Assessing the Macroeconomic Performance of Greece in a Comparative Perspective

Nikolaos Mylonidis*[a]
&
Vanghelis Vassilatos†

Abstract

This paper uses growth accounting in order (i) to compare the long-run macroeconomic performance of three European countries (Greece, Ireland and Sweden) and (ii) to evaluate some possible factors that might account for Greece's relative income and labor productivity stagnation. Ireland and Sweden provide the basis of comparison as they are often seen by Greek policy makers as benchmarks of how well a relatively *small* country can do in the European Union. We find that Greece's relative stagnation is primarily due to Total Factor Productivity (TFP) differences. We argue that Greece's TFP gap is likely accounted for by the low degree of openness of the Greek economy.

JEL classification: O11, O52, O57
Keywords: Greece; Neoclassical Growth; Total Factor Productivity

* Department of Economics, University of Ioannina, Greece.
† Department of Economics, Athens University of Economics and Business, Patission Street 76, Greece
[a] Corresponding author: University of Ioannina, Department of Economics, University Campus, 45110 Ioannina, Greece. Tel: +30 26510 95 927. Fax: +30 26510 95093. *E-mail:* nmylonid@uoi.gr

Assessing the macroeconomic performance of Greece in a comparative perspective

1. Introduction

Growth inequalities across countries have always been present. The exploration of the determinants of these inequalities helps in understanding what policy measures are needed in order to fill the gap between the poorest and wealthiest nations. This process of convergence towards the most developed countries has been one of the main objectives in the European Union (EU).

In this sense, Greece is a peculiar case. Although Greece has been a member of the EU since 1981, not only it has failed to converge with the richest nations in Europe, but it is also falling behind other member states with similar historical macroeconomic performance. This paper attempts to identify the causes of Greece's failure to reach the welfare level of the wealthiest European states, or even to replicate the economic success of other less developed European countries. Two European countries serve as benchmarks for the macroeconomic performance of Greece; Sweden and Ireland.

Sweden and Ireland are often viewed by Greek policy-makers as benchmarks of how well a relatively *small* country can do in the EU. On the one hand, it is Sweden that has combined sustained and high rates of growth with high level protection of social rights. On the other hand, it is Ireland which managed to transform from a dependent small underdeveloped state on the periphery of the United Kingdom to Europe's leading performer in prosperity. An additional reason to single out and compare these three countries is that they are often seen as *successful cases* of economic growth in the EU over the past decade although the sources of their growth differ substantially (see EEAG Report 2006).[1]

In this paper we analyze the macroeconomic trends of Greece, Ireland and Sweden over approximately the last 5 decades using a neoclassical growth accounting framework. We start with a comparison of the long-run macroeconomic performance of the three countries. The comparison shows that Greece has made no significant progress in catching up to the other two European countries. This evidence motivates the basic question we address in this paper: Which are the causes of Greece's stagnation and why Greece has failed in catching up to Ireland and Sweden?

[1] According to the EEAG Report 2006, accumulation in IT capital and TFP seem to have been the most important underlying sources of growth in Sweden. Greece has relied on more traditional sources, such as non-IT capital accumulation and increasing labor input. Finally, Ireland has had great success on many fronts, including both IT and non-IT capital accumulation, high TFP growth rates and increasing labor input.

Next, we decompose GDP per capita into two components: real GDP per worker and employment rates. This decomposition shows that Greece's stagnation is primarily due to its lower labor productivity, especially when compared to Ireland where labor productivity has soared over the last 20 years. It seems that stagnant relative total factor productivity (TFP) is the key determinant factor behind Greece's relative output and labor productivity stagnation. TFP stagnation, in turn, seems to be related to the low degree of openness of the Greek economy.

The paper is organized as follows. The next section outlines the neoclassical model on which we base our investigation. Section 3 compares Greece's macroeconomic trends to those in Ireland and Sweden. Section 4 investigates some possible key factors behind Greece's persistent stagnation. Section 5 concludes the paper and provides some policy implications.

2. The neoclassical model

This section briefly outlines a neoclassical growth model. The setup follows Cole *et al.* (2005).

The representative household in country *i* has the following objective function:

$$\max E_0 \sum \beta_i^t \left\{ u_i \left(C_{it}, L_{it} \right) \right\} \tag{1}$$

where $0 < \beta_i < 1$ is the discount factor and $u_i \left(C_{it}, L_{it} \right)$ is the preference for consumption (C_{it}) and labor (L_{it}) at period *t*.

Population (denoted by N_{it}) grows at a constant rate $n_i \geq 0$:

$$N_{it} = \left(1 + n_i \right)^t \tag{2}$$

A Cobb-Douglas production function (with constant returns to scale) produces output used for consumption and investment:

$$A_{it} K_{it}^{\theta} L_{it}^{1-\theta} \geq C_{it} + X_{it} \tag{3}$$

where A_{it} is TFP, K_{it} is capital and X_{it} is investment.

The process generating capital is given by:

$$K_{it+1} = X_{it} + \left(1 - \delta \right) K_{it} \tag{4}$$

where $0 < \delta < 1$ is the depreciation rate of capital.

Finally, TFP can be decomposed into two components:

$$A_{it} = \eta_{it} A_t, \quad 0 < \eta_{it} \leq 1 \tag{5}$$

where A_t is the world technology frontier and η_{it} is the relative efficiency of country *i* in using that technology.

It should be noted here that this simple model generates long-run differences between countries through two channels: (a) through the relative efficiency term η and (b) through differences in the relative supplies of capital and labor.

3. Comparing macroeconomic trends

3.1 Greece's persistent economic stagnation

Greece has experienced a turbulent growth during the past five decades. Figure 1 displays the evolution of real GDP growth in Greece over the period 1962 – 2004, relative to a 2 percent trend.[2] This trend reflects the average growth rate of the U.S. economy and it is a commonly used proxy for the rate at which TFP grows. Notice that we can roughly identify three distinctive subperiods. During the first subperiod (1962 – 1979), growth in Greece outstripped the annual trend growth of 2 percent. The major interruption to this growth pattern was the oil crisis in 1973 – 1974. During the second subperiod (1980 – 1997) output fell almost consistently below its 2 percent trend. Finally, in the last subperiod (1998 – 2004) growth rates outperformed the 2 percent trend.

[Figure 1]

Figure 2 compares Greece's long-run macroeconomic performance relative to that of Ireland and Sweden. It displays data on annual real GDP per capita over the period 1960 - 2004. Output is measured as a percentage of U.S. real GDP per capita. The average output of Greece is just 45 percent of the U.S. output, compared to an average of 51 percent for Ireland and 82 percent for Sweden.

[Figure 2]

We next consider how these relative output gaps have changed over time. Table 1 presents decade averages of per capita output. The table shows that Ireland, with a similar output level to Greece up to the 1980s, has experienced a significant catch up over the last 2 decades and almost doubled its

[2] A description of all data used in this section is given in the Appendix.

prosperity level (exceeding even that of Sweden's). Sweden's level of prosperity has constantly outperformed the output level of Greece throughout the sample period, albeit at a falling rate. However, the Swedish output level still remains almost 60 percent higher than that of Greece. Finally, Greece has at best remained stagnant especially from the 1980s onwards.

[Table 1]

One of the most interesting features of these data is the constancy of Greece's relative stagnation. Note that the relative output gap measure applied in the present study sheds new light on this issue and gives us a more complete picture than that suggested by focusing on the GDP growth rate only. Although in terms of GDP growth rates, Greece is generally viewed as one of the best performing economies in the Eurozone, especially since 1995 (see EEAG Report 2006), once we focus on the relative output gap measure it is only after 2000 that it starts to catch up. Moreover, if one looks further back in time, Greece's output level not only has failed to catch up but actually has fallen from 53 percent of the U.S. in the 1970s to 46 percent in 2004. In the following subsections we attempt to further explore this matter.

3.2 Output decomposition

We now decompose output per capita (Y/N) into two components: output per worker, i.e., per economically active individual, (Y/L), and the number of workers relative to total population, (L/N):

$$\frac{Y}{N} = \frac{Y}{L}\frac{L}{N} \tag{6}$$

This decomposition allows for the investigation of two possible stagnation factors namely, low-worker productivity (Y/L) and low employment (L/N). Figure 3 illustrates productivity rates in Greece, Ireland and Sweden relative to the U.S., whereas Figure 4 presents the corresponding employment rates. Two major findings emerge from these figures. First, employment rates do not seem to constitute a key factor for Greece's stagnation. The average relative employment rates vary from 0.88 in the case of Greece to 1.06 in the case of Sweden. Ireland's average relative employment rate is 0.92. Hence, Greece's employment rate is on average about 80 percent as high as in Sweden, and approximately equal to that in Ireland. The 20 percent employment gap (when compared to Sweden) may seem significant, but is unlikely to account for the fact that Greece's per capita output is almost half of that of Sweden.

In contrast, labor productivity seems to play a significant role in the present investigation. Labor productivity is clearly one of the factors behind Ireland's

economic success story. Irish productivity rose from 59 percent of the U.S. level in 1985 to 97 percent of the U.S. level in 2003. Swedish productivity has remained at relatively high levels throughout the period considered with an average rate of 76 percent relative to the U.S. Finally, the figure establishes that Greece's stagnation can be largely attributed to falling productivity. In particular, Greece's productivity was 62 percent of the U.S. level in the 1970s but fell to 53 percent in 2003. This decline is particularly evident from the 1980s onwards. Based on the last available observations the Greek labor productivity is on average about $\frac{1}{2}$ of the Irish level and $\frac{2}{3}$ of the Swedish level.

[Figures 3 and 4]

3.3 Total Factor Productivity

Since labor productivity plays a key role in our empirical investigation, it is worth decomposing it into two further components: physical capital per worker and total factor productivity (TFP). This decomposition allows us to evaluate the relative contribution of each component to Greece's labor productivity gap.

A measure for labor productivity can be easily derived from the Cobb-Douglas production function:

$$\frac{Y_{it}}{L_{it}} = A_{it}\left(\frac{K_{it}}{L_{it}}\right)^{\theta} \tag{7}$$

If we assume for the purposes of our empirical analysis that the U.S. TFP is a reasonably proxy for the world technology frontier, which implies that $\eta_{US} = 1$ for all *t*, then the relative labor productivity gap for country *i* is given below:

$$\frac{\left(\frac{Y_t}{L_t}\right)^{i}}{\left(\frac{Y_t}{L_t}\right)^{US}} = \frac{\left[\eta_t A_t\left(\frac{K_t}{L_t}\right)^{\theta}\right]^{i}}{\left[A_t\left(\frac{K_t}{L_t}\right)^{\theta}\right]^{US}} \tag{8}$$

Equation (8) states that the labor productivity gap is determined by two factors: (a) TFP gap and (b) capital-labor ratio gap. Besides its direct effect on labor productivity, TFP has an indirect effect through its impact on the capital-labor ratio (see Cole *et al.* (2005), p. 81). Thus, equation (8) accounts for both the direct and indirect effect of TFP on labor productivity.

The first step in this decomposition is to obtain data on capital-to-output ratios. To construct time series for physical capital stocks we use the perpetual inventory model (PIM) which is based on the capital accumulation process described in equation (4). To make an initial estimate of the capital stock we follow the approach suggested by McQuinn and Whelan (2007). According to this approach the ratio of investment to capital is given by:

$$\frac{X_t}{K_{t-1}} = \frac{\Delta K_t}{K_{t-1}} + \delta \tag{9}$$

and thus,

$$K_{t-1} = \frac{X_t}{\frac{\Delta K_t}{K_{t-1}} + \delta} \tag{10}$$

The initial capital stock estimate for 1960 for each one of the three countries is calculated according to the latter formula, using the average growth rate of investment over the 1950s as the proxy for the growth rate of the capital stock and assuming a depreciation rate (δ) of 5 percent.

Table 2 reports decade averages of the capital-to-output ratio in Greece, Ireland and Sweden relative to the U.S. The table shows that the Greek and Swedish ratios have roughly been the same over the entire sample period, and they both outperform the Irish capital share. These data suggest that capital shortfall does not seem to constitute a major factor for Greece's labor productivity gap.

[Table 2]

Our estimates of capital stock, in conjunction with data on labor and real GDP, can be used to obtain the growth accounting estimates of TFP per country over the period 1960 – 2004.[3] These estimates are calculated relative to the U.S. estimated TFP level. Figure 5 shows that Sweden's TFP has remained almost stable during the period considered. In particular, Sweden's TFP was 79 percent of the U.S. level in 1960, and was 81 percent in 2004. Ireland's TFP rose significantly (especially from the mid-1980s onwards) reaching the corresponding U.S. level in 2003. In contrast, the estimates for Greece indicate that its TFP chronology can be split into three subperiods which roughly correspond to the respective real GDP growth periods (see Section 3.1). During the first subperiod (1960 – 1980), TFP rose from 44 percent of the U.S.

[3] The parameter θ in the Cobb-Douglas production function is assumed equal to 1/3. This is the capital share frequently used in the growth literature.

level to 70 percent of the U.S. level. In the second subperiod (1981 – 1999), Greece's TFP initially declined and remained stagnant thereafter at approximately 59 percent of the U.S. level. Finally, during the current decade (2000 – 2004), a small upward trend in TFP is observed.

[Figure 5]

4. Possible causes of Greece's TFP gap

In this section we attempt to assess the impact of three conventional factors that might account for Greece's TFP gap – human capital, quality of institutions and openness of the economy.

4.1 Human capital

Up to now, our analysis has treated labor as a homogeneous factor of production, without any adjustment for differences in the human capital between countries. This implies that Greece's TFP gap may be partially due to underinvestment in the education of its labor force. This conjecture is worthy to be investigated as Ireland's economic success is often attributed, among other things, to its educational policy which has been consistently pursued by Irish governments since its initiation in 1967. The long-tailed impact of the change in educational policy is widely accepted. Many of the Northern European countries (including Sweden), which invested heavily in education in the immediate post-war years, experienced high growth rates up to the late 1970s.

Figure 6 plots the human capital stock in Greece, Ireland and Sweden relative to the U.S. Following Hall and Jones (1999) and Caselli (2005), the human capital stock is computed as a function of years of schooling in the population, i.e.,

$$h = e^{\varphi(s)} \qquad (11)$$

where h is the human capital stock, s is the average number of years of schooling in the population over 25 years old in Barro and Lee's (2000) dataset, and φ is a piecewise linear function such that:

$$\varphi(s) = 0.134 * s \quad \text{if} \quad s \le 4$$
$$\varphi(s) = 0.134 * 4 + 0.101 * (s - 4) \quad \text{if} \quad 4 < s \le 8$$
$$\varphi(s) = 0.134 * 4 + 0.101 * 4 + 0.068 * (s - 8) \quad \text{if} \quad s > 8$$

If human capital differences are the primary stagnation factors, then we should observe Greece's relative human capital stock stagnating, and human capital in Ireland and Sweden catching up to the U.S. However, this conjecture cannot be verified from Figure 6 since human capital in *all* three

countries is catching up to the U.S. level, especially from the 1980s onwards. Generally, the picture that emerges from Figure 6 is similar to that in Figure 4 (employment rates) and suggests that human capital is not the key factor behind Greece's TFP underperformance.

[Figure 6]

4.2 Institutional quality

The fact that Greece's relative output and productivity remain stagnant despite the increase in human capital implies that a different factor is holding back Greek relative TFP and output. Moreover, the fact that the income level in Ireland is currently above that of Sweden, whereas at the same time its human capital level is lower, suggests that there is an alternative factor driving its economic success.

Identifying this alternative factor is not an easy job. There is a general consensus that good institutions play a key role in economic growth (Mauro, 1995; Knack and Keefer, 1995; Acemoglu *et al*., 2001). Furthermore, Hall and Jones (1999) observe that the bulk of the relationship between institutions and growth runs through the impact of institutions on TFP.

Our main measures of institutional quality are the indices of law & order and of bureaucracy. Such measures are proxies for the transaction and transformation costs of production that may affect the volume and efficiency of investment and hence growth. Transaction costs, for example, are far higher when property rights are not reliable. Under these conditions, private firms typically operate on a small scale and/or in an underground economy. Transformation costs, too, can be raised substantially because unenforceable contracts mean using inexpensive technology and operating less efficiently and competitively on a short-term horizon.

The rule of law accounts for the cost of transaction and it has been an important focus of the literature on institutions and economic performance, such as Rodrik *et al*. (2004) and Dollar and Kraay (2003). It is measured by the International Country Risk Guide (ICRG) law and order index for the period 1984 - 2004.[4] The law sub-component is an assessment of the strength and impartiality of the legal system, while the order sub-component is an assessment of popular observance of the law. Thus, it is an index which measures whether and to what extent institutions protect property rights, and whether reliably enforced laws and regulations govern economic and social interactions. The index of bureaucracy (that is the ease of doing business) accounts for the transformation costs in the production process. It is measured by the ICRG's bureaucracy quality index for the same period (1984 – 2004). High points are given to countries where the bureaucracy has the strength

[4] Data are not available prior 1984.

and expertise to govern without drastic changes in policy or interruptions in government services. In contrast, countries that lack the cushioning effect of a strong bureaucracy receive low points because a change in government tends to be traumatic in terms of policy formulation and day-to-day administrative functions.

Table 3 reports the relative law & order and bureaucracy quality levels in selected time periods for Greece, Ireland and Sweden using the corresponding ICRG indices. The patterns in the table suggest that the institutional quality might account for Greece's TFP gap. However, it is unlikely to be a key factor because if it had been, then Greece should have experienced a significant increase in its TFP in the 1990s and possibly a subsequent decline in the post-2000 period. Nonetheless, none of these predictions are consistent with the data plotted in Figure 5.

[Table 3]

4.3 Openness of the economy

A wide range of empirical studies claim that outward-oriented economies consistently have higher growth rates than inward-oriented countries (see *inter alia* Edwards (1993) and Rodriguez and Rodrik (2001) for an extensive review of the relevant empirical literature on the growth effects of openness). Furthermore, a number of theoretical papers argue that low degree of openness in the economy leads to higher competitive barriers which in turn lead to low productivity through the channel of *X-inefficiency*, i.e. the failure of a firm to produce at its minimum cost (see Cole *et al.* (2005) for further discussion and references on this issue). The most basic measure of openness is the simple trade shares, which is exports plus imports divided by real GDP. Figure 7 plots these shares for Greece, Ireland and Sweden (relative to the U.S.) for the period 1960 – 2004. The figure shows that Greece has systematically been less open than the other two countries. Furthermore, Ireland's level of openness has sky-rocketed since the mid-1980s reaching its maximum point in 2001 (7.43 times higher than the corresponding U.S. level). This evidence is consistent with the existing literature and verifies the conventional view on the growth effects of openness.

[Figure 7]

5. Concluding remarks

This paper has assessed the long-run macroeconomic performance of Greece in a comparative perspective. Using growth accounting techniques, we found that stagnant TFP is the key factor behind Greece's relative output and labor productivity stagnation during the 1980s and 1990s. TFP measures the efficiency with which an economy uses its capital and labor services.

Identifying the causes behind Greece's relative income and labor productivity stagnation is crucial for providing right policy recommendations. We attempt to assess some possible factors (human capital, institutional quality and openness of the economy) that might account for Greece's TFP stagnation. The analysis indicates that the low degree of openness of the economy is at least one of the factors that drive down Greek relative TFP and output.

The main policy implication of our investigation is that Greece may be able to replicate the economic success of other European countries by raising competition. It should be noted here that competition is a broader concept than our preferred measure of simple trade shares. Trade can stimulate higher productivity, and subsequently higher growth rates, through different channels. For example, trade provides access for a country to technological advances, to vital investment and intermediate goods and encourages the development of research and development activities through increasing returns to innovation (Yanikkaya, 2003). However, there are other channels through which competition is linked to productivity, e.g. government policies that encourage (or discourage) the entry of more efficient firms, entry costs of new firms, well (or poorly) functioning capital markets and flexible (or inflexible) labor market regulations (Cole *et al.*, 2005).

Our findings can only be suggestive. Should low competition be the key factor behind Greece's relative TFP stagnation, then the quest for better understanding the reasons of the low competition in the Greek economy has to continue. If, however, this is not the case and other factors better explain this stagnation, then our analysis suggests that these factors should work through TFP and they must have been in place for at least the last two decades.

Appendix

Data definitions, sources and calculations

Variable	Source	Calculation
Real GDP (in 2000 constant prices)	Penn World Tables version 6.2	RGDPCH*POP
Real GDP per capita (in 2000 constant prices)	Penn World Tables version 6.2	RGDPCH
Real GDP per worker (in 2000 constant prices)	Penn World Tables version 6.2	RGDPWOK
Employment rates	AMECO	Total labor force / Population (15-64 years)
Real Investment (in 2000 constant prices)	Penn World Tables version 6.2	(KI/100)*(RGDPCH*POP)
Schooling	Barro and Lee (2000)	Average number of years of schooling in the population 25+
Law & Order Index	ICRG	Perceptions based index. Higher numbers indicate better environments
Bureaucracy quality index	ICRG	Perceptions based index. Higher numbers indicate Better environments
Openness (in 2000 constant prices)	Penn World Tables version 6.2	OPENK

References

Acemoglu, D., Johnson, S. and Robinson, J. A., 2001, "The colonial origins of comparative development: An empirical investigation", *American Economic Review*, 91, 1369-1401.

Barro, R. J. and Lee, J-W., 2000, "International Data on Educational Attainment: Updates and Implications", CID Working Paper No. 42.

Caselli, F., 2005, "Accounting for cross-country income differences", in: P. Aghion and S. Durlauf, eds., *Handbook of economic growth*, Elsevier, p.679-742.

Cole, H. L., Ohanian, L. E., Riascos, A. and Schmitz Jr, J.A., 2005, "Latin America in the rearview mirror", *Journal of Monetary Economics*, 52, 69 – 107.

Dollar, D. and Kraay, A., 2003, "Institutions, trade and growth." *Journal of Monetary Economics*, 50, 133-162.

Edwards, S., 1993, "Openness, trade liberalization, and growth in developing countries", *Journal of Economic Literature,* 31, 1358–1393.

EEAG Report on the European Economy, Chapter 3, 2006.

Hall, R. and Jones, C. I., 1999, "Why do some countries produce so much more output per worker than others?", *Quarterly Journal of Economics*, 114, 83-116.

Heston, A., Summers, R. and Aten, B., 2006, Penn World Table Version 6.2, Center for International Comparisons of Production, Income and Prices at the University of Pennsylvania.

Knack, P. and Keefer, S., 1995, "Institutions and economic performance: cross-country tests using alternative institutional measures", *Economics and Politics*, 7, p.207-227.

Mauro, P., 1995, "Corruption and growth", *Quarterly Journal of Economics*, 110, p.681-712.

McQuinn, K. and Whelan, K., 2007, "Solow (1956) as a model of cross-country growth dynamics", *Oxford Review of Economic Policy*, 23, 45-62.

Rodriguez, F. and Rodrik, D., 2001, "Trade policy and economic growth: a skeptic's guide to the cross-national evidence", in: Bernanke, B.S., Rogoff, K. (Eds.), NBER Macroeconomics Annual 2000. MIT Press, Cambridge.

Rodrik, D., Subramanian, A. and Trebbi, F., 2004, "Institutions rule: the primacy of institutions over geography and integration in economic development." *Journal of Economic Growth*, 9, 131-165.

Yanikkaya, H., 2003, "Trade Openness and Economic Growth: A Cross-Country Empirical Investigation", *Journal of Development Economics*, 72, 57– 89.

Table 1. Real GDP per capita relative to the U.S. (averages for selected periods)

Decade	Greece	Ireland	Sweden
1960s	0.38	0.42	0.87
1970s	0.53	0.46	0.86
1980s	0.48	0.46	0.82
1990s	0.42	0.57	0.74
2000-2004	0.44	0.78	0.75
Average (1960-2004)	0.45	0.51	0.82

Source: Penn World Tables, version 6.2.

Table 2. Capital-to-Output ratios relative to the U.S. (averages for selected periods)

Decade	Greece	Ireland	Sweden
1960s	0.99	0.98	1.40
1970s	1.22	1.04	1.33
1980s	1.42	1.18	1.34
1990s	1.36	0.98	1.35
2000-2004	1.16	0.76	1.16
Average (1960-2004)	1.24	1.01	1.27

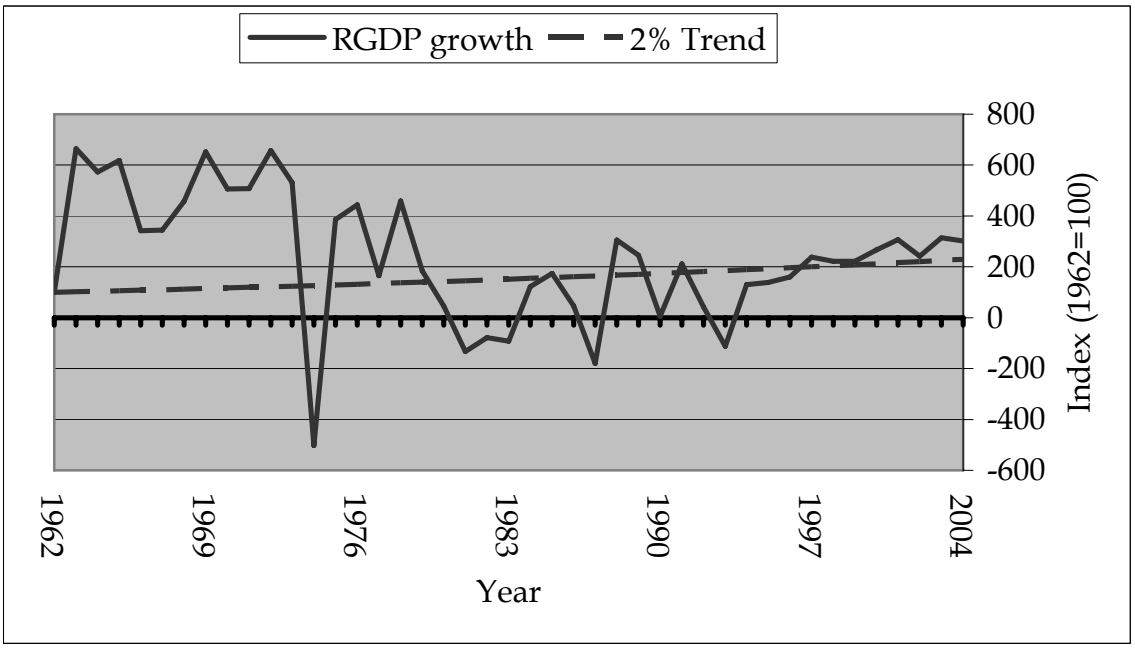
Source: Penn World Tables, version 6.2.

Table 3. Institutional quality (averages for selected periods – U.S. = 100)

Period	Greece	Ireland	Sweden
		Law and Order	
1984-1989	50	67.59	100
1990-1999	78.19	92.64	100
2000-2004	55.29	108.76	108.76
		Bureaucracy Quality	
1984-1989	50	87.75	100
1990-1999	72.92	98.44	100
2000-2004	75	100	100

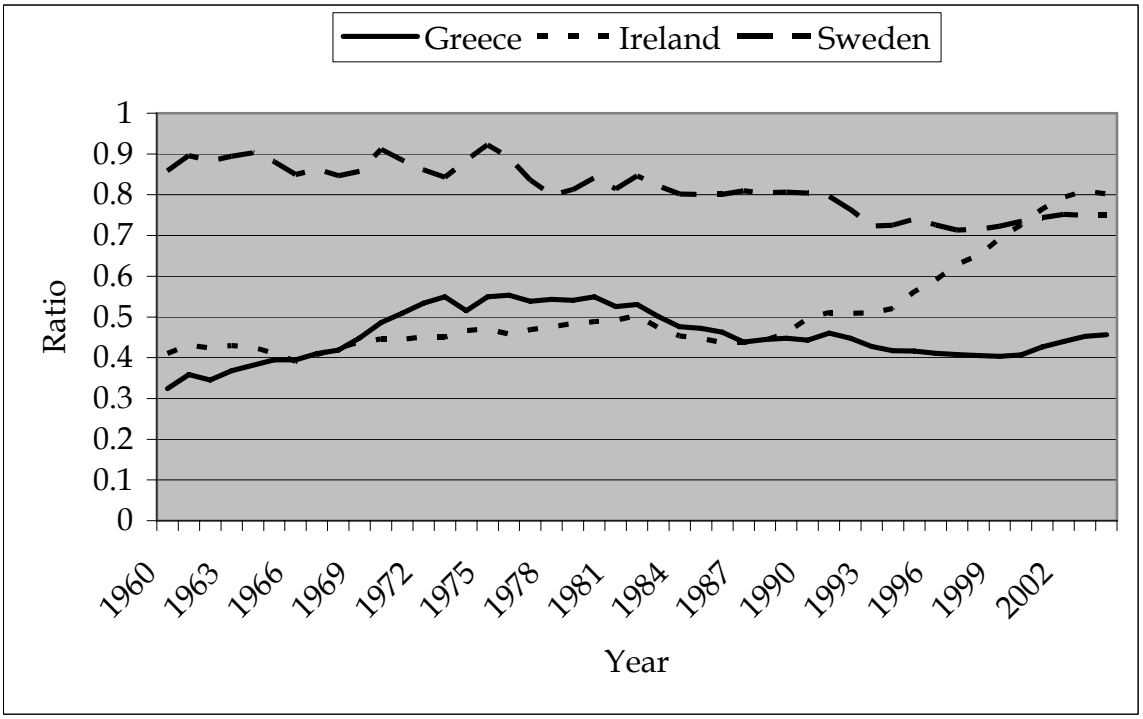
Source: International Country Risk Guide (ICRG).

Figure 1. Real GDP growth of Greece



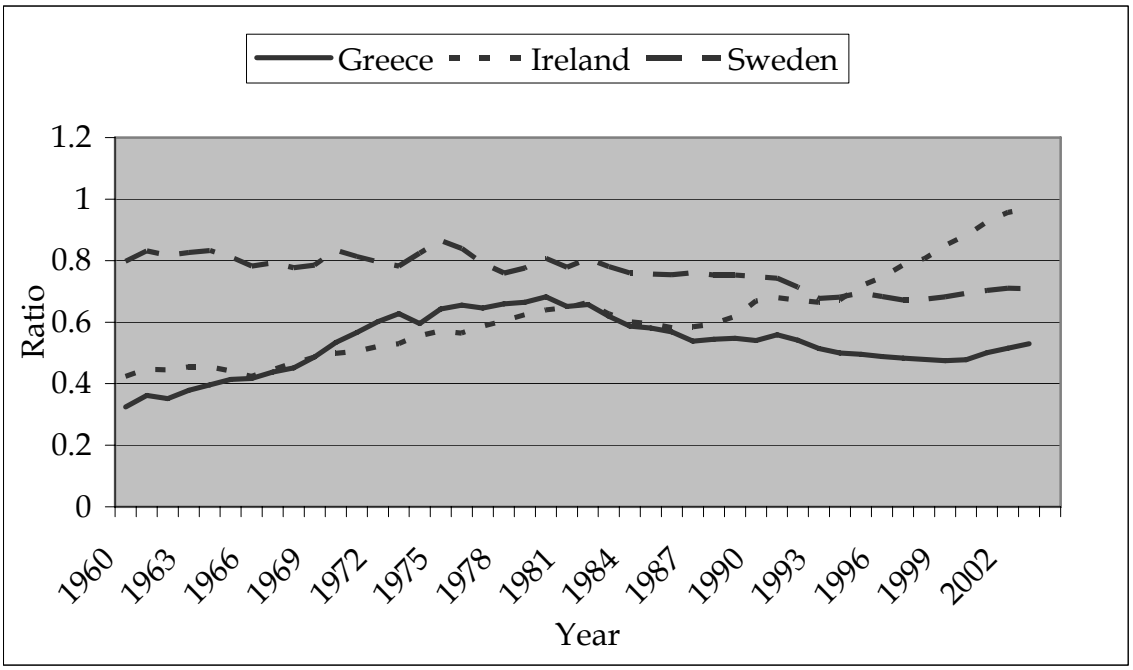
Source: Penn World Tables, version 6.2.

Figure 2. Real GDP per capita relative to U.S.



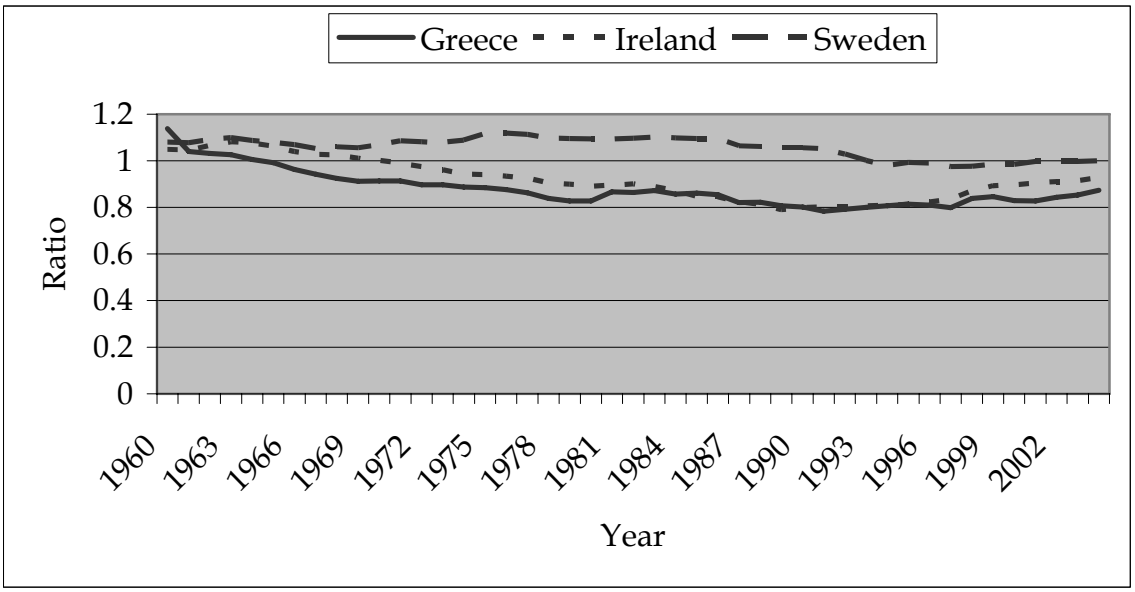
Source: Penn World Tables, version 6.2.

Figure 3. Real GDP per worker relative to U.S.



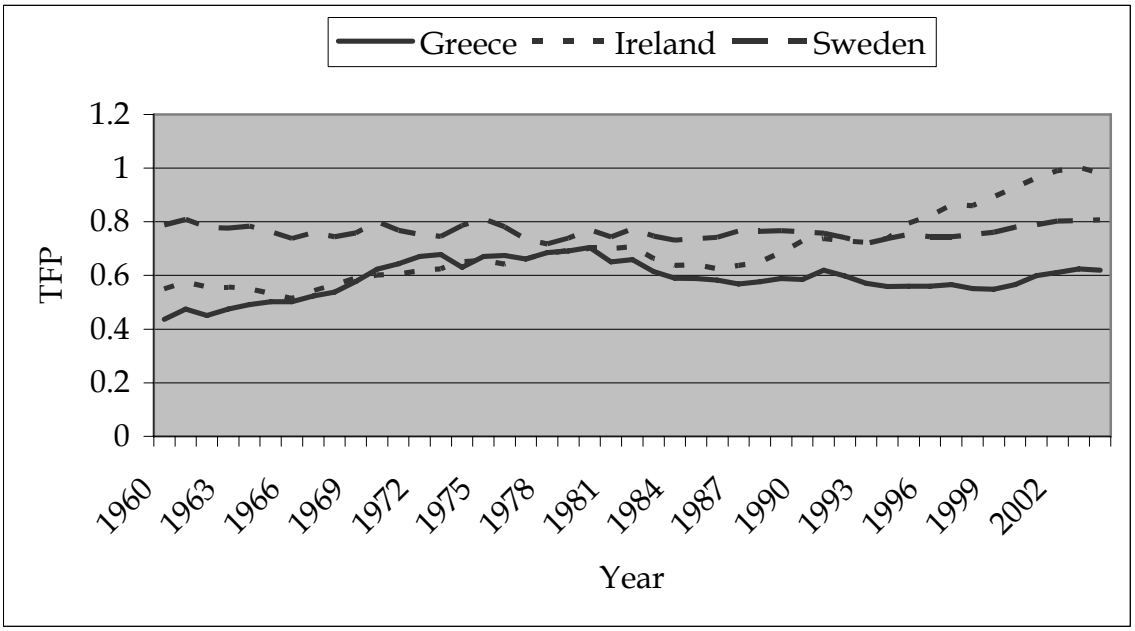
Source: Penn World Tables, version 6.2.

Figure 4. Employment rates relative to U.S.



Source: AMECO.

Figure 5. Total Factor Productivity relative to U.S.



Source: Penn World Tables and AMECO, version 6.2.

Figure 6. Human Capital Stock relative to U.S.

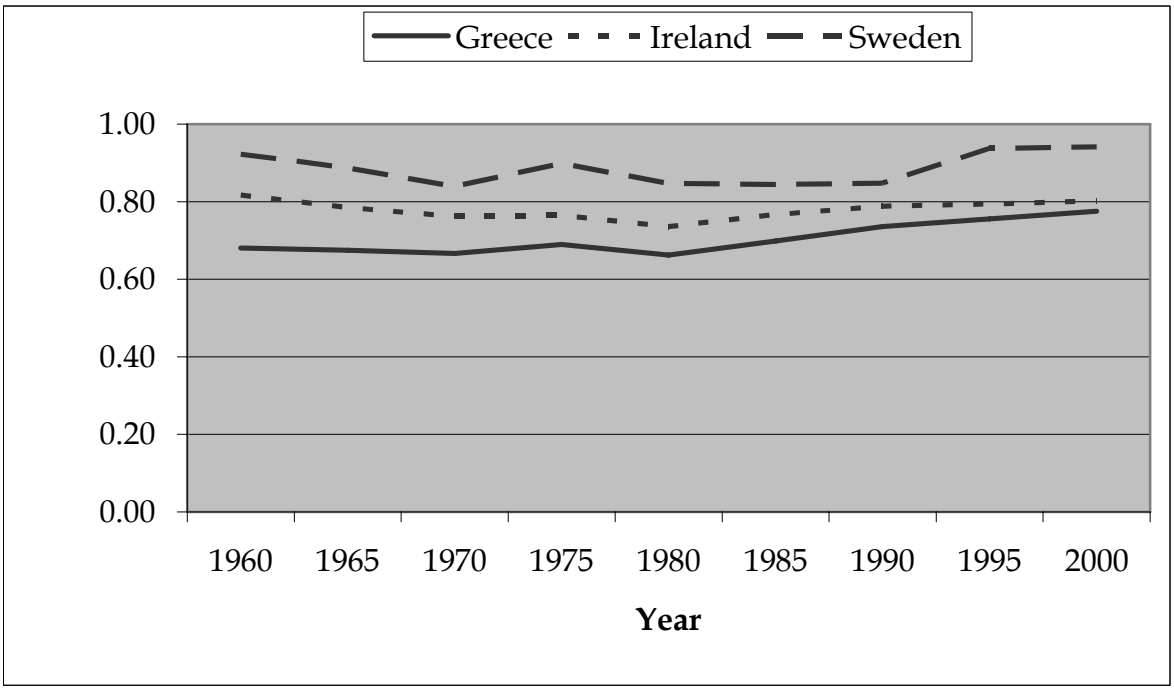


Figure 7. Trade Shares of Real GDP relative to U.S.