflator over GDP deflator.

and Hassett (1992), Cummins, Hassett and Hubbard (1996)-report significant negative effects of taxation on gross fixed capital formation. Studies that distinguish between types of taxes, corporate income taxes are found to be most harmful, followed by personal income taxes, consumption taxes and property taxes [McBride (2012), Arnold et al (2011)]. Taxes can lead to an increase in the cost of capital and reduce incentives to invest. In addition, taxes could provide preferential incentives to specific sectors, leading to distortions in capital allocation and reducing potentially the overall investment productivity. A variety of methods and data sources have been used to quantify the effects of taxation on investment. Djankov et al (2008) have found that raising the effective corporate tax rate by 10 percentage points reduces the investment rate by 2.2 percentage points using a sample of 85 countries. Other empirical studies that focus on the user cost of capital that is adjusted for taxation find an elasticity of investment with respect to the tax-adjusted user cost of capital of between -0.4 and -1.0 [Hassett and Hubbard (2002), Auerbach (2005)].

## 5. Econometric Model for Investment in Greece and Results

In this section, we investigate the relation between the total investment as % of GDP and the major determinants of investment we described in the previous section for the case of Greece. For the investigation of the statistical relation between investment-to-GDP ratio and output growth for Greece from 1960 up to now, we use an autoregressive OLS regression with dependent variable gross fixed capital formation as a percent of GDP, and independent variables the growth rate of real GDP per capita and the lagged investment-to-GDP ratio.<sup>8</sup> In particular, the OLS regression is the following:

$$I_t = c + b_0 Y_t + b_1 I_{t-1} + \varepsilon_t$$

where  $I_t$  refers to Investment-to-GDP ratio at time  $t$ ,  $c$  is the constant term,  $Y_t$  refers to real GDP per capita growth at time  $t$ ,  $I_{t-1}$  refers to Investment-to-GDP ratio at time  $t-1$  and  $\varepsilon$  is the disturbance term.

As is evident in Table 3, we find statistically significant relation between investment ratio and GDP growth rate for all countries of our sample (except for Luxembourg).<sup>9</sup> Obviously, the

investment is elastic with respect to output. Computing the long-term effect of real GDP growth on the investment-to-GDP ratio by dividing the estimated coefficients to one minus the coefficient of the lagged-dependent variable, we conclude that a sustained 1 percentage point increase in per capita output growth in Greece would over time lead to a 1.8 percent of GDP increase in the investment rate. A lower long-term sensitivity of investment to output growth compared to Greece was found for Austria, Belgium, Italy and Ireland, while the remaining countries of our sample reported a higher sensitivity than Greece.

At a second stage, given the availability of macroeconomic data for Greece, we try to find other key macroeconomic variables that affect gross fixed capital formation as a percent of GDP. In combination with real GDP growth, we use the following variables: real interest rate, credit to firms and tax rate. More specifically:

(a) Cost of capital is measured by long-term interest rate from the ECB Database minus HICP inflation<sup>10</sup>;

(b) Credit to firms is total credit to the private sector (including securitized loans and securities) by domestic Monetary Financial Institutions from the Bank of Greece database;

(c) As far as taxation is concerned, we use Corporate Income (Nominal) Tax Rates from the OECD Tax Database.

To quantify and test the contribution of these variables to changes in the investment-to-GDP ratio we employ the following OLS regression:

$$I_t = c + b_1 GDP_{t-2} + b_2 RIR_{t-1} + b_3 DC_{t-2} + b_4 DT_{t-2} + b_5 I_{t-1} + \varepsilon_t$$

where  $I$  refers to Investment as a per-cent of GDP (%),  $c$  is the constant term,  $GDP$  refers to real GDP growth in 2005 prices,  $RIR$  refers to real interest rate,  $DC$  refers to private credit annual growth,  $DT$  refers to annual changes in the corporate tax rate, and  $\varepsilon$  is the disturbance term. Our sample consists of quarterly data from 2001 to 2013.

<sup>8</sup> Past investment-to-GDP ratios captures the extent to which investment rates are persistent. This means that if investment is a highly persistent process, higher investment-to-GDP ratios at time  $t$  would be associated with higher investment-to-GDP ratios at time  $t+1$ .

<sup>9</sup> The insignificant relationship between GDP per capita growth and investment-to-GDP ratio in Luxembourg may be attributed to the high volatility in Luxembourg's output growth, given the financial sector's large share in output. Financial market developments are closely correlated with the volatility of overall GDP, and this may constitute a

reason why investment ratio is uncorrelated with output growth (See IMF, 2009).

<sup>10</sup> Real long-term interest rate is computed as follows:  $(ILN - INFL) : [(INFL : 100) + 1]$ , where  $ILN$  = Nominal long-term interest rate and  $INFL$  = HICP Price deflator.



Table 3: Investment rate and GDP growth, OLS Regression

$$I_t = c + b_0 Y_t + b_1 I_{t-1} + \varepsilon_t$$

$I_t$ : Investment-to-GDP ratio in year  $t$ ,  $Y_t$ : real GDP per capita growth rate in year  $t$ ,  $c$ : constant term,  $I_{t-1}$ : Investment-to-GDP ratio in year  $t-1$ ,  $\varepsilon_t$ : disturbance term

*Dependent Variable*: Investment-to-GDP ratio (in p.p)

*Independent Variables*: Real GDP per capita growth rate (in p.p), Investment-to-GDP ratio one year earlier (in p.p)

*Method*: OLS (with heteroskedasticity and autocorrelation consistent covariance or Newey – West estimator)

*Sample*: 1961-2013 (53 observations), unless otherwise stated

Countries	<b>c</b>	<b>b<sub>0</sub></b>	<b>b<sub>1</sub></b>	Adjusted R-Squared
USA	-0.24 (1.2412)	0.25*** (0.0477)	0.96*** (0.0562)	0.90
Japan	1.20 (0.7635)	0.21*** (0.0354)	0.93*** (0.0300)	0.96
Austria	3.08*** (1.1004)	0.26*** (0.0758)	0.84*** (0.0476)	0.86
Belgium	2.79** (1.2257)	0.24*** (0.0758)	0.84*** (0.0606)	0.85
Germany	1.37 (0.9888)	0.25*** (0.0339)	0.90*** (0.0490)	0.95
Denmark	1.10 (0.7222)	0.40*** (0.0460)	0.91*** (0.0329)	0.92
<b>Greece</b>	<b>2.67*</b> <b>(1.3652)</b>	<b>0.29***</b> <b>(0.0731)</b>	<b>0.84***</b> <b>(0.0678)</b>	<b>0.79</b>
Spain	-0.27 (1.4220)	0.47*** (0.0777)	0.97*** (0.0635)	0.91
Finland	0.64 (0.9257)	0.28*** (0.0723)	0.94*** (0.0357)	0.92
France	1.99** (0.7675)	0.24*** (0.0339)	0.88*** (0.0361)	0.93
Ireland	-1.77* (0.9212)	0.34*** (0.0814)	1.02*** (0.0421)	0.89
Italy	2.44* (1.0150)	0.23*** (0.0396)	0.86*** (0.0494)	0.93
Luxembourg	8.12*** (2.2654)	0.07 (0.0753)	0.60*** (0.1014)	0.34
Netherlands	3.13*** (1.0399)	0.24*** (0.0552)	0.82*** (0.0470)	0.89
Portugal	0.23 (1.7639)	0.24*** (0.0984)	0.96*** (0.0780)	0.87
Sweden	0.63 (0.6797)	0.23*** (0.0722)	0.94*** (0.0289)	0.92
UK	0.28 (0.7206)	0.24*** (0.0489)	0.96*** (0.0439)	0.87

**Notes:**

- The numbers inside the brackets are standard errors.
- The asterisks \*\*\*, \*\* and \*, refer to 1%, 5% and 10%, significance levels respectively.
- The sample for Austria, Belgium, Spain, France, Portugal, Ireland, Netherlands and Germany is from 1971 to 2013 and for Denmark from 1967 to 2013.

**Sources:**

- AMECO – The annual macroeconomic database (European Commission, Economic and Financial Affairs), The World Bank

The results of our analysis, which are reported in Table 4, are the following:

1. The relationship between real GDP growth and investment-to-GDP ratio is positive and highly significant, with a coefficient of 0.2326. A unit increase (decline) in real GDP growth two quarters earlier (time t-2) is associated with an increase (decline) in the investment rate by 0.2326 p.p at time t.
2. We find a negative and statistically significant relationship between real interest rate and the investment-to-GDP ratio. The respective coefficient is -0.1228. This means that a unit increase (decline) in real interest rate at time t-1 is associated with a decrease (increase) in the investment rate by 0.1228 p.p at time t.
3. In terms of percent changes in total credit to firms, the relationship between credit growth at t-2 and investment rate at t is positive and statistically significant. The respective coefficient is equal to 0.0851, suggesting that a unit increase (decline) in total private credit growth two quarters earlier is associated with a 0.0851 increase (decline) in the investment as a % of GDP.
4. In what concerns taxation, our specification suggests a negative and statistically significant relationship between the annual change in the corporate tax rate and the investment rate. That said, a unit increase (decline) in the annual change in the corporate tax rate two quarters earlier is associated with a 0.3073 decline (increase) in the investment as a % of GDP in the current quarter.
5. Higher investment-to-GDP ratios at time t-1 are associated with higher investment-to-GDP ratios at time t. In particular, a unit increase (decline) in the investment as a percent of GDP one quarter earlier is associated with a 0.2772 increase (decline) in the investment-to-GDP ratio in the current quarter.

The explanatory power of our econometric model is strong. The independent variables explain a big fraction of the variance of the dependent variable, given that the  $R^2$  is 86% and the adjusted  $R^2$  is equal to 85%.

**Table 4: Basic Regression**Dependent Variable:

$I_t$ : Investment as a percent of GDP (%).

Independent Variables:

$GDP_{t-2}$ ,  $RIR_{t-1}$ ,  $DC_{t-2}$ ,  $DT_{t-2}$ ,  $I_{t-1}$ .

Method:

OLS (with heteroskedasticity and autocorrelation consistent covariance or Newey – West estimator).

Sample:

2001Q3 - 2014Q2 (52 observations)

	<b>C</b>
Constant	13.4304 (1.9326)
	$\beta_1$
Real GDP Growth (-2)	0.2326*** (0.0671)
	$\beta_2$
% Real Interest Rate (-1)	-0.1228*** (0.0391)
	$\beta_3$
% Annual Change in Credit to Firms (-2)	0.0851* (0.0447)
	$\beta_4$
Annual Change in the Corporate Tax Rate (-2)	-0.3073*** (0.0754)
	$\beta_5$
Investment-to-GDP Ratio (-1)	-0.2772** (0.1043)
R-Squared	0.8625
Adjusted R-Squared	0.8476
Durbin - Watson	2.1362

Notes:

1. The numbers inside the brackets are standard errors.
2. The asterisks \*\*\*, \*\* and \*, refer to 1%, 5% and 10%, significance levels respectively.

Sources:

1. European Commission, World Bank, OECD and Bank of Greece, Eurobank Research.

## 6. Hypothesis for Explanatory Variables and Projections for Investment in Greece

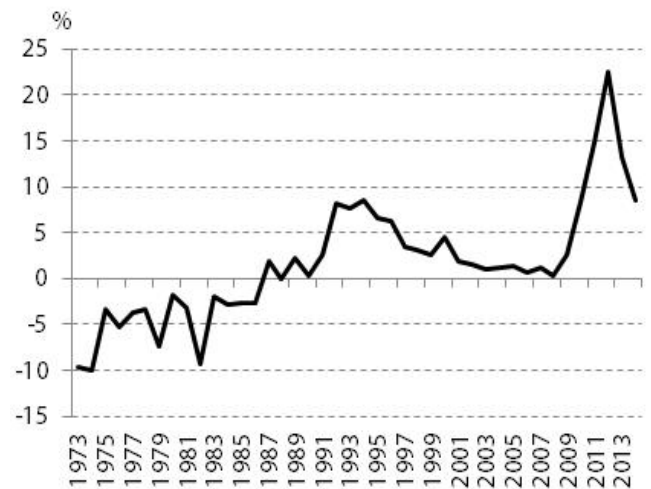
The estimates of Table 4 can be used to construct long-term projections for the investment as a percent of GDP in Greece over the next seven years. Figure 9 depicts our predictions for investment in Greece, given specific assumptions for the explanatory variables under our baseline expectations, as well as under a more optimistic and a rather adverse scenario.

Greece has finally returned to positive economic growth in 2014, after six years of negative output growth. According to the Fifth review of the Second Economic Adjustment Programme for Greece (June 2014), the structural reforms undertaken over the last four years in labor and product markets constitute a concrete basis for a positive annual *GDP growth* of 2.9% in 2015, followed by a pickup to 3.7% in 2016, and 3.5% in 2017, 3.3% in 2018 and 3.6% in 2019. Our baseline scenario for the path of the unemployment rate during 2015-2020 is close to the above-mentioned GDP growth forecasts of the Second Economic Adjustment Programme, with an average growth rate of about 3.3% during 2015-2020. On our adverse scenario, real economic activity is on average 1.5 percentage points lower than our baseline scenario. On the other hand, our optimistic scenario includes a stronger recovery to 4.0% on average for the following six years.

As far as the *cost of capital* is concerned, real long-term interest rate has increased considerably during the crisis and the subsequent depression, surging to an average of roughly 23% in 2012 (Figure 6). Financial conditions have improved from mid-2013 until September 2014 and real interest rates have fallen significantly, with the Greek government bond yield moving back to levels reported at the beginning of 2010. Indeed, the Greek government managed to return to the international bond markets in April 2014, issuing a 5-year bond after four years of its exclusion from international capital markets. Nevertheless, political uncertainty has weighed on investor sentiment since mid-October and has resulted in a sharp increase of nominal long-term interest rates. This fact, combined with the deflationary pressures which have recently strengthened, have led to a significant increase in real interest rates in the last quarter of 2014.

Under our baseline assumptions, real interest rate – as measured by the difference between nominal long-term interest rate and percentage change of GDP price deflator – falls gradually from an average of 13.3% in 2013 to about 4.0% by 2020. Should financial market conditions prove to be more favourable for Greece in the foreseeable future, then real long-term interest rate could decline below 2.0% at the end of 2020 (optimistic scenario). In the opposite direction, if financial conditions do not improve so fast as currently expected (adverse scenario), then real long-term interest rates could stay above the high levels of 8.0% by the end of 2020.

**Figure 6: Real Long-Term Interest Rates**



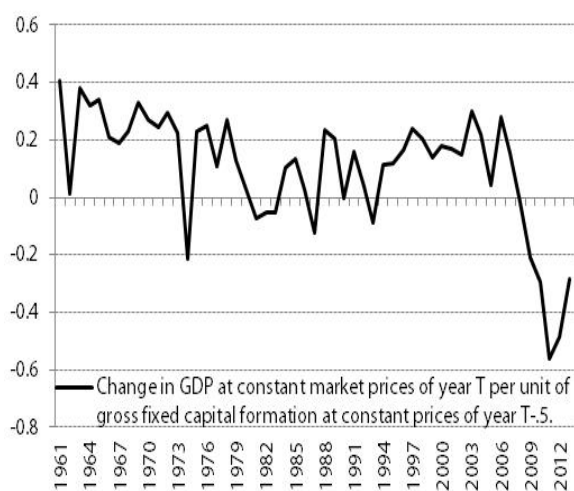
Source:

1. AMECO – The annual macroeconomic database (European Commission, Economic and Financial Affairs).

Although the ECB<sup>11</sup> together with the EU have taken measures to stop the financial crisis and provide liquidity to the Euro zone countries and especially to the Euro zone periphery countries, *credit growth* to the Greek economy remains remarkably weak. The deleveraging of the Greek banking sector has been taking place and Greek banks have been improving their liquidity ratios, but the continuing decline in the loans to the private sector remains one of the main challenges for the Greek economic prospects. Meanwhile, returns on investment have declined significantly in recent years, removing firms' incentives to ask for loans in order to invest. Looking at Figure 7, we find that the marginal efficiency of capital has plunged since 2008 in Greece, given that the cost of capital has increased while the marginal productivity of capital has declined. The pace of contraction of private sector credit growth has weakened from -6.5% in 2012 to -5.6% in 2013 and to about -4.3% in 2014 so far, but still remains at negative territory (Figure 8). Evidence from past financial and economic crises suggests that credit growth is likely to take several years to recover, while it is expected to lag

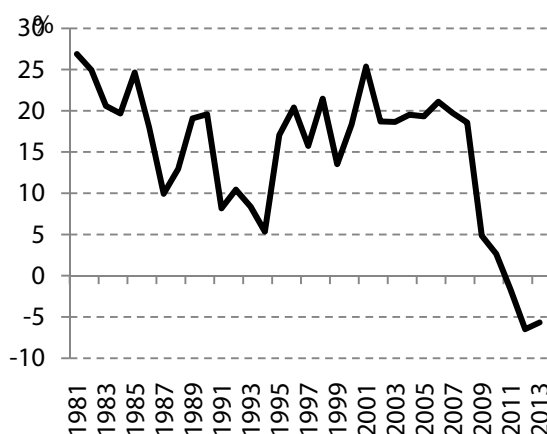
<sup>11</sup> The Governing Council of the ECB has recently announced measures to enhance the functioning of the monetary policy transmission mechanism by supporting lending to the real economy. In particular, the Governing Council has decided: (a) To conduct a series of targeted longer-term refinancing operations (TLTROs) aimed at improving bank lending to the euro area non-financial private sector (i.e. euro area households and non-financial corporations), excluding loans to households for house purchase, over a window of two years, (b) To intensify preparatory work related to outright purchases of asset-backed securities (ABS). Meanwhile, the ECB is expected to extend its QE measures and move forward to purchases of sovereign debt securities in 2015.

the recovery in economic activity by at least two years (IMF, 2005). That said, we expect private sector credit growth to turn positive in 2016, and accelerate gradually to about 2.0% in 2020. Should Greece's banks prove better positioned to support the economic recovery and remove doubts about the efficiency of bank capital, then credit to firms could accelerate faster to 4.0% towards 2020 (optimistic scenario).<sup>12</sup> On the contrary, in the case of a more "creditless recovery" credit to firms could continue to shrink throughout 2014-2020 (adverse scenario).

**Figure 7: Marginal Productivity of Capital**


Source:

1. AMECO – The annual macroeconomic database (European Commission, Economic and Financial Affairs).

**Figure 8: Private Credit Growth**


Source:

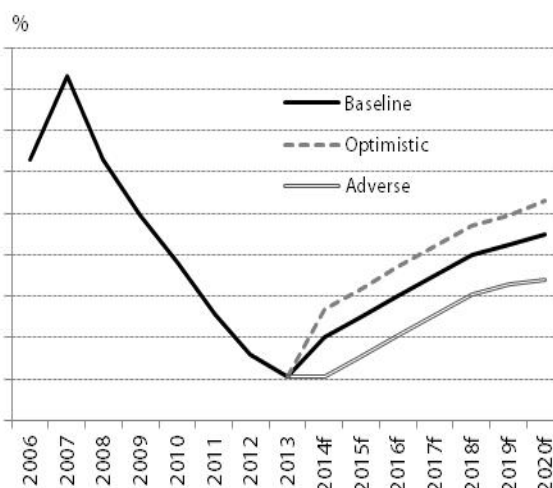
1. Bank of Greece

Apart from shrinking credit, rising *tax burdens* have vigorously strained private sector balance sheets during the last six years of deep recession. That said, the Greek government plans for future reductions in current tax rates conditional on the fiscal

<sup>12</sup> According to the fifth review of the Second Economic Adjustment Programme for Greece (June 2014), private credit growth is expected to turn positive in 2016, reporting a 3.6% annual change growth.

neutrality of these reforms. We assume a gradual reduction of the corporate income tax rate from the current level of 26%<sup>13</sup> to 22% in 2020, exerting a positive effect on capital investment and giving an incentive to increase productivity. Under the optimistic scenario the corporate tax rate is reduced even further to 15% towards 2020, while in the adverse scenario the tax rate stays stable at 26% throughout the forecasting horizon.

As Figure 9 depicts, our baseline assumptions are consistent with an average annual increase in the investment-to-GDP ratio of approximately 1.0 p.p. for the following years towards 2020, reaching a total increase of roughly 7.0 p.p. over the next seven years (from 12.1% in 2013 to 19.0% in 2020). If we take into account the latest forecasts of the International Monetary Fund (IMF, WEO Database, October 2014) and the Second Economic Adjustment Programme (April 2014) for nominal GDP growth in Greece,<sup>14</sup> then our baseline scenario suggests a cumulative increase in the level of investment of about 90.0% over the forecasting period, i.e. from €22.1bn (in current prices) in 2013 to roughly €42.0bn in 2019. Our analysis suggests that a faster than currently expected economic recovery could result in a cumulative increase in investment as a per-cent of GDP of roughly 8.5 p.p. during 2014-2020. Nevertheless, a more adverse scenario includes an increase in the investment rate from 12.1% in 2013 to 16.8% in 2020.

**Figure 9: Estimations – Investment as a % of GDP (2014-2020)**


Source:

1. European Commission, World Bank, OECD and Bank of Greece, Eurobank Research.

<sup>13</sup> As of 2013, the standard rate of corporate tax in Greece is 26%. For Greek partnerships the tax rate is 26%, too. Companies not using the double entry bookkeeping system pay 26% for income up to EUR 50,000, and 33% for the exceeding income. See [http://www.worldwide-tax.com/greece/greece\\_tax.asp](http://www.worldwide-tax.com/greece/greece_tax.asp)

<sup>14</sup> These forecasts include a nominal GDP growth rate of -0.1% in 2014, 3.3% in 2015, 4.9% in 2016, 4.8% in 2017 and 2018, and 5.4% in 2019.



## 7. Conclusions

Investment activity, a prerequisite for economic growth, has been severely damaged by the chronic competitiveness deficit and the twin deficits (external and budget) that led to the deep economic recession in Greece. Investment as a percent of GDP has plunged since 2007 in other European countries as well due to the European sovereign debt crisis, but Greece reported one of the highest investment rate declines because of its own structural problems. The aim of this report is to provide a quantitative assessment of investment activity in Greece, identifying major factors behind investment decisions that can boost investment expenditures in the years ahead.

After describing the evolution of investment from a historical perspective and analyzing the structure of gross fixed capital formation, we describe major determinants of investment from a theoretical point of view. At a first stage, we find a positive and statistically significant relationship between investment ratio and GDP growth rate. In particular, a sustained 1 percentage point increase in per capita output growth in Greece would over time lead to a 1.8 percent of GDP increase in the investment rate.

In addition, we find other key macroeconomic variables that affect the investment-to-GDP ratio for the case of Greece. Using quarterly data from 2001 to 2013, we employ a simple linear econometric model that relates the investment rate with real GDP growth, real interest rate, private credit growth and corporate tax rate. Our results suggest a positive and statistically significant relation between the investment rate and real GDP growth (0.32) and changes in credit to firms (0.15). On the other hand, there is a negative and statistically significant relation between the investment rate and real interest rate (-0.12) and changes in the corporate tax rate (-0.36).

Given the estimated coefficients and by making some hypotheses on the path of our explanatory variables, we produce projections for investment as a percent of GDP over the period 2014-2020 under three alternative scenarios, i.e. an adverse, a baseline and a conservative. According to our baseline scenario, we estimate that investment as a percent of GDP will increase by approximately 6.7 percentage points over the next seven years -from 12.1% in 2013 to 18.8% in 2020- given an average real GDP growth of 3.3% during 2015-2020, a long-term real interest rate of 4.0% by the end of 2020, credit to firms' growth of 2.0%, and a gradual decline in the corporate tax rate towards 22% in 2020. Given the above mentioned assumptions for the explanatory variables and GDP growth forecasts for Greece from the EC and the IMF, the level of investment could increase to about €41.8bn in 2019 from €22.1bn in 2013, reporting an 89% increase in the following six years.

Subsequently, we estimate the investment-to-GDP ratio under a more optimistic and an adverse scenario. A faster than expected economic recovery that includes an average real GDP growth of

4.0%, a real interest rate of 1.0% by the final quarter of 2020, credit to firms' growth of 4.0% towards 2020, and a sharper decline in the corporate tax rate towards 15% in 2020 could result in a stronger increase in the investment rate to almost 20.2% at the end of 2020. In the adverse scenario, where average real interest rate stays at high levels above 7.0%, private credit growth stays into negative territory and the corporate tax rate remains stable at 26.0%, investment increases to 17.0% as a percent of GDP in the next seven years.

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## Appendix A: Investment Policy Review

Greece has made progress in reducing national fiscal imbalances over the last four years, and has adopted a series of significant market-oriented economic reforms. By the end of 2013, Greece has managed to reduce its general government budget deficit from -15.2% of GDP in 2009 to -2.5% of GDP in 2014, and concurrently generate a small primary budget surplus of 0.8% of GDP in 2013 and 2.0% of GDP in 2014<sup>15</sup>. In line with the requirements of the EU/IMF bailout program introduced in March 2010, the Greek government has sought to open up the closed professions, liberalize the labor market, reform the pension system as well as the tax code, proceed to state-owned assets' and enterprises' sales to increase revenues, and streamline investment procedures. The establishment of Enterprise Greece (Invest & Trade)<sup>16</sup> in 2014 -an investment promotion agency that is the merger of the previous Invest in Greece S.A. with the Hellenic Foreign Trade Board- is an effort to promote Greece's investment opportunities by acting as an information source for interested foreign investors. Furthermore, the government has agreed with the EU and the IMF to adopt key recommendations proposed by the OECD in November 2013 in order to improve Greece's economic competitiveness. As reported in the Fifth Review of the Economic Adjustment Programme of Greece, the Greek government has addressed 43 – the most important ones – of the 329 regulatory distortions that hamper competition in four major sectors (tourism, retail, building materials, and food processing), and is committed to address all of the remaining ones.

### Foreign Direct Investment

- The primary investment incentive law currently in force is the "Creation of a Business-Friendly Environment for Strategic and Private Investments" (Law 4146/2013).<sup>17</sup> The purpose of this law is to provide an efficient institutional framework and increase transparency for private investments, accelerating the approval processes for pending and approved investment projects. The law also reduces the value of strategic investments and provides incentives to interested investors through tax exemptions, allowing non-EU countries citizens with property in Greece worth more than €250,000 (\$345,000) to acquire 5-year renewable residence permits for themselves and their family members.

In recent years, there were other laws as well aimed at reducing institutional hurdles and attracting new investment projects:

- Law 3919/2011 implemented to liberalize closed professions continued well into 2013.
- Law 3982/2011 simplified the licensing process in the manufacturing sector and technical professions, and lowered barriers to entry through the modernization of some qualification and certification requirements.
- Law 4014/2011 reduced the complexity of the licensing system for environmental issues.
- Law 3894/2010 (the so-called "fast track") allows Enterprise Greece to speed up licensing procedures for investing in specific sectors (tourism, energy, industry, telecommunications, healthcare, transportation, technology/innovation, waste management). Under this law, investment projects must meet one of the following conditions: (a) exceed €100 million; or (b) exceed €15 million in the industrial sector; or (c) exceed €40 million and create at least 120 new jobs; or (d) create 150 new jobs.

### Foreign Controls Limits

The Greek government has opened the telecommunications market to foreign investment, while the gas market is being liberalized.<sup>18</sup> In addition, the electricity market is partially deregulated, and more action is expected towards this direction. Plans for the restructuring of the electricity market in order to sell the state-owned Public Power Corporation (PPC) to investors have been announced in May 2013, and the privatization is ongoing. Moreover, the electricity transmission company ADMIE, which has already been split off from PPC, will be privatized, facilitating investment to connect the islands to the mainland system and reduce costs.<sup>19</sup>

### Privatizations

A key pillar of the adjustment programme of Greece is privatizations, given that they contribute to the reduction of public debt and increase the efficiency of companies and, consequently, the competitiveness of the economy as a whole. The Hellenic Republic Asset Development Fund, an independent non-governmental privatization fund established in 2011, is responsible for the sale of the government's valuable assets (companies, concessions, buildings and land), and push

<sup>15</sup> The 2014 estimates are included in the first draft of the government budget presented in the Greek parliament in October 2014.

<sup>16</sup> <http://www.investingreece.gov.gr/default.asp?pid=2&la=1>

<sup>17</sup> Law 4146/2013 is gradually replacing Law 3908/2011.

<sup>18</sup> According to the Fifth Review of the Economic Adjustment programme of Greece, gas consumption in Greece is among the lowest in the EU in per capita or per GDP terms, indicating scope for increased consumption to reduce costs and provide cleaner energy. The three local gas distribution monopolies will be opened to competition, and the gas transmission company has been sold (the deal is awaiting regulatory approval).

<sup>19</sup> PPC will be split into two generation and retail companies. The "small PPC" (which will take about 30% of PPC assets) will be privatized, which should stimulate private investment and competition. The government will also sell 17% share in the legacy PPC, which will reduce its holdings to 34%.



the privatization process forward. In particular, the detailed inventory of targeted assets refers to 50% land parcels, 35% infrastructure (including energy infrastructure) and 15% public companies (gas, electricity and water). However, performance on privatization continues to fail meeting initial targets, with the Greek authorities repeatedly revising its privatization objectives downward. Indeed, receipts for 2013 were just over €1 billion, short of the €1.6 billion indicative target (the target had been lowered in the fourth review).

#### Greece's reported progress on the structural front

The **World Bank's "Doing Business 2015"**, an annual report that compares business regulations for domestic firms in 189 economies, confirms that Greece has maintained a steady pace of regulatory reform. In particular, Greece has the 61<sup>th</sup> place out of 189 economies, advancing by 4 positions compared to 2014. Overall Greece managed to improve its position by almost 40 notches since 2010 an un-preceded achievement for a country with such a fiscal and competitiveness stretch. Going back on the 2015 results and from Table 4, notice that Greece made starting a business easier as it advanced by 5 positions in the "starting a business" index, by lowering the cost of registration. It also made transferring property easier, advancing by 54 positions in "registering property" index through the reduction in the property transfer tax from 10% of the property value to 3%, and the elimination of the requirement for a municipal tax clearance certificate.

Meanwhile, Greece was also ranked first in the **"Adjustment Progress Indicator"** by the **Lisbon Council & Berenberg Bank** for 2013 and 2014. The Adjustment Progress Indicator tracks the progress countries are making on four key measures of adjustment: 1) a reduction (or increase) in the fiscal deficit, adjusted for interest payments and cyclical factors, 2) the rise (or fall) in exports relative to imports in the external accounts, 3) changes in unit labour costs, and 4) the pace of pro-growth structural reforms.

It should be noted that Greece also improved by 5 positions in the **"OECD Indicator of Product Market Regulation"** between 2008-2013, with the OECD ranking Greece as the country with the greatest responsiveness to OECD recommendations.

**Table 4: Ease of Doing Business in Greece, 2015**

	2015	2014	Change
<i>Rank out of 189 economies</i>			
<u>Doing Business</u> (Composite Index)	61	65	+4
<i>Distance to Frontier (% points)</i>			
OECD average (2015)	66.70%	64.99%	+1.71
Rank: 25, Distance to Frontier: 76.47%			
<u>Starting a Business</u>	52	57	+5
OECD average: 45, 91.24%	90.71%	89.22%	+1.49
<u>Dealing with Construction Permits</u>	88	90	+2
OECD average: 67, 76.03%	72.31%	72.36%	-0.05
<u>Getting Electricity</u>	80	73	-7
OECD average: 56, 81.83%	76.67%	76.68%	-0.01%
<u>Registering Property</u>	116	170	+54
OECD average: 56, 76.93%	61.16%	43.14%	+18.02
<u>Getting Credit</u>	71	67	-4
OECD average: 50, 61.77%	50%	50%	0
<u>Protecting Minority Investors</u>	62	61	-1
OECD average: 41, 63.06%	57.50%	57.50%	0
<u>Paying Taxes</u>	59	41	-18
OECD average: 53, 81.03%	78.30%	81.29%	-2.99
<u>Trading Across Borders</u>	48	50	+2
OECD average: 26, 86.12%	80.80%	80.30%	+0.50
<u>Enforcing Contracts</u>	155	155	0
OECD average: 40, 69.82%	43,60%	43,65%	-0,05
<u>Resolving Insolvency</u>	52	51	-1
OECD average: 22, 76.88%	55.98%	55.78%	+0.20

Source:

1. World Bank

## Appendix B: Changes between ESA 95 and ESA 2010

European national accounts are produced by Member States in a comparable and reliable way, according to the current European System of Accounts (ESA). This is particularly important for measures of the economy which have a key role to play in the economic and fiscal policy of the European Union. An example is the measurement of Gross National Income, which sets a ceiling on the overall budget of the EU, and determines to a large extent the budget contributions of each Member State. Also key is the measurement of GDP and its components, given its role in providing a measure of domestic economic activity against which the financial health of the Member State's economy can be judged through ratios such as government deficit as a percentage of GDP, and government debt as a percentage of GDP.

The starting point for the changes introduced to update ESA 95 to ESA 2010 was a list of 44 issues and 29 clarifications<sup>20</sup> which provided the basis for changes to the SNA 1993 to produce the new SNA 2008.

As GDP and GNI levels are particularly important aggregate economic measures for Member States and the pursuit of economic policy in the European Union, two summary tables (5a&5b) are given showing which of the changes affect GNI and GDP, together with the output, expenditure and income components of GDP.

### List of conceptual issues – Changes which impact GNI

1. Research and Development recognized as capital formation
  - 1a. R&D created by a market producer
  - 1b. R&D created by a non-market producer
2. Valuation of output for own final use for market producers
3. Non-life insurance – Output, claims due to catastrophes, and reinsurance
4. Weapon systems in government recognized as capital assets
5. Decommissioning costs for large capital assets
6. Government, public and private sector classification
7. Small tools
8. VAT-based third EU own resource
9. Index-linked debt instruments
10. Central Bank – allocation output
11. Land improvements recognized as a separate asset

### List of conceptual issues not affecting GNI

12. Employee stock options
13. Super dividends
14. Special Purpose Entities abroad and government borrowing
15. Head offices and holding companies
16. Sub-sectors of the financial corporations sector
17. Guarantees
18. Special Drawing Rights (SDRs) of the IMF as assets and liabilities
19. Payable tax credits
20. Goods sent abroad for processing
21. Merchanting
22. Employers' pension schemes
23. Fees payable on securities lending and gold loans
24. Construction activities abroad
25. FISIM between resident and non-resident financial institutions

For more details concerning the description of the changes between ESA95 and ESA2010, the consequences of the change in terms of estimates as well as numerical examples, you can see the Manual on the changes between ESA95 and ESA2010 (2014 edition) published by the European Commission (See footnote 20).

<sup>20</sup> <http://ec.europa.eu/eurostat/documents/3859598/5936825/KS-GQ-14-002-EN.PDF/b247b032-6910-4db8-8f29-cb71d575752f>

**Table 5a: Impact of changes ESA95 to ESA2010 on GNI Questionnaire (ESA 2010 codes)**

<b>Production approach</b>		1a	1b	2	3	4	5	6	7	8	9	10	11
P.1	Output of goods and services	+	0/+	+	X	-/+	X	X					0/+
P.2	Intermediate consumption				X	-/0			X			-	
B.1g	Gross value added	+	0/+	+	X	0/+	X	X	X			+	0/+
D.21	Taxes on products												
D.31	Subsidies on products												
<b>Expenditure approach</b>													
P.3 (S15)	Household final consumption expenditure			+	X							+	
P.3 (S14)	NPISH final consumption expenditure		-/+		X		X					+	-/+
P.3 (S13)	General government final consumption expenditure		-/+		X	-/+	X	X				+	-/+
P.5	Gross capital formation	+	+/0	+		+/0			X				+/0
P.51g	Gross fixed capital formation	+	+/0	+		+/0			X				+/0
P.52	Changes in inventories												
P.53	Acquisition less disposals of valuables												
P.61	Exports of goods												
P.62	Exports of services				X							+	
P.71	Imports of goods												
P.72	Imports of services				X								
<b>Income approach</b>													
D.1	Compensation of employees												
B.2g/B.3g	Gross operating surplus/mixed income	+	0/+	+	X	0/+	X	X	X			+	0/+
D.2	Taxes on production and imports												
D.3	Subsidies												
B.1g	Gross Domestic Product (GDP)	+	0/+	+	X	0/+	X	X	X			+	0/+
D.1	Compensation of employees received from RoW												
D.1	Compensation of employees paid to RoW												
D.2	Taxes on production and imports paid to institutions of the EU									-			
D.3	Subsidies received from the institutions of the EU												
D.4	Property income received from RoW										X		
D.4	Property income paid to RoW										X		
B.5g	Gross National Income (GNI)	+	0/+	+	X	0/+	X	X	X	+	X	+	0/+

**Notes:**

- (+) positive impact, (-) negative impact, (X) impact can go either way, (0) no impact
- Columns 1b and 4: the first sign shows the impact in year of acquisition; the second sign shows the impact in subsequent years
- Columns 1a and 1b: the signs correspond to the case where R&D is produced on own account.

**Source:**

- European Commission

Table 5b: Impact of changes ESA95 to ESA2010 on GNI Questionnaire (ESA 2010 codes)

		12	13	14	15	16	17	18	19	20	21	22	23	24	25	
<b>Production approach</b>																
P.1	Output of goods and services													X	-	
P.2	Intermediate consumption													X	-	
B.1g	Gross value added													X	X	
D.21	Taxes on products															
D.31	Subsidies on products															
<b>Expenditure approach</b>																
P.3 (S15)	Household final consumption expenditure															
P.3 (S14)	NPISH final consumption expenditure															
P.3 (S13)	General government final consumption expenditure															
P.5	Gross capital formation															
P.51g	Gross fixed capital formation															
P.52	Changes in inventories															
P.53	Acquisition less disposals of valuables															
P.61	Exports of goods									-	+					
P.62	Exports of services									+	-			X	-	
P.71	Imports of goods									-						
P.72	Imports of services									+				X	-	
<b>Income approach</b>																
D.1	Compensation of employees													X		
B.2g/B.3g	Gross operating surplus/mixed income													X		
D.2	Taxes on production and imports								X							
D.3	Subsidies								X							
B.1g	Gross Domestic Product (GDP)								0					X	X	
D.1	Compensation of employees received from RoW													X		
D.1	Compensation of employees paid to RoW													X		
D.2	Taxes on production and imports paid to institutions of the EU															
D.3	Subsidies received from the institutions of the EU															
D.4	Property income received from RoW													X	X	
D.4	Property income paid to RoW													X	X	
B.5g	Gross National Income (GNI)								0	0	0				0	0

**Notes:**

- (+) positive impact, (-) negative impact, (X) impact can go either way, (0) no impact

**Source:**

- European Commission



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