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Long-Term Growth Prospects of the Greek Economy

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1. Introduction

Drastic fiscal consolidation and sharp wage cuts in order to improve fiscal balances and restore competitiveness have thrown the Greek economy in a deep recession, with real GDP contracting by 20% over the period 2008-2012 and expected to decline by a further 5% in 2013. The sharp contraction of real GDP, combined with deflation, has worsened public debt dynamics, with the public debt-to-GDP ratio expected to peak at 178% in 2013, up from 129% in 2009, despite the debt-restructuring (PSI) in March 2012 and a number of debt-relief measures (OSI) in December 2012.

Given the crucial role of economic growth in stabilizing debt-dynamics, the central issue is whether the Greek economy will be able to embark on a new sustainable growth path in the long term. The aim of this analysis is to examine the role of long-term growth fundamentals, such as the size of the public sector, competitiveness and openness of the economy, inflation, investment in physical and human capital and quality of institutions, on the growth outlook of the Greek economy.

In order to identify the factors which will likely promote the growth potential of the Greek economy, we start with a review of the academic literature on long-term economic growth (Section 2). In Section 3, we focus on the determinants of growth where the academic community has reached a consensus. Using historical data available from the World Bank and other international sources, we look at the evolution of Greece's position in the global context over the past 50 years. The comparison of Greece to other countries in the world or the euro area, regarding its position in terms of the main determinants of economic growth, gives us useful insights about Greece's relative economic performance in the past few decades. In Section 4, we use a range of estimates from the existing empirical literature so as to quantify the impact of growth determinants on Greece's economic growth prospects relative to the average country in the world in the long run. Public expenditures and terms of trade interacted with trade openness seem to be the most important sources of growth for Greece over the next decade. In particular, the projected reduction in the public sector wage bill is crucial for Greece's long-term economic performance, as the expected decline in Greece's government consumption is estimated to add roughly 0.80% p.a. to real per capita GDP growth. Moreover, the restructuring of the Greek economy towards the external sector seems to be important for a sustainable growth path, as the improvement in Greece's trade openness is estimated to contribute about 0.40% p.a. to per capita GDP growth, taking into account the interaction of the terms of trade with trade openness as well.

2. A Brief review of the economic growth theory

The traditional neoclassical growth theory (Solow-Swan 1956) sets out a dynamic general equilibrium model where per capita income growth is determined by the accumulation of human and physical capital. The so-called exogenous growth model is based on a production function with constant returns to scale, diminishing returns to capital and labor and smooth elasticity of substitution between the inputs. The Solow-Swan production function is applied along with the assumption of a constant rate of savings (investment) as a fraction of output. A key feature of the neoclassical growth model is the convergence property; the lower the starting level of real per capita GDP, the faster is the expected growth rate. The convergence property is due to the assumption of diminishing returns to capital, according to which economies with less capital per worker tend to have higher rates of return and higher growth rates. The convergence does not apply in an absolute sense but is rather conditional, in the sense that the steady-state levels of capital and output per worker depend on the saving rate, the growth rate of population and the position of the production function that may vary across economies. Recent empirical studies suggest the inclusion of additional sources of cross-country variation, particularly differences in government policies and investment in human capital.

The assumption of diminishing returns to capital in the neoclassical model led to the prediction that in the absence of continuing improvements in technology, per capita growth must eventually come to an end. This modeling deficiency was recognized by neoclassical growth theorists in the late 1950s and 1960s, who assumed that technological progress occurred in an exogenous manner so as to have constant per capita long term growth rates, while retaining the prediction of conditional convergence. However, this way the long-run per capita growth rate is determined by the rate of technological progress and the growth rate of population, both of which are exogenous in the standard theory.

The inclusion of a theory of technological change in the neoclassical growth theory is a rather difficult task, as technological progress involves the creation of new ideas which are partially non-rival and, therefore, is not compatible with the standard assumptions of competition. Arrow (1962) and Sheshinski (1967) made the first attempts to provide a theoretical framework in which ideas are included, the so-called learning-by-doing process. The abandonment of the neoclassical growth model according to which the long-term growth rate is associated to the rate of exogenous technological progress came with Romer's work (1987, 1990). The new endogenous growth models, which found significant contributions by Aghion & Howitt (1992) and Grossman and Helpman (1991), determined the long-run growth rate within the model. According to this theory, technological advance results from purposive Research and Development (R&D) activity that comes from some form of ex post monopoly power. With no tendency to run out of ideas, the growth rate can be raised in the long-run. However, given that there may be distortions associated with the creation of new products and new production methods, in this framework the long-run growth rate can be influenced by government actions, such as maintenance of law and order, taxation, provision of infrastructure services etc.

The endogenous growth theory was extended to preserve the convergence property. The so-called models of the diffusion of technology assume that the long-run growth rate is driven by discoveries in the technologically leading economies, with the follower economies contributing to technological advances by imitation of leading economies. Given that imitation is cheaper than innovation, diffusion models describe a form of conditional convergence that resembles the predictions of the neoclassical growth theory (Barro and Sala-i-Martin, 1995b).

The theoretical advances of the endogenous growth theory in the 1980s and the improved availability of datasets that cover broad cross-sections of countries with long time series have had a major impact on the empirical growth literature. The cross-country empirical work on growth ("growth regressions") has received new inspiration and was extended to include the role of government policies, human capital, research and development activity and the diffusion of technology. The empirical research on the sources of growth include the studies of Barro (1991,1996, 2003), Mankiw, Romer, Weil (1992), Barro and Sala-i-Martin (1995) and Vamvakidis and Zanforlin (2002). These studies regress the average growth rate of per capita GDP across countries on potential growth determinants suggested by the endogenous growth theory, measured on average over the period under consideration. The following section includes a description of the most important factors that affect long-term growth prospects, relevant to the Greek economy.

3. The long-run determinants of growth

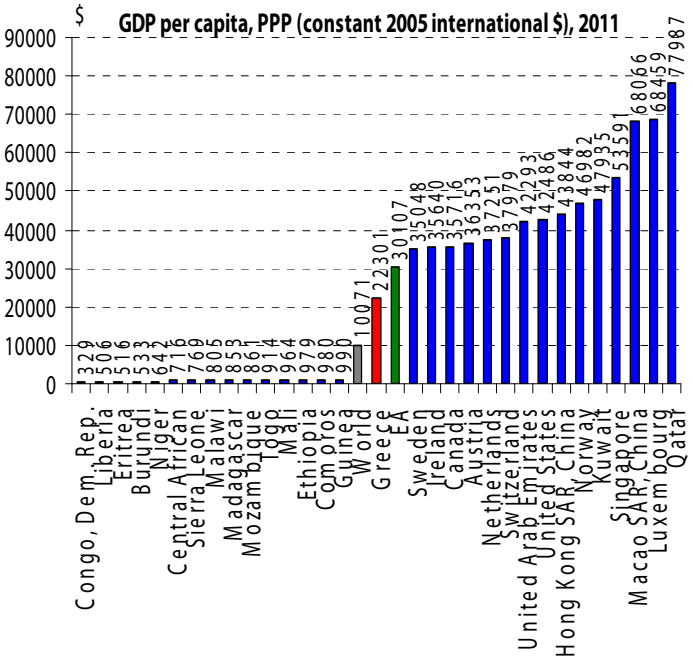
The empirical literature on long-term economic growth broadly agrees on the main determinants of growth. This section discusses major determinants of economic performance based on various empirical research studies, and their values in Greece, compared with the euro area and the world in general. Among the most important factors affecting long-term growth, relevant to the Greek economy, are:

3.1 Initial level of GDP

According to the neoclassical growth model, the so-called "convergence factor" predicts higher growth in response to lower starting GDP per person for given values of the other explanatory variables. The most common way to test for convergence among a group of countries is to estimate a regression of growth of real GDP per capita over a certain period on the initial level of real GDP per capita. When no country effects are assumed, several academic studies find evidence of

convergence at a rate of about 2.3-2.5% per year[1]. However, given that economies differ in terms of several aspects such as consumer's propensity, willingness to work, access to technology, government policies, educational attainment, the convergence force applies only in a conditional sense. The growth rate of a country tends to be high if the initial GDP per capita is low relative to its long-run position. For example, a low income country that has a low long-term position due to harmful government policies or a very low level of investment would not tend to grow rapidly.

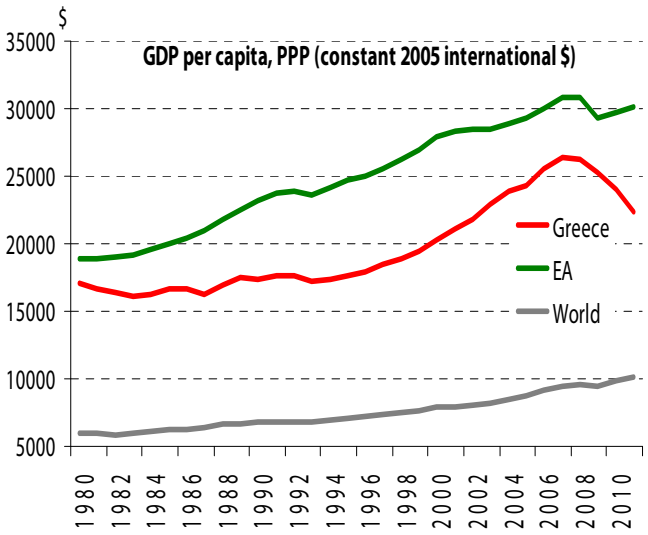
Figure 1



Source: The World Bank

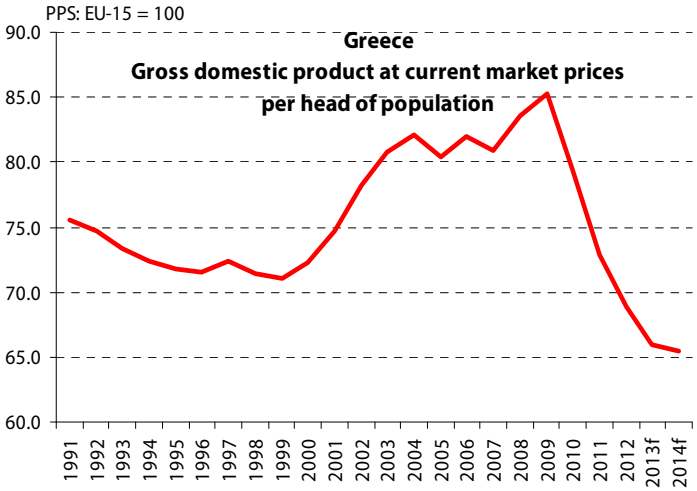
Historical data available at the World Bank gives us the chance to determine Greece's position in terms of real GDP per capita relative to the average country in the world, as well as the average country in the Euro area. Greece's real GDP per capita is currently 22,300$, more than twice the average real GDP per capita in the world measured in PPP-adjusted US dollars as of 2011 (Figure 1). As is evident in Figure 1, the poorest countries in the world are African countries -the Democratic Republic of the Congo, Liberia, Eritrea etc-, with real GDP per capita hovering below 1,000$ in 2011. Among the richest countries, Qatar, Luxembourg and Macao in China have real GDP per capita above 65,000$, highlighting the high level of divergence between low and high-income countries. Comparing Greece with the average euro area member state, we find that Greece has historically had a lower level of per capita GDP than the EA-17 average (Figure 2), and, therefore, should have been experiencing faster growth rates than other member states due to convergence forces, keeping everything else equal. Figure 3 shows the relative living standards in Greece relative to the old EU-15, measured in GDP at current prices per head of population. World economic and financial crisis that burst in 2009, combined with Greece's fiscal consolidation measures, has led to a significant decline in Greece's living standards, down from its recent peak of 85.2 in 2009 to roughly 73 in 2011. A further decline is expected in the next couple of years, with the European Commission projecting that by the end of 2014 Greece will have returned back to the 1980s, in terms of GDP per capita relative to the EU-15.

Figure 2



Source: The World Bank

Figure 3



Source: European Commission, Ameco database

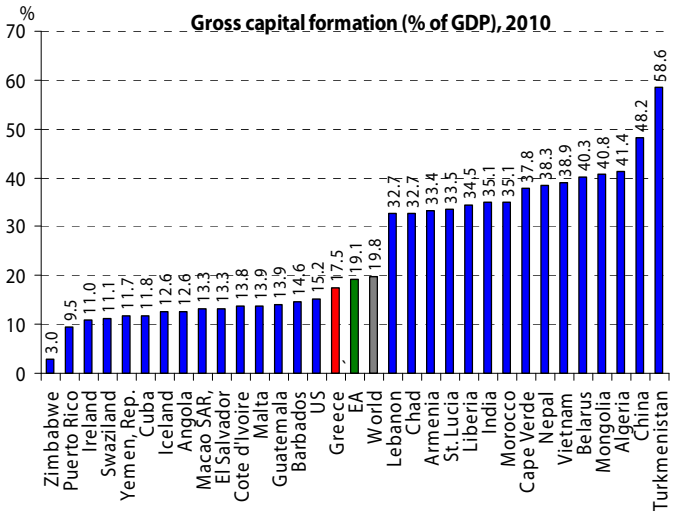
[1] Barro (1996, 2003)

3.2 Gross capital formation as a percent of GDP

Investment in physical capital is a fundamental determinant of economic growth identified by both neoclassical and endogenous growth models. The neoclassical theory identifies the positive impact of investment on GDP growth on the transitional period, while the endogenous growth models point to more permanent effects. In theory, gross capital formation contributes positively to economic growth either directly, by increasing the physical capital stock of the economy[2], or indirectly by promoting technology[3].

Figure 4 highlights that Greece lags behind the average country in the world in terms of its investment share in GDP, as gross capital formation represents 17.5% of GDP in Greece (as of 2010), relative to an average of roughly 20% for the whole world. Countries with very low investment shares in GDP, such as Zimbabwe and Puerto Rico do not exceed 10% of GDP, in contrast to countries with excessively high levels of investment (Turkmenistan, China and Algeria) that exceed 40% of GDP. Among countries with high levels of investment, China -the world's second largest economy- has long depended on government-funded investment to boost economic expansion. According to the World Bank' s historical data, China's investment share in GDP has increased during the financial crisis from roughly 42% in 2007 to about 49% of GDP in 2011 due to the country's effort to sustain relatively high growth rates.

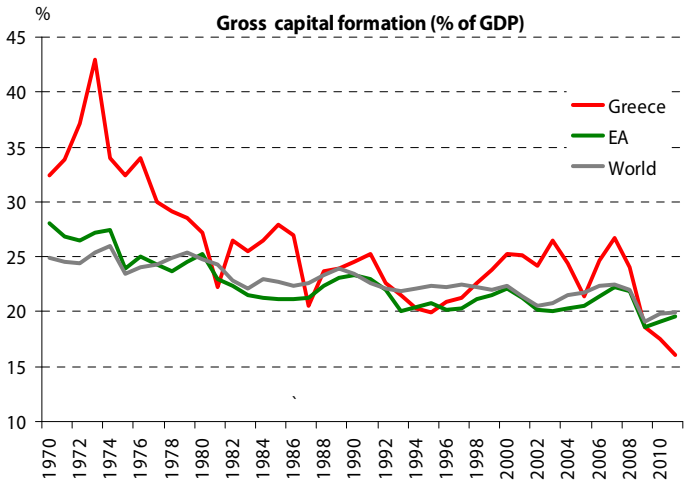
Figure 4



Source: The World Bank

Looking back at the evolution of Greece's investment levels (Figure 5), we find that although the investment share of GDP was below the euro area average in the 1950s, it actually outpaced the euro area average during the 1960s and 1970s and skyrocketed above 40% of GDP in mid-1970s, relative to a ratio of 27% in the euro area and 25% in the whole world. Greece's share of capital formation to GDP has been relatively close to the average in the rest of the euro area over the 1980-99 period, with Greece at about 24% against an average in the Euro area of 22%. The following years registered a better investment climate for Greece, with an average investment share of 24% during 2000-2008, relative to the 21% EA average. However, the global financial crisis and the severe recession in Greece have led to a huge decline in Greece's investment share in GDP from its most recent peak of 27% in 2007 to 16% in 2011, compared to a relatively a smoother decline in the euro area from 22% in 2007 to roughly 20% in 2011.

Figure 5



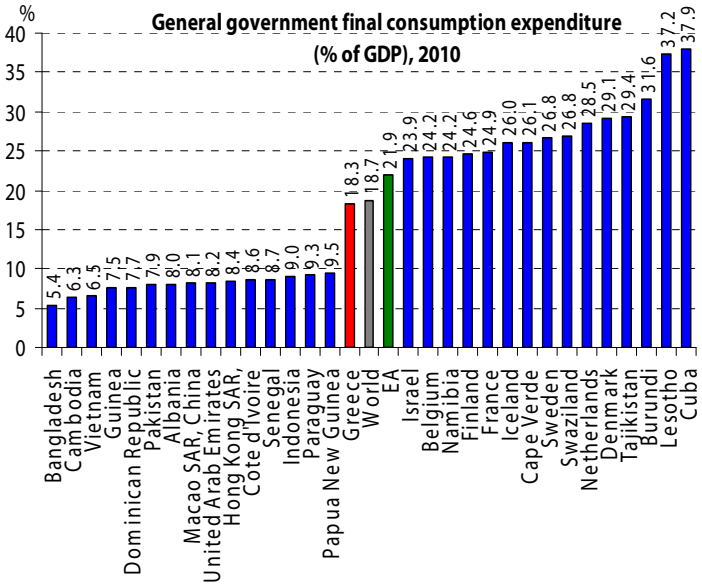
Source: The World Bank

3.3 Government consumption share in GDP

The ratio of government consumption to real GDP has typically been found to be negatively correlated to real GDP growth. Real government consumption is sometimes adjusted by subtracting government expenditures for defense and education, as these categories of spending are likely to have direct effects on productivity or the security of property rights. Besides, government expenditures in education are regarded as a factor that contributes positively to economic performance4. Large government expenditures can crowd out private sector demand and investment spending, causing interest rates to rise and, thereby, affecting negatively credit availability. Moreover, the taxes often imposed to finance government expenditures can have a negative impact on economic growth in the long-term.

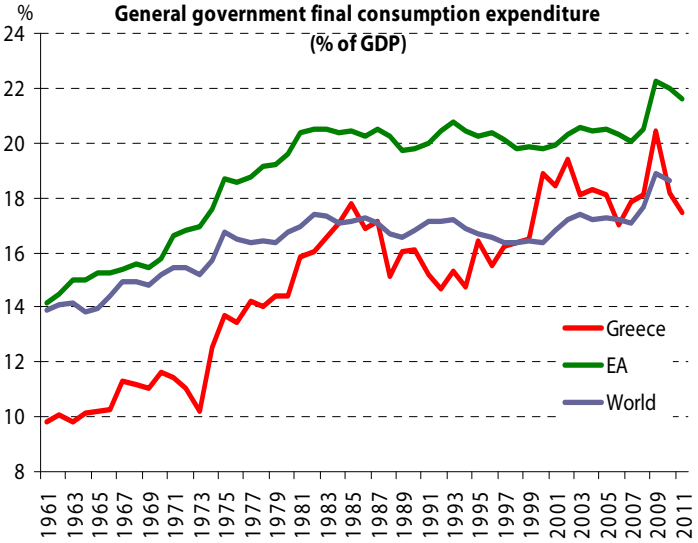
[2] See Plossner (1992)
[3] See Levine and Renelt (1992).
[4] See Bose at al. (2007) and references therein.

Figure 6



Source: The World Bank

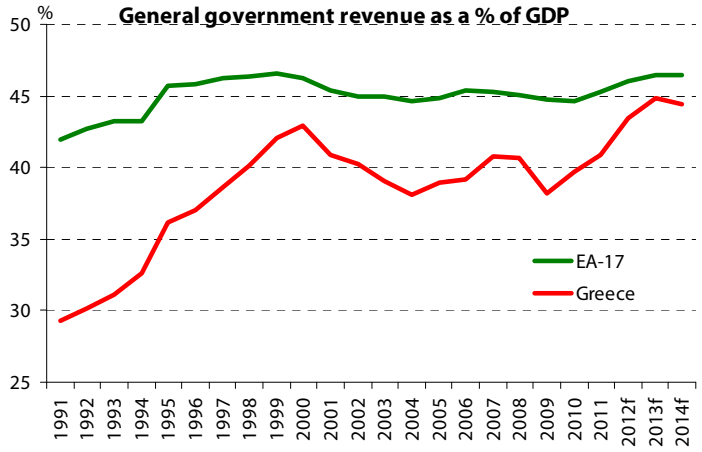
Figure 7



Source: The World Bank

Greece is in line with the average country in the world in terms of government consumption share in GDP, with its general government final consumption expenditures representing 18% of GDP in 2010 (Figure 6). Countries with very low government shares do not exceed 7.0% of GDP (Bangladesh, Cambodia, Vietnam), whereas countries with very high levels of government consumption surpass 30% of GDP (Burundi, Lesotho, Cuba). Comparing Greece with other developed countries in the Euro area (Figure 7), we find that Greece has historically had a lower share of government consumption than the euro-area average. The share of government consumption in Greece has generally been on an upward trend from the mid-1970s until the mid-1980s, increasing from 10% of GDP in 1973 to 18% in 1985. After ten years of a declining government consumption share due to some progress in fiscal consolidation, public expenditures have gradually increased to above 20% of GDP in 2009. The significant increase in government consumption implies that the burden of any fiscal consolidation program in Greece must have fallen on revenues. Indeed, general government revenues increased from 29% to 41% over the last 20 years (Figure 8). This increase is four times larger than the corresponding increase in the EA-17, with government revenues increasing from 42% in 1991 to only 45% in 2011. However, the government has embarked on major expenditures reforms for a wide range of government activities since 2009, with final consumption expenditures falling gradually to 17.4% of GDP in 2011. Government consumption is expected to continue its downward trend in the following years.

Figure 8



Source: IMF, World Economic Outlook Database, October 2012

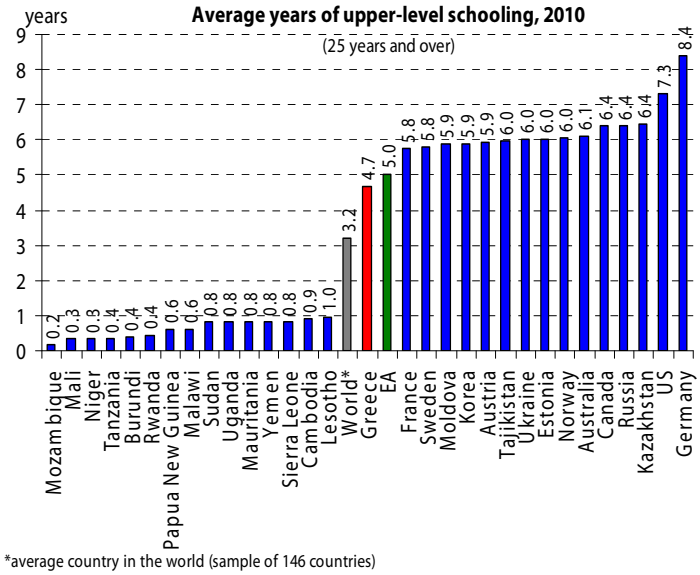
3.4 Investment in human capital

Human capital is a main source of growth in endogenous growth models and one of the key extensions in the neoclassical growth models as well. Most empirical studies have used educational attainment as a proxy for the quality of human capital, showing a significant link between enrolment rates in secondary education[5], or total years of schooling[6], and growth of per capita GDP. Based on the Barro-Lee data set of

[5] Mankiw at al 1992, Vamvakidis & Zanforlin (2002)
[6] Barro (1991, 2003), Sfakianakis et al (2012)

Educational Attainment in the World, 1950–2010, we constructed Figure 9 which depicts the average years of attainment for males and females aged 25 years and over in secondary and higher schools (referred to as upper-level schooling) for Greece, the average country in the world and countries with very low and very high levels of educational attainment. The average years of upper-level schooling in Greece is almost 5 years as of 2010, close to the euro area average and 1.5 times higher than that of the average country in the world (3.2 years). As expected, Germany and the US have the best quality of human capital in terms of secondary and higher schooling, with 8.4 and 7.3 average years for population aged 25 years and over, respectively. On the contrary, there are countries like Mozambique, Mali and Niger, with almost zero level of upper-level schooling. Figure 10 shows the educational attainment in Greece versus the euro area average since 1950 at 5-year intervals. Average years of upper schooling in Greece were on a steady upward trend in the 1950s, reaching about 2.5 times the EA-12 average in 1960. The following 20 years were characterized by a downward trend in Greece, with the average years of schooling falling from 2.5 in 1960 to 1.8 in 1980. In line with the EA-17 countries, Greece's educational attainment has been on an upward trend since 1980, with an average gap of about 0.5 years between Greece and the euro area average between 1980 and 2010.

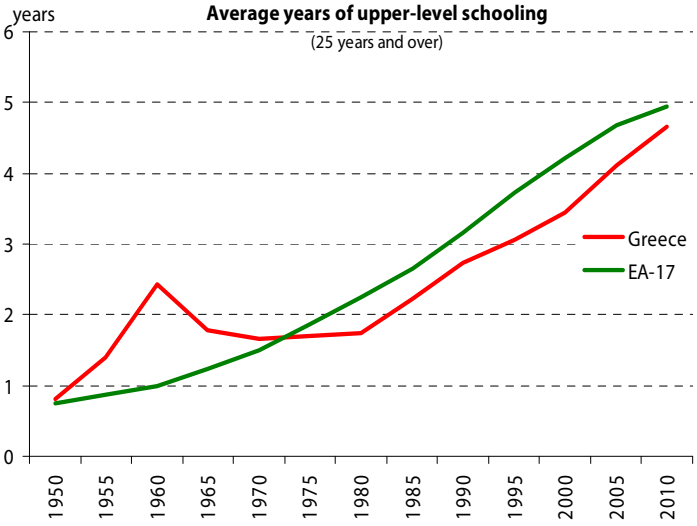
Figure 9



*average country in the world (sample of 146 countries)

Source: Barro, Robert and Jong-Wha Lee, April 2010, "A New Data Set of Educational Attainment in the World, 1950-2010." NBER Working Paper No. 15902.

Figure 10



Source: Barro, Robert and Jong-Wha Lee, April 2010, "A New Data Set of Educational Attainment in the World, 1950-2010." NBER Working Paper No. 15902.

3.5 Trade openness

Openness to trade, which is measured by the ratio of exports plus imports of goods and services to GDP[7], has been identified in the economic growth literature as an important determinant of growth performance. A country is more open to external trade and, consequently, has a higher ratio of imports and exports to GDP when barriers to international transactions (including tariffs, quotas, and transportation costs) are relatively low. International openness affects economic growth through several channels such as the dissemination of knowledge and technological process, the exploitation of comparative advantage, or by increasing scale economies in those sectors that are promoted by trade. Although in the theoretical literature several scholars have argued against trade openness as a major driver of growth showing that trade openness can be detrimental to growth in the presence of market imperfections[8], a large part of the empirical literature has concluded that economies, which are more open to trade and capital flows, have higher GDP per capita and grow faster.

[7] Several variables have been identified in the literature to measure trade openness, each with its own share of criticism. The ratio of exports plus imports to GDP is one of the most frequenlty used and robust measures of openness to trade, see Levine & Renelt (1992).
[8] See Rodriguez & Rodrik (2001)

Figure 11

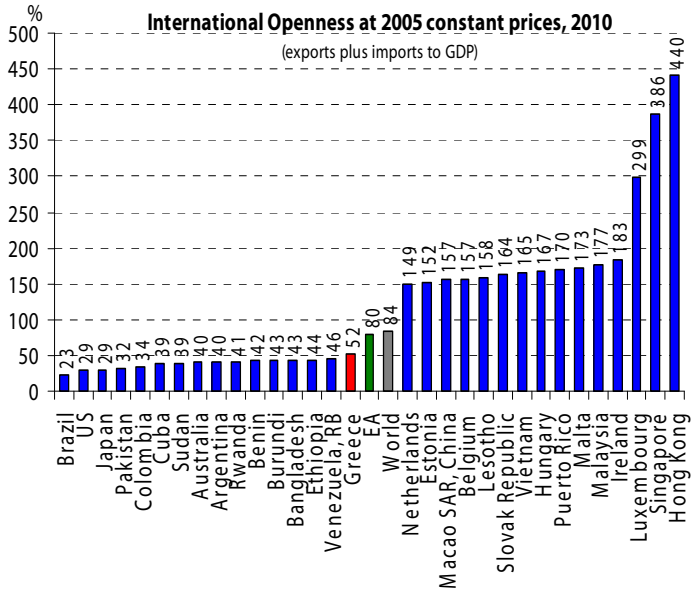
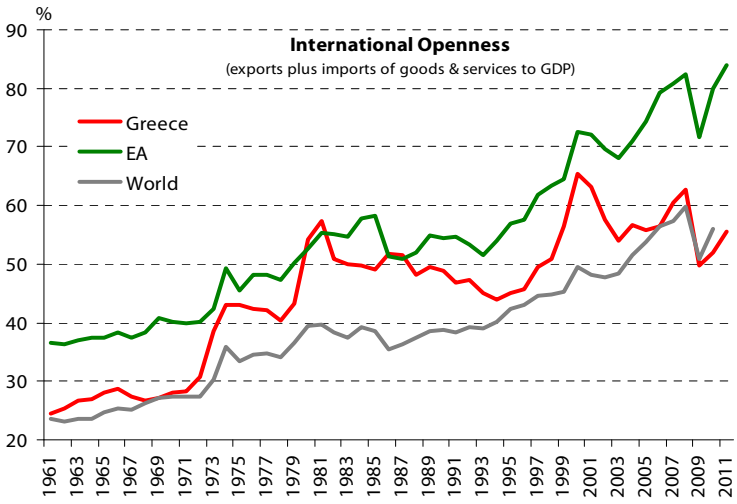


Figure 12



Source: The World Bank

Figure 11 shows that Greece lags behind the average country on the world in terms of trade openness. In particular, Greece's exports plus imports comprise 52% of GDP as of 2010, while the average country in the world has about 1.6 times the trade share of Greece (84%). It should be noted that the degree of trade openness is highly sensitive to country size, as large countries, such as the US and Japan, tend to rely relatively more on domestic trade and, therefore, have a ratio of trade to GDP of roughly 30%. Greece's trade share has historically been lower than the euro-area average (Figure 12), but this gap has widened in recent years, from 7% in 2000 to roughly 30% in 2011.

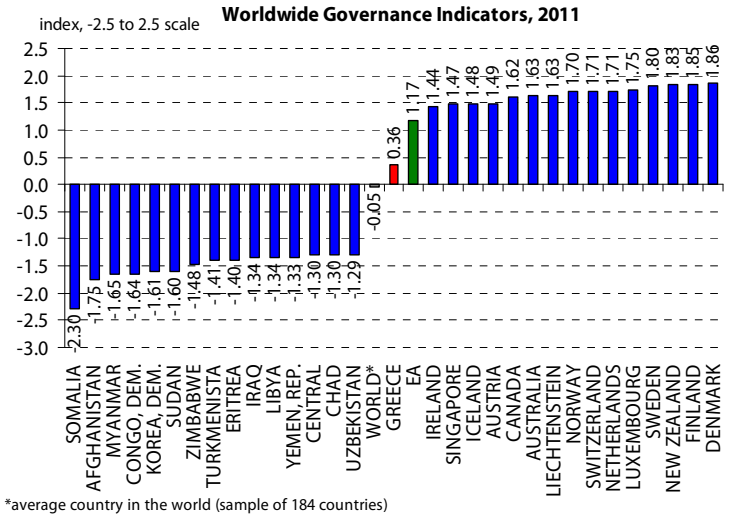
3.6 Institutional framework

The literature has also emphasized the role played by institutions in shaping economic performance[9]. Recent empirical studies have highlighted several key institutions -such as property rights, regulatory institutions, institutions for macroeconomic stabilization, institutions for social insurance and institutions of conflict management- that play directly a crucial role for economic growth, or indirectly, affecting other determinants of growth such as the physical and human capital and investment[10]. The most broadly used measures in the empirical literature for the quality of the institutional framework are the rule of law, corruption, property rights, government repudiation of contracts, bureaucracy quality and risk of expropriation[11]. In order to incorporate the concept of the institutional framework and governance in Greece relative to other countries worldwide, we use the Worldwide Governance Indicators (WGI) produced by the World Bank[12]. According to the World Bank's definition, "governance consists of the traditions and institutions by which authority in a country is exercised. This includes (a) the process by which governments are selected, monitored and replaced; (b) the capacity of the government to effectively formulate and implement sound policies; and (c) the respect of citizens and the state for the institutions that govern economic and social interactions among them". The World Bank recognizes six dimensions of governance: Voice and Accountability, Political Stability and Absence of Violence, Government Effectiveness, Regulatory Quality, Rule of Law and Control of Corruption.

Figure 13 illustrates the (unweighted) average of the above mentioned six indicators, which ranges from approximately -2.5 (weak governance performance) to 2.5 (strong governance performance). As is evident, Greece stands above the average country in the world in terms of institutions and governance but far below the euro area average, with latest data for 2011 reporting an index of 0.36 for Greece versus 1.17 for the euro area and -0.05 for the average country in the world. Advanced countries such as Denmark, Finland and New Zealand have a high quality of governance, in contrast to Somalia, Afghanistan and Myanmar that have the lowest quality of governance in the world. Looking at the evolution of Greece's quality of governance since the mid-1990s (Figure 14), Greece has been well below the euro area average since the series started in 1996. This difference has been gradually increasing in recent years, creating a gap of about 0.8 points in 2011 from 0.5 in the mid-2000s.

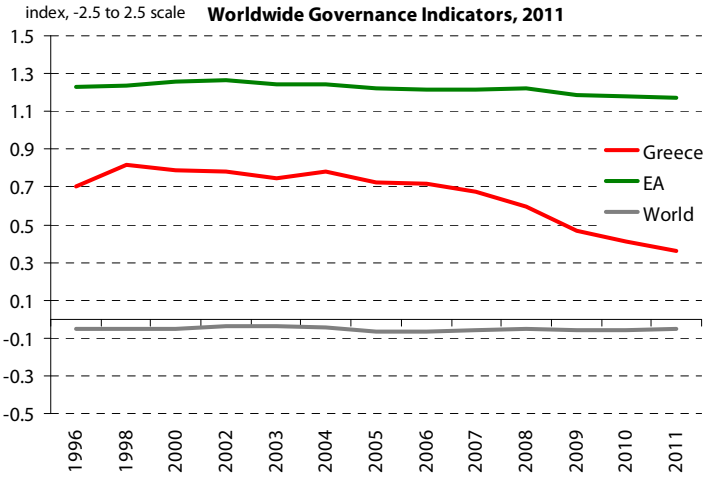
[9] Lewis (1955), Ayres (1962), Tavlas & Petroulas (2010)
[10] See Rodrik (2000)
[11] See Knack & Keefer (1995)
[12] The Worldwide Governance Indicators (WGI) are a research dataset summarizing the views on the quality of governance provided by a large number of enterprise, citizen and expert survey respondents in industrial and developing countries. These data are gathered from a number of survey institutes, think tanks, non-governmental organizations, international organizations, and private sector firms.

Figure 13



*average country in the world (sample of 184 countries)

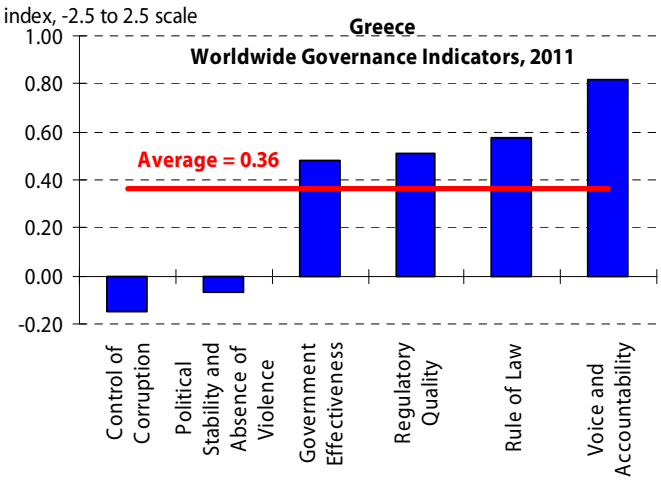
Figure 14



Source: Worldwide Governance Indicators, The World Bank

Figure 15 illustrates the individual six indicators that comprise the average governance indicator, as of 2011; Greece has the lowest rate in terms of *control of corruption (-0.15)*, reflecting perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. *Political instability* is another source of weakness in Greece, as expert survey respondents seem concerned about the likelihood that the government will be destabilized or overthrown by unconstitutional or violent means, including politically-motivated violence and terrorism. On the contrary, *Voice and Accountability*, which reflects perceptions of the extent to which Greece's citizens are able to participate in selecting their government, as well as freedom of expression or association, and a free media, have the highest rate among the six broad dimensions of governance (0.82).

Figure 15



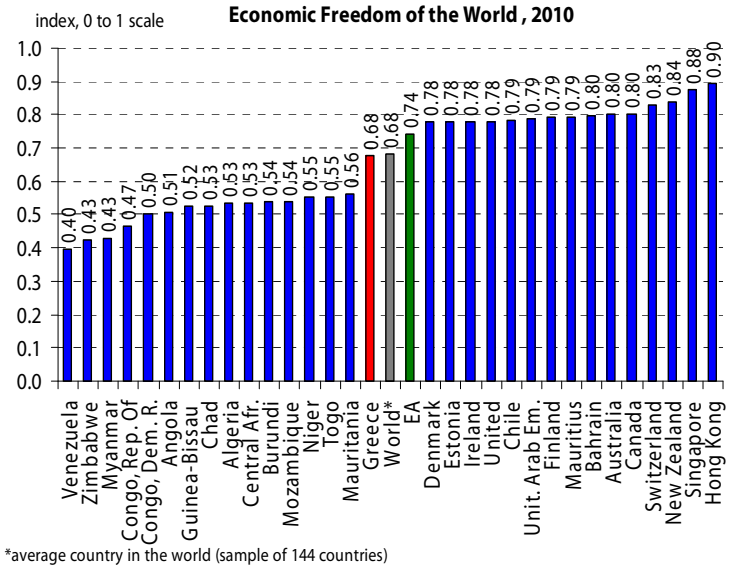
Source: The World Bank

3.7 Economic Freedom

The relationship between political factors and economic performance has been examined by numerous studies, which concluded that the political environment plays an important role in economic growth[13]. Researchers usually assess the political environment using variables such as the degree of democracy or political intervention in production and allocation decisions. We use the so-called "Economic Freedom Index" produced by the Fraser Institute, which employs a variety of data to rate the degree of economic freedom in a country. Figures 16 and 17 below indicate the overall economic freedom rating for Greece, the average country in the world and countries with the highest and the lowest ratings. The index published in Economic Freedom of the World[14] measures the degree to which the policies and institutions of countries are supportive of economic freedom. The cornerstones of economic freedom are personal choice, voluntary exchange, freedom to compete, and security of privately owned property. The index measures the degree of economic freedom present in five major areas: (1) Size of government; (2) Legal system and security of property rights; (3) Sound money; (4) Freedom to trade internationally and (5) Regulation.

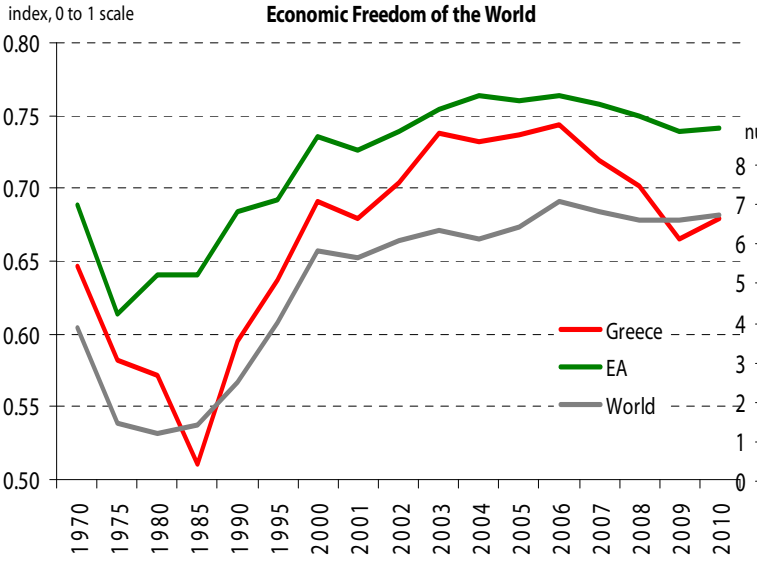
[13] Kormendi and Meguire (1985), Scully (1988), Grier and Tullock (1989), Brunetti (1997), Lensink et al. (1999)
[14] http://www.freetheworld.com

Figure 16



*average country in the world (sample of 144 countries)

Figure 17



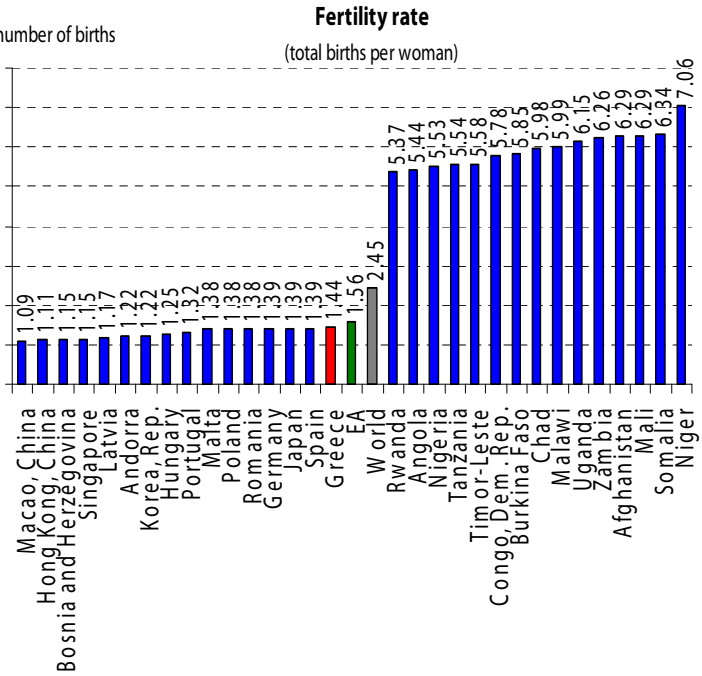
Source: Fraser Institute

According to the latest observation in 2010, the index hovers in Greece around the average country in the world (0.68), and below the euro area average of 0.74. Countries with the highest degree of economic freedom are Hong Kong, Singapore and New Zealand, while countries with the lowest degree of freedom are Venezuela, Zimbabwe and Myanmar. Looking the evolution of the index in Greece and in the euro area as a whole, it is evident that economic freedom in Greece has rapidly converged towards the EA-17 average from 1985 to 2006, but diverged afterwards until 2009.

3.8 Fertility Rate

The fertility rate refers to the number of births for the typical woman over her expected lifetime. The role of fertility in promoting long-term growth has been investigated in a number of empirical papers. A higher fertility rate implies that increased resources must be devoted to child caring, rather than to production of goods [15], so the fertility rate of each country has a negative effect on its GDP per capita growth. Historical data from the World Bank suggest that in Greece women give birth to about 1.4 children as of 2010, well below the 2.5 births for the average country in the world (Figure 18). Emerging economies such as Afghanistan, Somalia and Mali have a fertility rate above 6, while Niger's rate exceeds 7. In line with the euro area average, Greece had a relatively high fertility rate of about 2.5 in the 1960s and 1970s (Figure 19). The downward trend that followed over the next two decades resulted in a fertility rate in Greece of about 1.2 in late 1990s, versus 1.4 for the EA. The difference between Greece and the euro area average has declined in recent years, with 1.44 births in Greece versus 1.56 in the euro area. The global fertility rate has historically been on a downward trend, declining from 5 births per woman in the mid 1960s to about half this number in 2010.

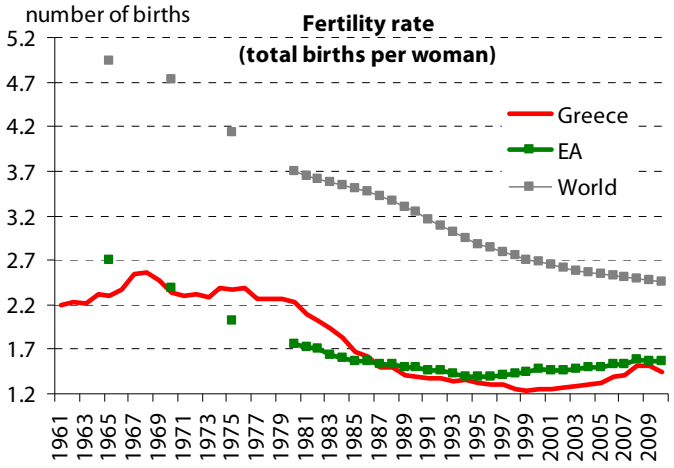
Figure 18



Source: The World Bank

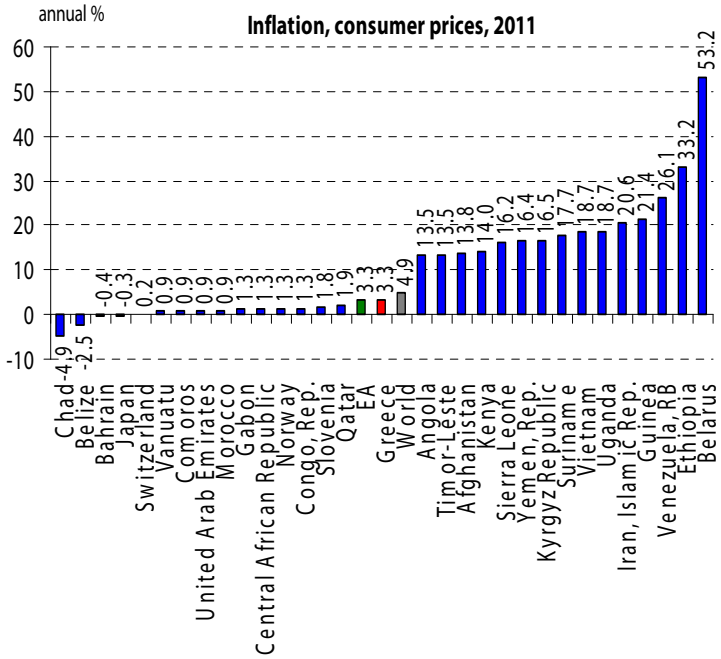
[15] See Becker & Barro (1988)

Figure 19



Source: The World Bank

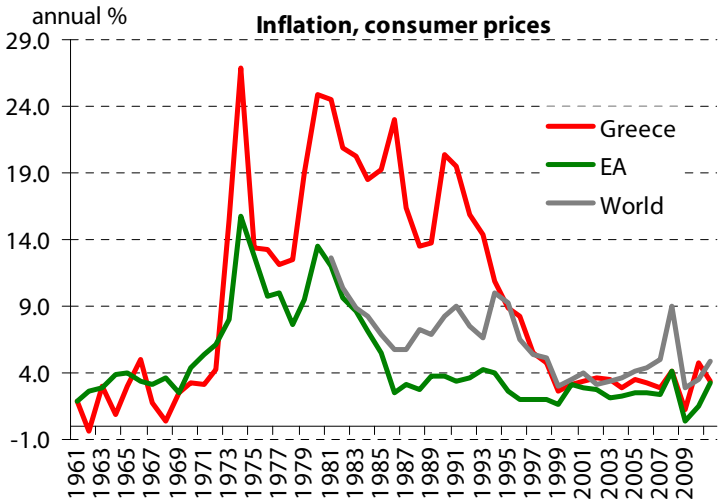
Figure 20



3.9 Inflation

High inflation rates have been associated in economic theory with lower economic growth, as they seem to affect the level of business investment and productivity growth[16]. According to the latest data available in the World Bank database, consumer price inflation in Greece was equal to the euro area average in 2011 (3.3%) but well below average consumer price inflation in the world which was roughly 5% (Figure 20). However, high inflation was a major problem of the Greek economy from the 1970s until the mid-1990s, with consumer price inflation in Greece averaging about 14%, versus a euro area average of 6.2% and a world average of 7.5%. Figure 21 illustrates that we have witnessed four major inflation peaks in Greece –in 1974, 1979-80, 1985-86 and in 1990- with inflation rising to at least 20%. The peaks of 1974 and 1979-80 were to a large part attributed to the global oil crises, but inflation in Greece was well above inflation in other industrial countries during the crises. Greece's inflation rate moved to a downward trend in the 1990s, as the result of the adoption of a nominal exchange rate anchor as the main intermediate target for monetary policy. Combined with a tighter fiscal policy and several institutional measures which increased policy effectiveness and credibility, the anchoring of inflation to a nominal exchange rate target led to a gradual decline in consumer price inflation from 20% in 1990 to 2.9% in 2007, close to the euro area average of 2.4%.

Figure 21



Source: The World Bank

3.10 The terms of trade

The empirical growth literature identifies the terms of trade as a key growth determinant in a panel of countries over long periods of time[17]. The variable is measured by the growth rate of

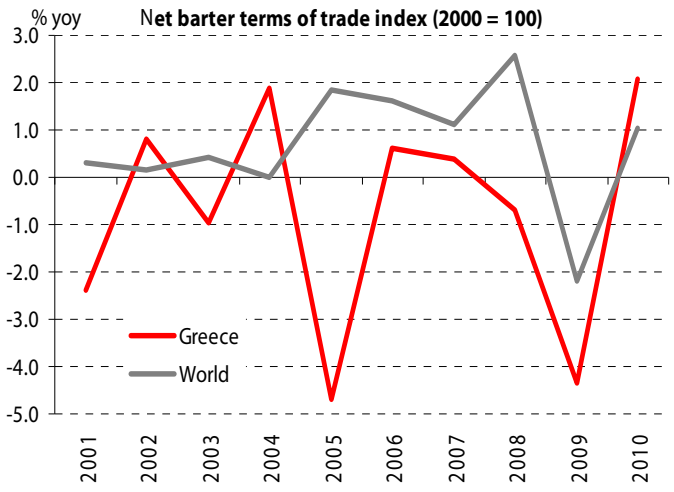
[16] Fischer (1993).

[17] Barro (1996, 2003), Barro and Sala-i-Martin (1995)

the terms of trade -export prices relative to import prices- over decade-long time intervals, multiplied by the average ratio of exports plus imports to GDP. When export prices increase relative to import prices, then a larger volume of imports can be purchased with a given volume of exports. The implied increase in the relative price of exports is equivalent to a transfer of income from the rest of the world to the domestic economy and could, therefore, have a positive impact on consumption, savings, investment and, consequently, on economic growth.

Figure 22 portrays the net barter terms of trade index calculated by the World Bank as the percentage ratio of the export unit value indexes to the import unit value indexes, measured relative to the base year 2000. The World Terms of Trade Index is calculated as the weighted average of the national terms of trade indexes, weighted with each country's real GDP (in per capita PPP). The growth rate of the terms of trade over the ten-year period 2001-2010 was negative in Greece (-0.7% p.a), relative to an average positive growth of 0.7% p.a. for the average country in the world. With the rise in many physical commodity prices which occurred during the decade of the 2000s, import prices have more than doubled in Greece during 2003-2008, worsening Greece's real purchasing power in the global economy. In particular, the sharp increase in the price of oil created a further downward pressure on economic growth in oil importing countries, as a large share of consumer spending flows to oil-producing states.

Figure 22

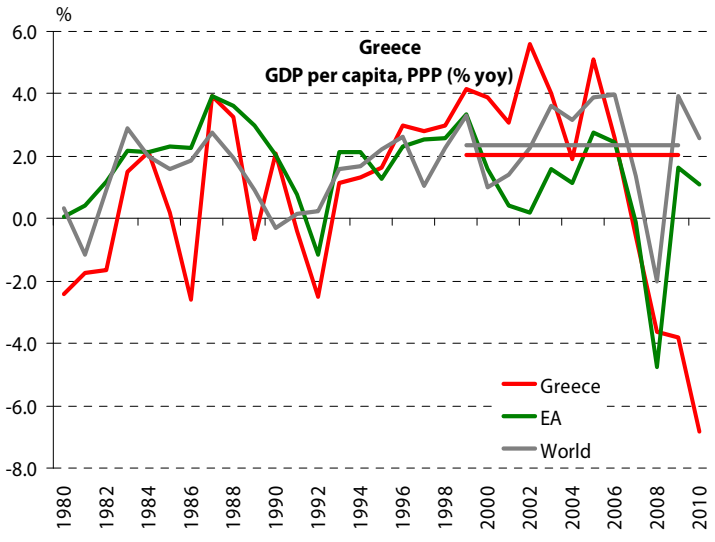


Source: The World Bank

4. Simulation exercise for Greece

In order to quantify the impact of the growth determinants on Greece's economic performance, we use a range of estimates from the existing empirical literature. Table 1 reports estimates of the average effect of each determinant of growth to economic performance, giving a minimum and a maximum effect based on the results of previous studies. We start our meta-analysis by computing the average growth rate of the Greek economy relative to the average country in the world over the past decade, using the identity $\Delta y_i = a_1 * x_{1i} + a_2 * x_{2i} + \ldots + a_k * x_{ki}$, where Δy is the average growth rate of GDP per capita in PPP terms in Greece for 2000-2010, x_{1i} , x_{2i} , ….., x_{ki} are the values for the variables recognized as determinants of growth and a_1, a_2, …… a_k are the estimated coefficients presented in Table 1. Based on the changes in the growth determinants in Greece relative to world during 2000-2010, Greece's per capita GDP should have grown faster by 0.8 percentage points compared to world growth according to the model. However, Greece's economic growth was actually about 0.4% lower than the average growth rate in the world during 2000-2010, as historical data provided by the World Bank report an average growth rate of GDP per capita in PPP terms of 2.0% in Greece over the period 2000-2010, against an average growth rate of 2.4% in the whole world (Figure 23).

Figure 23



Source: The World Bank

The estimates of Table 1 can be used to construct long-term forecasts of economic growth in Greece relative to world growth. These predictions have been constructed by making specific assumptions for the determinants of growth over the next 10 years, provided that the model has the same forecast error in the next decade.

4.1 Real per capita GDP

The strong contraction in domestic demand, compounded by the fiscal consolidation programme necessary to bring the Greek public finances onto a sustainable territory, has led to a significant fall in real GDP per capita over the past 5 years. Output is projected to drop by about 6.0-7.0% in 2012, with growth moving into positive territory only after mid-2013, provided that markets regain confidence as the second economic adjustment programme for Greece is successfully implemented. Overall, we expect a contraction of about 4.5-5.0% in 2013 on an annual basis, and a growth rate close to zero in 2014. Real economic activity will gradually gain momentum after 2015, with an average growth rate of about 2.0-2.5%; In our analysis, we assume that per capita real GDP increases from about $22.558 in 2011 to around the 2005-2006 levels of about $25.000 over the next 10 years (Table 2).

4.2 Government consumption

As far as government consumption is concerned, the 2013-16 Medium-Term Fiscal Strategy (MTFS) includes important fiscal consolidation measures to rationalise and reduce public expenditures. Following the long-term forecasts for public consumption presented in the new MTFS, which include an average annual decline of -3.8% over the period 2013-2016, we assume that government consumption as a percentage of GDP declines from 17.5% of GDP in 2011 to about 13% of GDP over the next 5-10 years (Table 2).

4.3 Fixed capital formation

The recovery of the Greek economy is highly dependent on investment, which currently remains subdued as capacity utilization is falling further. In the first half of 2012, investment continued to contract in all asset categories, with the biggest decline concentrated in equipment and housing investment. We expect investment to accelerate in 2014, supported by a rebound in economic sentiment and an improving business environment. Furthermore, the expected acceleration of the absorption of EU Structural Funds once existing legal and financial hurdles for key infrastructure projects have been removed will probably bring about investment. The new medium-term fiscal programme projects that gross capital formation will turnaround towards positive annual growth rates in 2014, accelerating to a 10% growth y-o-y in 2016. In this context, we assume that gross capital formation as a percent of GDP will gradually increase from 14.5% of GDP in 2011 to about 20% over the next 10 years (Table 2), close to the Euro area average investment share in GDP over the last 20 years.

4.4 Competitiveness

The cost competitiveness gains from wage reductions over the past three years are also likely to support the export sector. In particular, nominal unit labor costs in Greece have declined by about 20% since 2009 relative to trading partners, due to nominal wage declines despite a declining productivity as a result of the recession. As the economy rebounds over the next 10 years, Greek nominal unit labor costs will probably continue to decline due to increasing labor productivity. According to our estimates[18], for every 1% decline in relative ULCs, export shares in global trade increase by 0.8%. Assuming that Greek nominal ULCs decline by a total of 30% over the period 2009-2020, this translates into an increase in the share of Greek exports of goods and services by 24%, similar to their 2000 level. In order to reach this target by 2020, Greek exports should increase 3% p.a. faster than exports of 35 industrial countries over the period 2013-2020 and the export-to-GDP ratio is expected to increase from 25% currently to 39% by 2020, approaching the average export-to-GDP ratio of the EA 17 (40%). With the economy rebounding from the recession, imports are also expected to increase. However, subdued growth rates of private consumption will likely keep import growth at relatively moderate levels, with the import-to-GDP ratio increasing from its current level of 31% to about 34%, close to its average in the period 2000-2010. Although the contribution of domestic demand to real GDP growth in Greece over the previous decade was about two times the average of the EA 17 (4.2% versus 2.1% p.a. over the period 1995-2008), the restructuring of the Greek economy towards the external sector will likely lead to a decline of the contribution of domestic demand, with the Greek economy heading to a more balanced growth path. Overall, our central scenario assumes that trade openness increases from 55.5% in 2011 to around 70% over the next 10 years, mainly due to an increase in the export base of the economy (Table 2).

4.5 Terms of trade

The continuing decline in Greek unit labor costs in the long-run will lead to lower export prices, exerting a downward pressure on the terms of trade in the long-term. However, terms of trade of goods and services are affected by import prices as well; soaring commodity prices during the global economic boom period of 2003-2008 have led to a sharp increase in Greece's import prices. Although it is very difficult to project either the direction or persistence of commodity price changes, we believe that commodity prices are far less likely to increase at the pace of the last decade and could in fact decline due to the weaker global economic outlook. On this ground, we assume that terms of trade gradually increase to their 2003 level in the long-term as import prices return to more normal levels. This translates into a 0.5% increase p.a. of the terms of trade over the next 5-10 years (Table 2).

[18] Malliaropulos D. and Anastasatos T. (2013).

4.6 Inflation

The downward adjustment in unit labor costs has contributed to a slowdown in inflation. Consumer price inflation has declined from a high of 4.7% in 2010 to 3.1% y-o-y in 2011 and to 1.2% in 2012. Consumer price inflation is expected to turn negative over the next couple of years and to report moderate positive values later on. In this context, we assume that consumer price inflation in Greece declines from its 2000-2010 average of 3.3% to about 1.0% over the next 5-10 years (Table 2).

4.7 Institutions

As far as the institutional framework is concerned, Greece's governance rate has been on a downward trend since 2004, with the overall governance index declining from 0.78 to 0.36 in 2011. Control of corruption is the component of the index with the lowest rate, and indicators of the perception of corruption from Transparency International place Greece as the lowest range in the EU in 2012. Public sector reforms to be undertaken in the medium-term are expected to address the weaknesses in the existing system and support the fight against corruption. Structural reforms are also expected to improve government effectiveness and regulatory quality. Overall, we expect Greece's governance index to increase from its current low level of 0.36 to about 0.63, close to its 2000-2010 average (Table 2).

4.8 Fertility, education and economic freedom

Furthermore, we assume that the remaining determinants of Greece's economic performance (fertility rate, educational attainment and Economic Freedom Index) stay around their 2000-2010 levels, that is 1.4 births per woman, 4 years of upper level schooling and an economic freedom index of 0.71, respectively (Table 2).

4.9 Long-term growth prospects of the Greek economy

Based on all the above assumptions for the determinants of growth, we find that Greece's economy has the potential to rebound relative to world's economic performance by about 1% per year in the long-term, provided that Greek authorities implement a wide range of reforms under the economic adjustment programme, necessary to create the basis for sustainable growth (Table 2). Assuming that global economic growth increases by about 2.5% p.a. over the next 10 years (equal to its average annual growth in the period 2000-2010), then per capita real GDP (in PPP terms) in Greece would increase by an average annual growth of about 3.5% p.a.

According to our analysis, public expenditures and terms of trade interacted with trade openness seem to be the most important sources of growth for Greece over the next decade. As reported in Table 2, government consumption as a percent of GDP is expected to add to Greece's economic performance roughly 0.80% p.a., provided that public consumption declines significantly, reflecting the projected reduction in the public sector wage bill. Moreover, the improvement in Greece's trade openness is estimated to contribute roughly 0.17% p.a. to per capita GDP growth, whereas the interaction of terms of trade with trade openness adds 0.19% p.a. to growth. The trade openness improvement is mainly attributed to the expected increase in the export-to-GDP ratio, as the restructuring of the Greek economy towards an export-led growth model progresses.

Although we do expect an acceleration in business investment growth in the next decade, gross capital formation is expected to be a drag for per capita GDP growth compared to the previous decade. This is so because the previous decade was characterized by very high levels of investment in Greece, with an average investment share of 23.5% of GDP in Greece, well above the euro area average of 20.7% of GDP and a world average of 21.3% of GDP. The economic recession in Greece over the past three years has led to a sharp decline in the economy's investment share from roughly 27% of GDP in 2007 to about 15% of GDP in 2011. While the expected rebound in economic sentiment and an improving business environment will support investment in Greece, gross capital formation will not surpass the very high levels of the previous decade, hovering around the euro area average of about 20% of GDP. According to our estimates, the decline in the investment share in GDP relative to the previous decade will shave about 0.2% p.a. from per capita growth relative to world growth. Nevertheless, the expected rebound in Greece's investment may be partly reflected in the structural change of the Greek economy towards an export-led growth model, as is evident in the positive contributions to growth from trade openness and terms of trade interacted with openness.

It should be noted that this prediction is very sensitive to changes in the values of Greece's main determinants of growth. For example, if international openness increased to about 80%, close to the 2011 euro area level, this would contribute roughly 0.2% p.a. more to per capita GDP growth relative to world growth, should we take into account its interaction with terms of trade. If educational attainment improved significantly compared to the previous decade, hovering around its 2010 level of 5 years of upper level schooling, this would add a further 0.8% p.a. to GDP growth. On the opposite side, if the Greek government did not proceed to the expected reductions in public expenditures and public consumption stayed around its 2011 level of 17.5% of GDP, this would remove about 0.7% p.a. from real GDP growth compared to global growth.

Table 1

	Coefficient estimates		
Determinants of growth	**MIN**	**MAX**	**AVERAGE**
Initial level of GDP	-0.025	-0.023	-0.022
Government consumption share in GDP	-0.25	-0.06	-0.15
Investment share in GDP	0.053	0.074	0.0615
Openness	0.008	0.02	0.014
Educational attainment	0.0034	0.0118	0.0084
Institutional Framework	0.0196	0.0293	0.0245
Economic Freedom	0.09	0.096	0.093
Fertility rate	-0.0161	-0.0132	-0.0147
Inflation	-0.053	0.00	-0.0250
Change in terms of trade	0.127	0.304	0.1745

Table 2
Growth Determinants in Greece and the World

	World 2000-2010	Greece 2000-2010	Greece 2013-2020	Contribution to Greece's GDP growth vs global growth in the next decade		
				AVERAGE	**MIN**	**MAX**
Government consumption as a % of GDP	17.4%	18.4%	13.0%	+0.80%	+0.33%	+1.36%
Trade Openness (Exports plus Imports as a % of GDP)	52.7%	57.6%	70.0%	+0.17%	+0.10%	+0.25%
Inflation rate	4.2%	3.3%	1.0%	0.06%	0.00%	0.12%
Institutional Framework (0 to 1 scale)	0.49	0.63	0.63	0.00%	0.00%	0.00%
Educational attainment (Years of upper-level schooling)	2.94	4.07	4.07	0.00%	0.00%	0.00%
Economic Freedom (0 to 1 scale)	0.68	0.71	0.71	0.00%	0.00%	0.00%
Log(Fertility rate)	Log(2.55)=0.41	Log(1.36)=0.13	0.13	0.00%	0.00%	0.00%
Terms of tradex Trade Openness	0.69%	-0.73%	0.50%	+0.19%	+0.10%	+0.23%
log(GDP)	Log(8,808)= 3.94	Log(23,794)= 4.38	Log(25,000)= 4.40	-0.05%	-0.05%	-0.04%
Investment as a % of GDP	21.3%	23.5%	20.0%	-0.20%	-0.24%	-0.17%
Total				**+0.97%**	**+0.24%**	**+1.75%**

5.

Conclusion and policy suggestions

The economic recession over the past five years, in combination with the fiscal consolidation measures under the Adjustment Programme, has led to a sharp deterioration in growth prospects of the Greek economy. Real GDP growth (in per capita PPP terms) has decelerated from an average annual growth of roughly 4.0% during 2000-2007 to negative growth rates that reached almost -7.0% in 2011 on an annual basis. Meanwhile, the Greek economy is expected to contract for a fifth successive year in 2012 and in 2013 as well, albeit at a slower pace.

Hence, it is of vital importance to identify specific factors that can potentially promote Greece's economic prospects in the long-run. Estimates from empirical growth regressions help us to determine the potential sources of growth, and provide some understanding about the size of their impact. According to our estimates, the recovery of the Greek economy is highly dependent upon the implementation of reforms under the economic adjustment programme. More specifically, the projected reduction in government consumption expenditures is expected to contribute significantly to real GDP growth in the following years. If Greece achieves to reduce its public consumption outlays by about 4.5% of GDP, growth of per capita GDP could growth faster by an additional 0.8% p.a., compared to the average country in the world.

Furthermore, our analysis suggests that another major source of Greece's economic growth is its external sector, provided that the recent substantial improvement in competitiveness will lead to a rebound of Greek exports over the next decade. Overall, the improvement in Greece's trade openness is estimated to contribute about 0.40% p.a. to per capita GDP growth, taking into account the interaction of terms of trade with trade openness. Hence, the restructuring of the Greek economy towards an export-based growth model with a smaller public sector should create the basis for a rebound of long-term economic growth in Greece.

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