

DISCUSSION PAPER SERIES

No. 2852

**ECONOMIC GROWTH IN GREECE:
PAST PERFORMANCE AND
FUTURE PROSPECTS**

Barry Bosworth and Tryphon Kollintzas

INTERNATIONAL MACROECONOMICS



Centre for Economic Policy Research

www.cepr.org

Available online at:

www.cepr.org/pubs/dps/DP2852.asp

ECONOMIC GROWTH IN GREECE: PAST PERFORMANCE AND FUTURE PROSPECTS

Barry Bosworth, Brookings Institution
Tryphon Kollintzas, Athens University of Economics and Business, and CEPR

Discussion Paper No. 2852
June 2001

Centre for Economic Policy Research
90–98 Goswell Rd, London EC1V 7RR, UK
Tel: (44 20) 7878 2900, Fax: (44 20) 7878 2999
Email: cepr@cepr.org, Website: www.cepr.org

This Discussion Paper is issued under the auspices of the Centre's research programme in **International Macroeconomics**. Any opinions expressed here are those of the author(s) and not those of the Centre for Economic Policy Research. Research disseminated by CEPR may include views on policy, but the Centre itself takes no institutional policy positions.

The Centre for Economic Policy Research was established in 1983 as a private educational charity, to promote independent analysis and public discussion of open economies and the relations among them. It is pluralist and non-partisan, bringing economic research to bear on the analysis of medium- and long-run policy questions. Institutional (core) finance for the Centre has been provided through major grants from the Economic and Social Research Council, under which an ESRC Resource Centre operates within CEPR; the Esmée Fairbairn Charitable Trust; and the Bank of England. These organizations do not give prior review to the Centre's publications, nor do they necessarily endorse the views expressed therein.

These Discussion Papers often represent preliminary or incomplete work, circulated to encourage discussion and comment. Citation and use of such a paper should take account of its provisional character.

Copyright: Barry Bosworth and Tryphon Kollintzas

June 2001

ABSTRACT

Economic Growth in Greece: Past Performance and Future Prospects*

This Paper examines the past growth performance of the Greek economy and examines the outlook for future growth in light of the macroeconomic stabilization that was achieved over the last half of the 1990s and following Greece's admission to the euro currency zone. The Greek economy performed very poorly over the quarter-century 1970–95, during which it was the poorest country in the European Union. We develop a set of growth accounts that attribute part of the deteriorating performance to a fall-off in capital formation, but the most dramatic factor is a sharp deterioration in multifactor productivity, or the efficiency of the economy. Part of the explanation lies with the collapse of macroeconomic policy, which took the form of large fiscal deficits and very high rates of inflation. The Greek economy also fares poorly in other dimensions of its economic institutions, however, such as competitiveness of its tradable goods sectors, a highly constrained labour market, and a reputation as an unattractive market for foreign capital.

Over the last half of the 1990s, Greece undertook a successful programme to restore fiscal and monetary stability – by the end of 2000, it had qualified for admission to the euro currency system. The restoration of rational macroeconomic policies also led to an improvement in economic growth to the extent that Greece matched the performance of the rest of the EU over the 1995–2000 period. It also appears that these growth rates are sustainable and consistent with current rates of capital accumulation.

The next step would be for Greece to attain an accelerated path of growth that would allow it to catch up with the rest of the EU in future years, perhaps following the experience of Ireland. We conclude, however, that Greece still lacks a strategy to achieve further acceleration of growth. It lacks a strong export sector comparable to that of Ireland; and, while it continues to be an unattractive destination for foreign direct investment, domestic rates of saving are insufficient to finance higher rates of capital investment. It needs to institute a faster pace of reform for domestic economic institutions if it hopes to promote innovation and entrepreneurship.

JEL Classification: E60, O40, O50

Keywords: economic institutions, reforms, structural funds package, Greek economy

Barry Bosworth
Brookings Institution
1775 Massachusetts Avenue NW
Washington
DC 20036
USA
Tel: (1 202) 797 6122
Fax: (1 202) 797 6004
Email: bbosworth@brook.edu

Tryphon Kollintzas
Athens University of Economics and
Business (IMOP)
Department of Economics
Patisision 80
10434 Athens
GREECE
Tel: (30 1) 825 6998
Fax: (30 1) 823 1725
Email: kollintzas@hol.gr

For further Discussion Papers by this author see:
www.cepr.org/pubs/new-dps/dplist.asp?authorid=100555

For further Discussion Papers by this author see:
www.cepr.org/pubs/new-dps/dplist.asp?authorid=121261

* An earlier version of this paper was presented at the conference 'Economic Growth in Greece: Past and Future', organized by the Bank of Greece and the Brookings Institution, Athens, 7/8 December 2000. We are grateful to several of the participants in this conference for comments. Olivier Coibion provided extensive assistance in the preparation of this Paper. Tryphon Kollintzas gratefully acknowledges financial support of the European Commission. This Paper is produced as part of a CEPR Research Network on New Approaches to the Study of Economic Fluctuations, funded by the European Commission under the Training and Mobility of Researchers Programme (Contract No. ERBFMRX-CT98-0213).

Submitted 03 May 2001

NON-TECHNICAL SUMMARY

In this Paper we examine the past performance of the Greek economy in some detail, and we try to provide a few answers to the question of why growth slowed so dramatically. In the first section, we develop a simple set of growth accounts for Greece and compare the growth of labour productivity and multifactor productivity with those of the EU. All of the industrial countries experienced a series of external shocks and growth slowed considerably on a global basis. We use the EU average to adjust for these common factors, and evaluate Greece's performance relative to that average. Then we compare the growth of the Greek economy to three other countries with similar starting points and basic economic conditions, including structural funds transfers from the rest of the EU – Ireland, Spain and Portugal. In the second section, we examine several factors that have been suggested as possible contributors to the slowdown. These include the deterioration in macroeconomic policy, reduced rates of capital formation, the shock of entry into the EU, and the presence of structural rigidities in labour markets. In the third section, we try to look ahead to evaluate Greece's growth prospects in a world of more stable macroeconomic conditions, but one in which Greece will face an increasing degree of competition from countries in Central and Eastern Europe.

We conclude that the economic stagnation was attributable to a widespread weakening of economic institutions that went beyond the breakdown of macroeconomic policy to a rigid and overregulated labour market, a deterioration in the competitive position of the tradable goods sector, and continuing subsidies to inefficient enterprises. The restoration of a rational macroeconomic policy structure has provided support for a renewal of economic growth. If, however, Greece is to accelerate its growth rate to a pace that would imply significant convergence of incomes to the EU average, it will need to consider more drastic reform of existing economic institutions.

A substantial deregulation of labour markets and increased spending on education could improve future growth prospects by improving the quality of the Greek workforce. Despite some recent, modest changes, Greek labour markets are still heavily regulated, and the high level of employment taxes drives many workers into the informal sector. These are particularly important barriers to the participation of foreign firms.

Greece also lags behind the rest of Europe in the development of its public infrastructure. Some measures of the productivity gaps in specific industries are shown in Table 5. Greece appears particularly weak in transportation, the postal service, and electricity generation. While the government has

received large transfers from the EU to upgrade infrastructure, large portions were used to subsidize public enterprises. During the 1990s, the government has taken steps to sell or liquidate many of the enterprises for which it assumed responsibility in the 1980s, but the legacy is a decade or more of lost investment. Furthermore, given the budgetary strains, there is little choice but to pursue a more extensive and faster pace of privatization to provide the resources for modernization.

Third, although considerable steps have been taken to reform the system of state-owned banks, they remain highly inefficient relative to the rest of Europe with very wide loan–deposit rate spreads, and Greece continues to display a low rate of financial intermediation. A more dynamic and competitive banking system would improve the utilization of scarce saving and promote efficiency gains in industry. Having cleaned up the balance sheets of many of the state banks, Greece should be in a position to move ahead with an aggressive programme of privatization of the banking system and expansion of private security markets.

Finally, if Greece is successful in stimulating a more rapid pace of improvement in TFP, it will need to find a means of raising the national saving rate. Options for increased reliance on foreign saving seemed very limited in view of the existing current deficit and the weak export capacity. The international experience suggests that in the short run, an increase in public saving is the most certain means of achieving a higher rate of national saving. The experience with various incentives for private saving has been generally disappointing.

1. Introduction

Over the past quarter century the Greek economy has had a very disappointing rate of economic growth. After a rapid expansion in the years following the end of the civil war, the growth of real GDP slowed to only 1.5 percent annually in the period of 1973-95.¹ Much of the popular discussion has attributed the poor performance to deteriorating economic policy conditions in the period after 1973 -- particularly during the 1980s. Beginning in the mid-1970s the government ran large and sustained budget deficits and monetary policy accommodated a sharp acceleration of inflation. High rates of wage inflation led to a squeeze of profit margins and a weakening of investment incentives.

With the restoration of macroeconomic order in the late nineties, a more complete explanation of the growth slowdown takes on added importance. Will a stable macroeconomic environment be enough to restore growth or do the fundamental causes of the poor performance lie elsewhere? In addition, since its admission to the EU, Greece has received large transfers from the rest of the European Union. A major objective of those programs has been to promote a catch-up of incomes in the poorer countries. Will the resources of the Third Structural Funds Package (2000-2006) suffice so that income per capita in Greece will start converging to the EU average?² In the most recent five

¹ According to data collected by Maddison (1995), Greece was in 1950 the poorest of the current members of the European Union. Over the next two decades up to 1973, it was the fastest growing economy and its standard of living rose to exceed that of Ireland and Portugal. Since 1973, it has had the lowest rate of growth and has fallen back to being the poorest country in the EU.

² According to the Ministry of Finance, these transfers rose from an average of two percent of GDP in the 1980s to over four percent in the 1990s, and 5 percent in 2000.

years, 1995-2000, growth has averaged 3.3 percent annually, slightly exceeding the EU average.

In this paper we examine the past performance of the Greek economy in some detail, and we try to provide a few answers to the question of why growth slowed so dramatically. In the first section, we develop a simple set of growth accounts for Greece and compare the growth of labor productivity and multifactor productivity with those of the EU. All of the industrial countries experienced a series of external shocks and growth slowed considerably on a global basis. We use the EU average to adjust for these common factors, and evaluate Greece's performance relative to that average. Then we compare the growth of the Greek economy to three other countries with similar starting points and basic economic conditions, including Structural Funds transfers from the rest of the EU - Ireland, Spain and Portugal. In the second section, we examine several factors that have been suggested as possible contributors to the slowdown. These include the deterioration in macroeconomic policy, reduced rates of capital formation, the shock of entry into the EU, and the presence of structural rigidities in labor markets. In the third section, we try to look ahead to evaluate Greece's growth prospects in a world of more stable macroeconomic conditions, but one in which Greece will face an increasing degree of competition from countries in Eastern and Central Europe.

We conclude that the economic stagnation was attributable to a widespread weakening of economic institutions that went beyond the breakdown of macroeconomic policy to a rigid and over-regulated labor market, a deterioration in the competitive position of the tradable goods sector, and continuing subsidies to inefficient enterprises. The restoration of a rational macroeconomic policy structure has provided support for a

renewal of economic growth. However, if Greece is to accelerate its growth rate to a pace that would imply significant convergence of incomes to the EU average, it will need to consider more drastic reforms of existing economic institutions.

2. The Historical Record

In a 1995 paper, George Alogoskoufis referred to the break in Greek economic performance before and after 1973 as the ‘two faces of Janus’ because of the magnitude of the divergence in economic trends. For the twenty years up to 1973, Greece enjoyed high growth and low inflation; and for the twenty years thereafter, the economy stagnated and inflation became high and persistent. Alogoskoufis views the change as reflective of a major regime change as Greece moved from a dictatorship to democracy in 1974, with a subsequent deterioration of political and economic institutions.

Using the method of Recursive Residuals, Christodoulakis, Dimeli and Kollintzas (1996) on the other hand find a single break in the mean of the growth rate of GDP per capita at 1980. Among the several reasons they suggest for this break are the reduction in industry protection accompanying Greece’s entry in the EU and the political cycle effect of a “socialist” party (PASOK) taking over from a “conservative” party (New Democracy), in 1981.

2.1 *Growth Accounts*

The basic pattern of the growth experience is summarized in Figure 1a. The growth in output per worker slowed from a rate in excess of 9 percent annually in the 1960-73

period to one percent per year from 1973 to 2000.³ We can also divide the growth of labor productivity into the contribution of increases in physical capital per worker, improvements in education, and the residual of changes in multifactor productivity (MFP).⁴ As shown in the figure, but more clearly in Table 1, the growth slowdown can be traced both to a sharp deceleration of capital accumulation and an outright decline in multifactor productivity. The contribution of increased physical capital per worker drops from a robust 4.2 percent per year to only 0.7 percent. As measured by an index of educational attainment, the skills of the Greek labor force continued to rise throughout the period. The change in multifactor productivity actually turns negative; but, given the accuracy of the underlying data and the methodology, it would be more accurate to view it as stagnating over a twenty-five year period. Thus, while a falloff in capital formation appears to be a significant part of the story, there is also a very large deterioration in the performance of MFP.

Similar results were obtained by Christodoulakis, Dimeli and Kollintzas (1996) using a smaller sample (1960-1992), somewhat different measures of the factors of production and the old unrevised GDP data. They report the average growth rate of MFP to be 3.72, 1.89, and -0.04 in the sixties, seventies and eighties.⁵ These growth rates amount to 54%, 35% and -3% , respectively, of the corresponding labor productivity growth rates, in their data.

³ The rate of growth for output per worker and MFP is probably overstated in the pre-1973 period because married women in the agricultural sector were included as part of the labor force in the 1961 census. The drop in the number of unpaid family workers in agriculture between the 1961 and 1971 censuses accounted for a 10 percent decline in the measured labor force. In addition, we made no correction for changes in the workweek. However, the study by Tsaliki (1991) suggest a continuous decline in average hours after 1960 that would have only a small influence on relative rates of change for the subperiods.

⁴ The details of the construction of the growth accounts are provided in Appendix I.

One of the puzzles of accounting for the post-1973 slowing of growth is that it was a very general phenomenon affecting most of the world's economies. Thus, before we go too far in searching for a Greek explanation, we need to adjust for the external shocks that were common to all countries. We have done this by extending the growth-accounting methodology to 13 other European economies, and using the arithmetic average of the 13 as the benchmark against which we judge Greece's performance.

The results of the benchmark comparison are shown in Figure 1b, where each of the component indexes for Greece is divided by the corresponding EU average. The deteriorating performance of the Greek economy becomes even more evident, but the distribution of the sources of the decline between a reduced rate of capital formation and lower rates of MFP growth remain very similar, a lower rate of capital accumulation accounts for about 40 percent of the slowdown. The contribution of increased capital per worker, which had far exceeded the European average in the pre-1973 period, slowed to the average; and the growth of MFP consistently fell short of the performance of the rest of Europe until 1995. Since 1995, growth has matched that of the rest of Europe.

The adjustment for the common external shocks also has some influence on the timing of the break in the growth trend. In Figure 1b, the Greek economy outperforms the rest of Europe in the pre-1973 period, and growth slows after 1973; but there is another large downward break in the early 1980s that is most pronounced in the MFP component. Measured by both output per worker and multi-factor productivity, the Greek economy fell short of the rest of Europe by ever-increasing amounts throughout the 1980s and into the 1990s. Thus, relative to the rest of Europe, the break in

⁵ This GDP revision is explained in Appendix II.

performance seems more pronounced at about 1980, rather than 1973. That is of some potential significance, for as mentioned earlier, in 1981 Greece joined the European Community and PASOK won control of the government, introducing some new directions for economic policy.

Also in Table 1, the growth performance of the Greek economy is matched against that of three other European countries that were at similar stages of economic performance in the early 1960s, Ireland, Portugal and Spain. For the whole period of 1960-96, Greece compares quite favorably with the other three; but again that is due to the strong growth of the pre-1973 period. Since 1973, Greece has the lowest rate of increase in output per worker and the change in multi-factor productivity has been negative. Measured in purchasing power parity (OECD), Ireland has moved up to the average of the EU in terms of output per worker and Spain is only slightly below the average; but both Greece and Portugal have failed to make further progress in narrowing the gap after 1973. In addition, both Greece and Portugal experienced a very sharp deterioration in the contribution of capital per worker as well as MFP. In contrast, the slowdown in Spain was largely due to a falloff in MFP growth, and improvements in capital per worker have never been that important in Ireland.

In evaluating these comparisons, it is important to recognize that there are significant reservations about the quality of the economic data for Greece. As discussed more fully in Appendix II, a recent revision of the national accounts resulted in a 20 percent increase in the level of GDP beginning in 1988, as the national statistical office made an effort to capture more of the informal sector. There is considerable uncertainty about the appropriate adjustment for earlier years. In the published revisions, the adjustment to the

level of nominal GDP is phased down to 6 percent in 1960; but for the volume measures, the adjustment is significant all the way back to 1960. For example, the level of real GDP is raised by 38 percent in 1973 and 25 percent in 1960. Thus, the revisions have a modest impact on the estimate of real GDP *growth* over the full period.

We can also compare the national accounts to another independently derived measure of living standards. Real wage growth should move in line with economy-wide changes in labor productivity over long period of time. The comparison is less reliable for Greece because there are large numbers of the self-employed, and a survey of wage rates (independent of the national accounts) is limited to the manufacturing sector.⁶ Still, an index of the real wage in manufacturing, deflated by the CPI, is shown in Figure 2, together with indexes of labor productivity (inclusive of the self-employed) for the total economy and the industrial sector. The wage data confirm that Greece experienced very rapid growth in the 1960s; but, while there is a marked slowing of growth in later years, the timing is more supportive of the Christodoulakis, Dimeli and Kollintzas (1996) view, that the big break in performance occurred in the 1980s, not the 1970s.⁷

2.2 *Sectoral Comparisons*

Historical data at the level of individual industries are very limited in Greece; and with the recent revisions in the national accounts, information for the pre-1988 period has become even more questionable. However, given the large size of the agricultural sector in the early 1960s, some disaggregation is necessary for identifying the sources of growth. Thus, we have developed measures of labor productivity at the level of

⁶ According to the Ministry of Labor, the fraction of self-employed to employed was 37% and 35.5% in 1991 and 1997, respectively.

agriculture, industry, and services.⁸ For purposes of comparison, we compiled matching data for Spain and Portugal, two countries with similar economic conditions in the early 1960s, and we have only employment information for Ireland.⁹

We have modified the published data on agricultural output in Greece prior to 1988 simply because we could not understand the basis for the drastic revisions to the previously published information. In the new national accounts the estimate of nominal value added in agriculture is revised *down* for the 1960-88 period by an average of 9 percent with no change in the trend. In contrast, real output is revised *up* by a average of 70 percent with a peak of 125 percent in 1973. In effect, there is a dramatically different estimate of the time path of agricultural prices. The national accounts revisions are discussed in more detail in an appendix; but we have created an alternative, based on extrapolating the average ratio of the new to the old series for 1988-90, 0.98, back to 1960.

As shown in Figure 3, the pattern of change in output per worker at the sector level is broadly similar across the three countries. The growth in productivity is largest in agriculture, but it starts from a very low level.¹⁰ Furthermore, productivity growth in Spain has generally outpaced that of Greece and Portugal in agriculture and industry – the

⁷ The growth of real wages in excess of productivity in the last half of the 1970s is reflected in a large rise in labor share of GDP in the national accounts.

⁸ Agriculture includes forestry and fisheries, and industry is inclusive of mining, construction, manufacturing, and electricity, gas, and water. Services comprises a substantial number of industries where the output price is estimated on the basis of input prices, particularly wage rates.

⁹ Ireland does not compile volume measures of output at the sector level, but nominal measures of value added are available.

¹⁰ The spectacular gains in productivity in agriculture in all three countries is consistent with the notion of considerable unemployment being camouflaged as underemployment.

later by a wide margin. Greece has performed relatively better in services, but the growth slowdown is very evident in both industry and services.

A large decline in the proportion of employment in the agricultural sector (shown in panel 2 of figure 3) is also a very common feature of these economies and Ireland. In fact, the reallocation of employment -- from the low-productivity sector, agriculture, to the higher productivity sectors of industry and services -- has been a major source of the improvements in productivity reported in Table 1. We can illustrate this point by representing aggregate productivity as an employment-weighted average of productivity in the individual sectors:

$$(1) \quad A_0 = \sum_i \left(\frac{X_i}{E_i} \right) * \left(\frac{E_i}{E_0} \right) = \sum_i A_i S_i;$$

where X_i = output in industry i ,
 E_i = employment in industry i , and
 S_i = employment share in industry i .

Then, the change in aggregate productivity can be divided into a change effect that is computed as an employment-weighted average of productivity growth in individual industries and a levels effect of employment shifting from low-productivity industries to those with high productivity levels:

$$(2) \quad \dot{A}_0 = \sum_i \dot{A}_i S_i + \sum_i A_i \dot{S}_i.$$

Thus, the levels effect of reallocating labor can be measured by weighting the change in the employment share of each industry over various subperiods, using as weights the relative labor productivities at the beginning of each subperiod. The resulting estimates of the employment-shift effect are shown in Column 5 of Table 1. The resource reallocations were particularly important in the pre-1973 period, and thus they can

explain a significant portion of the slowing of MFP growth after 1973. The magnitude of the change between the 1960s and the 1990s is greatest for Spain, but it is also substantial for Greece and Portugal: one percentage point off the annual growth rate. It is relatively unimportant for Ireland because, even though there is the same magnitude of change in the employment shares, the differences in labor productivity across the sectors are modest.

2.3 *Saving-Investment Balance*

The prior sections have documented a significant deterioration in the contribution of increased capital per worker to economic growth. That falloff is also evident in the data on rates of national saving and investment. The basic data are summarized in Figures 4a and 4b. Compared to other EU countries, the national saving rate for Greece began at a modest level in the early 1960s, but rose sharply over the last half of the 1960s and the early 1970s. Greece also benefited in the 1960s from an inflow of foreign capital of about two percent of GDP. Given the low initial capital stock and the rapid growth of income, the total supply of saving was sufficient to finance a high rate of capital accumulation up to about 1981. The saving rate fell sharply in the early 1980s, however, and continued to drift down in subsequent years. In the 1990s, national saving has averaged about 18 percent of GDP, compared with about 21 percent for the rest of the EU. Foreign capital inflows have increased in importance in the 1990s; but foreign direct investment has remained steady at only about one percent of GDP, while the dominant inflows consist of foreign loans to the government and private firms. Private portfolio capital inflows are very small.

On the investment side (Figure 4b), the behavior of private-sector investment closely tracks the movements in the national saving rates – there is very little fluctuation in the government component.¹¹ A substantial portion of the long-run variation is accounted for by residential investment, so that the change in business investment is less than might be anticipated with such a large change in the saving rate.¹²

The nominal data suggest that much of the secular decline in national saving can be traced to a deterioration in the public sector fiscal position, as the budget balance changed from 0.5 percent of GDP in 1960-73 to an average of -13.6 percent in the 1985-95 period (Figure 5). The private saving rate has declined from its peak of the late 1970s, but it is still well above the rates of the 1960s. However, in the period after 1980 Greece experienced a very high rate of inflation and a major increase in public indebtedness – from 25 percent of GDP in 1980 to 100 percent by 1993. Thus, the division of national saving between the government and private sectors may be biased by the inclusion of nominal interest payments in the measure of government outlays. In an inflationary environment, a portion of interest payments represents a repayment of loan principal, amortization, rather than constituting income to the private sector recipients. The potential importance of this factor is apparent in Figure 5 where the primary public budget balance (exclusive of interest) departs dramatically from the trend of the overall balance.

¹¹ The rise in fixed investment in the mid-1970s is significantly less than that for saving because of a large increase in inventory accumulation that may reflect some inconsistency in the estimates of GDP from the income and product sides of the national accounts.

¹² Since our growth accounts are based on the total capital stock, inclusive of housing, we may have overstated the change in the contribution of capital between the 1960s and the post-1980 period.

We have made a rough adjustment for the inflation component by multiplying the outstanding stock of drachmae-denominated debt by the rate of inflation as measured by the consumer price index, and adding the result to the reported budget balance. The inflation-adjusted measure of the budget balance shows a much smaller deterioration of the budgetary situation in the 1980s, and correspondingly less of an improvement in recent years when inflation was reduced to much lower rates. The implications for the division of national saving between the public and private sector is shown in Figure 6. On an inflation-adjusted basis, the decline in government saving is much reduced, and a substantial portion of the fall in national saving is concentrated in the private sector. There is no direct means of determining which measure of public-private saving is more reasonable, but the nominal data do display an inverse relationship between public and private saving, Ricardian equivalence, that is completely absent in the adjusted data. This is evident in the following set of simple correlations between the public and private saving rates:

$$rs_p = a + b \cdot rs_g$$

Equation	Coefficient on public saving	t-statistic	Dependent var.- independent var.
1	-0.41	2.9	nominal – nominal
2	0.06	0.7	real – real

The first equation is based on the nominal data and the coefficient on public saving implies an offset of about 40 percent. In contrast, using the same equation with the

inflation-adjusted data results in an insignificant offset. Thus, the evidence of Ricardian Equivalence appears to be largely due to the difficulties of partitioning interest payments between income and principal repayment.

Kollintzas and Vassilatos (1996, 2000) argue that this drop in aggregate savings together with the simultaneous drop in public investment rates can account for the reduction in the growth rate of the economy within a neoclassical growth model without full Ricardian Equivalence.¹³ This happens as the economy's steady state growth capital-labor ratio is reduced and the convergence to this new steady state becomes slower. In addition, they argue that the transfers from the rest of the EU may have, further, adversely effect the incentives to save and work, strengthening the effects of government deficits.

3. Causes of the Productivity Slowdown

In part, the explanation of the collapse of economic growth in Greece is quite straightforward -- a large falloff in the rate of capital accumulation and its contribution to the growth in output. As we shall show, a decline in investment should be no surprise in view of the sharply deteriorating macroeconomic situation and the collapse of profits in the 1980s. However, the causes of the severe falloff in MFP growth are more difficult to quantify. We have come to conclude that it was the product of a large number of negative developments, including among others the worsening macroeconomic situation, a weak international competitive position, and a highly inefficient structure of the labor

market. It is also very clear from a simple examination of trends in foreign direct investment that Greece has not been viewed as a promising investment opportunity.

3.1 *Macroeconomic Instability*

The macroeconomic environment clearly collapsed in Greece in the latter part of the 1970s and remained in disarray throughout the 1980s. The general government budget balance switched from an average surplus equal to one percent of GDP in the 1960s to steadily increasing deficits after the 1973 oil price shock. These deficits averaged 9 percent of GDP in the 1980s and peaked at 16 percent in 1990. Throughout the period, the magnitude of the budget deficit was actually understated by a policy of directed lending from the banks to the public sector.¹⁴ Inflation, as measured by the CPI, rose from an annual average of 2 percent in the 1960s to 20 percent in the 1980s. Real rates of interest on bank lending and deposits, which had been strongly positive in the 1960s, went negative after 1973 and remained so until the late 1980s.

The late 1970s and 1980s also saw the emergence of strong cost pressures from the labor market as a strengthening of labor's bargaining situation, combined with controls on many prices, raised real wages well in excess of productivity (refer back to figure 2) and severely depressed profit margins. The return on equity in Greek manufacturing fell from an average of 6 percent in 1976-80 to -6.8 percent in 1982-86.¹⁵

¹³ Public investment as a fraction of GDP steadily declined from about 5.5% in the early sixties to less than 3% in the eighties.

¹⁴ This policy may have reduced growth significantly. In a neoclassical growth model with financial intermediation, calibrated for the Greek economy, Krystaloyanni (2000) has computed the effect of 1% permanent increase in the ratio of directed lending from the Banks to the public sector to reduce investment by 0.4% in the first year and by 0.5% in the new steady state. While, a 1% permanent increase in the rate of the revenue tax of Banks has about a ten times smaller effect than that.

¹⁵ Federation of Greek Industry (1999 and earlier years).

The contribution of macroeconomic policies to growth was examined in an empirical context in a 1993 paper by Fisher.¹⁶ For a cross-section of countries, he found a consistent negative relationship between growth and the rate of inflation and a significant positive association of growth and the public sector budget balance. While Greece's inflation experience falls into the moderate range by the standards of Fisher's analysis, his estimated impact of the budget balance on growth suggests that the swing in the annual fiscal balance by 10 percent of GDP might have reduced Greece's rate of economic growth by about two percent per year in the 1980s, or about one-fifth of the observed slowdown.

In the 1990s, a major effort was made to reverse the deterioration of macroeconomic policies. The public budget deficit was cut from 16 percent of GDP in 1990 to 1.8 percent of GDP by 1999; and inflation was reduced from the 20 percent annual rate of the 1980s to the standards required for entry to the EMU. Moreover, financial markets deregulation, which started in the late eighties and accelerated in the mid-nineties, must have contributed to the reduction of financial intermediation margins and promoted growth (Krystaloyanni, 2000). These developments have led to the improvement in the growth of GDP, an average of 3.3 percent in the 1995-2000 period. These positive benefits are, to date, at the low end of the impact found in studies such as that of Fisher.

3.2 *Entrance into the European Union*

In the effort to account for differences in rates of economic growth among developing countries, trade policy has played a central role. In several studies of the World Bank, an

¹⁶ Fisher (1993). See also Easterly and Rebelo (1993). Collins and Bosworth (1996) find some supporting evidence, though the magnitude of the effects are smaller.

open trade policy is identified as a key feature of economic growth in East Asia; and in a far-ranging global study, Sachs and Warner argued that a liberal trade policy is the most important element of government policy.¹⁷ In their empirical study, Sachs and Warner also characterized Greece as a fully open economy since 1959, citing an earlier study by Eichengreen (1994). If the Greek economy was really open at such an early date, entrance into the EC in 1981 should have had a relatively minor impact.

However, a much different perspective is provided by Giannitsis (1993), who argues that the Greek economy was actually quite closed prior to accession, citing levels of tariff and non-tariff protection that were high relative to Greece's European neighbors. The degree of protection is reduced substantially over the 1974-86 period, and accession required Greece to eliminate a preferential system of industrial subsidies, including export subsidies.¹⁸ Giannitsis argues that the process of integration into the EU was mishandled to the extent that the liberalization worsened the competitive position of Greek industries and contributed to a squeeze on profits of domestic firms. Thus, from his perspective, trade liberalization impacted negatively on growth.

In evaluating this argument, we looked first for evidence of the effect of EU accession on the structure of Greece's external trade. As with the national accounts, the analysis is complicated by conflicting measures of trade flows. Three alternative measures of non-fuel goods exports and imports as a percentage of GDP, shown in Figure 7. The series labeled national accounts refers to the goods component of the revised accounts. The customs series is identical to the estimate used in the old (base-1970)

¹⁷ World Bank (1993) and Sachs and Warner (1995).

¹⁸ Giannitsis (1993, table 1, p. 245.)

national accounts. The measure labeled 'Balance of Payments' is that of the balance of payments converted to local currency. Exports and imports of fuels have been removed from all of the series. The data are consistent in showing that Greece was a country with a very low ratio of exports to GDP in the 1960s, and that the role of both exports and imports expanded sharply in the 1970s. However, the new estimates of the national accounts imply a far larger expansion of exports up to the date on entry into the EU and a major erosion immediately thereafter. Exports decline from a peak of 17 percent of GDP in 1981 to less than 10 percent in 1997. The alternative series imply a much smaller expansion in the years prior to entry and a more gradual decline thereafter. Further differences emerge in the 1990s, when the BOP measure of goods trade shows a collapse of exports, expressed as a share of GDP, to a level below that of the 1960s. There are also large discrepancies in the various measures of imports; in particular, the revised national accounts indicate a much higher level of imports in the late 1970s and early 1980s than was previously reported in the customs series. Despite the large differences in the measures of gross trade flows, the Balance of Payments data and the new national accounts are in fairly close agreement on the magnitude of the trade balance.

Overall, evidence of a large trade shock from EU accession is mixed. The revised national accounts data do imply a large erosion of exports after accession, but that comes on the heels of a very large expansion in the 1979-81 period. Furthermore, the impact on imports, which was more the focus of the Giannitsis study, seems quite modest in the revised data. Imports rise as a share of GDP throughout the 1970s and 1980s, in both the revised national accounts and in the BOP statistics. But, there is little evidence of a significant change in the early 1980s. On the other hand, there is a substantial

reorientation of Greek trade toward the EC after 1981: the EU share of exports rose quickly from about 50 percent in 1980 to 70 percent by 1987, and the import share rose more gradually from about 52 percent in the 1980-85 period to 68 percent by 1990.¹⁹

Finally, the inflow of foreign direct investment into Greece might be viewed as an indicator of the impact of accession on external perceptions of economic opportunities in Greece. We compared the pre- and post-accession experience of Greece with that of Ireland, Spain and Portugal. As shown in Figure 8, Greece stands out both for the consistently small role of FDI and for the fact that there was no boost to FDI after accession. FDI averaged only about 1.5 percent of GDP in the 1970s and actually declined in subsequent years. In contrast, accession brought forth a doubling of FDI in the other three countries. FDI has remained in the range of about one percent of GDP throughout the 1990s.

We conclude that EC accession did not have a large negative impact on the competitiveness and thus the potential for growth of the Greek economy; but the review of the external economic relationship does expand on a more general notion that the industrial sector of the Greek economy is very weak, and the country lacks clear areas of competitive advantage. For Spain and Ireland, the existence of a large EC market supported a growth strategy that emphasized the expansion of the export-oriented industries.²⁰ No such strategy is evident for Greece, and there appears to have been a significant erosion of Greece's competitive position as reflected the share of exports in GDP.

¹⁹ Since 1990 the orientation of exports appears to have shifted away from the EU towards an expanded relationship with the transitional economies of Eastern and Central Europe.

3.3 *Labor Market Structures*

Throughout the 1990s, labor market reforms have been at the center of much of the European discussion of policy changes that are needed to enhance the adaptation to economic change. The OECD, in particular, has initiated a large volume of research on labor markets and the need to promote greater flexibility in work relationships. Much has been done to document the dimensions of employment protection legislation (EPL) and to assess the extent to which it influences labor market performance. It also has an obvious link to economic growth if it inhibits the adjustment to new technologies or discourages the achievement of scale economies.

A recent study by the OECD surveyed a large number of member countries and developed comprehensive summary measures of the relative extent of EPL.²¹ The measures are built up from an underlying set of indicators that reflect the strictness of regulations governing dismissal of workers (prior notification and severance pay) and restrictions on the use of temporary workers. The study also evaluates the empirical evidence between high levels of EPL and various dimensions of unemployment.

The study found that all of the Southern EU countries, including Greece, stand out with the most strict legislation on employment protection (Greece ranked 24th among 26 countries included in the study). Greece is very restrictive in preventing most forms of temporary employment, and it offers extensive protection against dismissal for workers with long tenure on the job. Most of these measures were introduced in the late 1970s and early 1980s, and they remained largely unchanged in the 1990s. While the OECD study found no relationship with overall rates of unemployment, EPL appears to favor employment of prime age males at the

²⁰ See Appendix III for more details on the comparison between Greece and Ireland.

²¹ The most thorough recent analysis is that of OECD (1999, chapter 2)

expense of other groups and to increase the duration of unemployment spells. Strict EPL is also strongly associated with higher rates of self-employment.²²

We used the EPL rankings to explore the extent of any relationship between job protection and economic growth for our prior sample of 14 European economies. As shown in Figure 9a and b, there is a negative but insignificant correlation between the EPL variable and rates of growth in output per worker over the period of 1980-97. The relationship is slightly stronger between EPL and reduced rates of growth in total factor productivity. The deviation of the value of the EPL variable for Greece from the mean of the European economies accounts for a reduction in the annual growth rate of MFP of about 0.6 percentage points.

A companion OECD study also found that Greece ranked last among 24 OECD countries in worker participation in job training programs.²³ Again, we find a significant correlation between this labor market measure and rates of growth in labor productivity and MFP (R^2 equal 0.21 and 0.27, respectively). However, because the measures of participation in job training and employment protection are highly correlated, it is not possible to measure their separate contributions. Used separately, both variables have comparable effects on the rate of growth of labor productivity and MFP.

An idiosyncratic feature of the Greek labor market, that most likely has contributed to unemployment and has lowered growth, is the rapid expansion of life-time government jobs in the eighties and most of the first part of the nineties and the increase in the public/private relative

²² The finding that restrictive EPL is associated with high levels of self-employment suggests that the legislation might discourage the formation of larger, more efficient plants. See for example, the article by Burtless in this volume. According to estimates of Eurostat, 57 percent of employment in the mid-1990s was in firms of less than 10 employees (Eurostat, 1998, p. 223).

²³ OECD (1999, chapter 3)

wages in the eighties (Demekas and Kontolemis, 1996). These two factors may have contributed in raising workers' effective reservation wages and in depressing private sector employment.

Greece does not stand out in most other dimensions of labor market performance. It has a modest unemployment insurance program both in terms of the replacement rate and duration; the minimum wage is about 50 percent of the average wage in manufacturing, and union membership equals about one-third of wage and salary employment. Until 1999, the rate of long-term unemployment was consistently below the EU average. One major uncertainty, however, is the extent to which the official data capture the full magnitude of the informal sector. A major response of both employers and employees to the strictness of the EPL measures and the high employment taxes should be to move into the informal sector. For example, the proportion of the workforce that is self-employed, 25 percent of the civilian non-agricultural workforce, is higher than for other economies at comparable stages of development. That may reflect efforts to avoid the labor market regulations.

We conclude that the strictness of EPL is part of the explanation for Greece's low rate of growth relative to the rest of Europe, but in the context of the large collapse of growth in the 1980s, it is but one of several contributors to a poor growth environment.

In a broader context, a recent study by Koedijk and Kremers found much stronger evidence of a negative relationship between an extended measure of economic regulation and growth.²⁴ They relied on a different set of 11 European countries and included measures of both product and labor market regulation. They report a large inverse correlation ($R^2 = 0.70$) between the ranking of regulation and economic growth. The relationship is strongest between product market regulation and growth; but their finding of a correlation with labor market regulation is

²⁴ Koedijk and Kremers (1996).

more significant than we report for the EPL variable. There is close correspondence in the ranking of countries that are in both samples, and they agree in classifying Greece as having a very restrictive regulatory environment.²⁵ The differences in overall conclusions are the result of the countries that are not common to the two samples, emphasizing the dangers of relying too heavily on results from a small number of cases.

4. Future Directions

The macroeconomic policies of Greece have come a long way over the past five years. As shown in Table 3, inflation has been reduced from the double-digit rates of the prior two decades to less than a 3 percent rate. The fiscal deficit has been cut from an astounding 12 percent of GDP in 1990-95 to below 2 percent in 1999, with a projected surplus by 2001, and interest rates have been steadily converging toward the European norm. In addition, the current account deficit has stabilized at about 3 percent of GDP. Thus, by most standards, Greece has met the criteria for admission to the Euro zone and it is scheduled to become a participant beginning in 2001.

Those macroeconomic gains have translated in an improved growth performance, at least as compared to the performance of the prior quarter century. Over the 1995-2000 period, gains in GDP have averaged 3.3 percent annually, and labor productivity has grown about 2.1 percent per year. The growth of TFP has also averaged about 1.2 percent per year, though some of that gain may reflect a cyclical recovery from very depressed conditions of the mid-1990s.

²⁵ Greece is classified as having highly regulated product markets because of a high degree of public ownership in the late 1980s and a lagging performance in the implementation of the Single Market initiative as of 1995. Both of these situations have changed somewhat in recent years.

This rate of growth should be sustainable in future years. While labor force growth will probably average less than one percent, the higher educational attainment of younger workers, suggest that Greece will continue to experience significant growth in the effective labor force of about 1.5 percent per year. The combination of employment growth and trend increases in TFP of 1-1½ percent per year would yield an overall rate of growth in output of 3 to 3.5 percent annually.²⁶ The capital stock measure (including housing) that we are using implies a relatively high capital-output ratio of about 3 and an annual rate of depreciation of 5 percent, or a required investment rate of about 24 percent of GDP $((.03+.05) \cdot 3)$. That compares to an actual 1999 investment rate equal to 23 percent of GDP.

However, the current rate of economic growth implies little or no convergence with average living standards in the rest of Europe. Unless Greece can begin to do better, it will continue to languish at the bottom of the European income distribution. Having stabilized the macroeconomic environment, the next stage for Greece is to find the means to significantly accelerate the rate of increase in living standards. And, although in the short run Greece has a pool of unemployed labor, the longer-term task is fundamentally one of raising the rate of growth in labor productivity.

One might hope that the Greek experience would more closely follow that of Ireland, where an equivalent set of macroeconomic reforms was followed by a dramatic acceleration of economic growth. Ireland did experience a significant lag between the stabilization program, which was initiated in 1987, and the acceleration of economic growth, which became most evident after 1993. Thus, it might be reasonable to argue that the benefits to Greece might be more substantial in future years.

²⁶ A current 11 percent rate of unemployment would permit a fast rate of growth for a few years if it were

A closer examination of the Irish experience, however, suggests that it is unlikely to serve as a model of what to expect in Greece. As discussed more fully in an appendix, Ireland is primarily a story of an export-led economic expansion that is being promoted by foreign firms using Ireland as an export platform to the rest of Europe. It was well positioned to take advantage of the Single Market initiative, with a long tradition of involvement by foreign firms, particularly those of the U.S.; and a depreciated exchange rate created a situation in which its manufactures could be very competitive within the EU.

Greece might try to emulate Ireland in attracting foreign firms; but it would be starting from a very low level, and it lacks some of the advantages of language and easy access to the major European markets. The restrictive regulatory environment, particularly with respect to labor markets, also makes Greece less attractive as a base for foreign firms. For example, the same OECD study that ranked Greece 24th out of 26 with respect to employment protection legislation, ranked Ireland 5th. Yet, without the intervention of foreign firms, it is difficult to visualize a source of the funds and management skills needed to revitalize the export sector. In addition, as an exporter of low-technology, labor-intensive manufactures, Greece is likely to be faced with intensified competition from the transitional economies of Eastern Europe.

Most importantly, the decision to join the Euro zone without an undervalued currency would seem to rule out a policy of export-led growth. As was shown in Figure 7, exports have been a declining share of GDP since the mid-1980s, the trade deficit is excess of 12 percent of GDP, and the stabilization program of the last five years, with its emphasis on monetary restraint, has placed upward pressure on the exchange rate (Table 3).²⁷ By entering at the current

accommodated by a higher rate of capital formation.

²⁷ One additional point of contrast is to note that relative unit labor costs in Greece rose by 15 percent in the 1993-99 period compared to a 27 percent decline in Ireland. Some alternative measures of the exchange rate position are provided in Figure A2.

rate, the government has apparently decided that the benefits of early membership in the Euro zone were worth rejecting the option of using a undervalued currency as a tool for promoting a more export-oriented growth strategy.

Given its weak competitive position, it is difficult to perceive a situation in which the export sector would provide the major impetus for an accelerated growth rate. Instead, the process of convergence will have to emphasize growth in the domestic economy. It will probably also have to be undertaken without substantial involvement of foreign firms.

According to statistics from the OECD, Greece has made substantial gains in upgrading the educational attainment of its workforce (Table 4). But public expenditures on education, expressed as a percent of GDP, are well below the OECD average (3.7 versus 4.7) and below those of comparable European economies such as Ireland and Spain. Nor do the existing measures of educational attainment make any adjustment for the quality of the training. Particularly at the tertiary level, the educational system is overcrowded and faculty salaries are very low by European standards. Tuition costs are modest; and given the high level of unemployment, there are few incentives to complete one's education in a timely fashion.

It also appears that labor market regulations have repressed the normal wage returns to education. During the 1980s, Greece maintained a wage indexation system that systematically narrowed the wage distribution. While indexation was eliminated in the early 1990s, national bargaining continues to exert strong influences on the wage structure. A paper by Kanellopoulos (1997) used information from household surveys to document the compression of the wage structure over the 1974-94 period. Between 1974 and 1982, there was a large reduction in the distribution of earnings: the log variance of male earnings declined by 40 percent and the difference in earnings at the 90th and 10th deciles was reduced by 30 percent. The distribution

remained basically unchanged in subsequent years. One cost of this policy was a decline in the return to both a tertiary and upper-secondary education of about 40 percent over the 20-year period.²⁸

A substantial de-regulation of labor markets and increased spending on education could improve future growth prospects by improving the quality of the Greek workforce. Despite some modest recent changes, Greek labor markets are still heavily regulated, and the high level of employment taxes drives many workers into the informal sector. These are particularly important barriers to the participation of foreign firms.

Greece also lags behind the rest of Europe in the development of its public infrastructure. Some measures of the productivity gaps in specific industries are shown in Table 5. Greece appears particularly weak in transportation, the postal service, and electrical generation. While the government has received large transfers from the EU to upgrade the infrastructure, large portions were used to subsidize the public enterprises. During the 1990s, the government has taken steps to sell or liquidate many of the enterprises that it assumed responsibility for in the 1980s, but the legacy is a decade or more of lost investment. Furthermore, given the budgetary strains, there is little choice but to pursue a more extensive and faster pace of privatization to provide the resources for modernization.

Third, although considerable steps have been taken to reform the system of state-owned banks, they remain highly inefficient relative to the rest of Europe with very wide loan-deposit rate spreads, and Greece continues to display a low rate of financial intermediation. A more dynamic and competitive banking system would improve the utilization of scarce saving and promote efficiency gains in industry. Having cleaned up the balance sheets of many of the state

²⁸ The wage premium of higher education/secondary education declined from 1.5 in 1974 to 1.23 in 1994. A

banks, Greece should be in a position to move ahead with an aggressive program of privatization of the banking system and expansion of private security markets.

Finally, if Greece is successful in stimulating a more rapid pace of improvement in TFP, it will need to find a means of raising the national saving rate. Options for increased reliance on foreign saving seemed very limited in view of the existing current deficit and the weak export capacity. The international experience suggests that in the short run, an increase in public saving is the most certain means of achieving a higher rate of national saving. The experience with various incentives for private saving has been generally disappointing.²⁹

In summary, Greece has implemented a very successful program for stabilizing the macroeconomic environment, but it is still in the process of developing an effective strategy for promoting economic growth. It has no well-defined areas of comparative advantage in the international sphere, and it has not yet implemented the institutional changes that would create competitive pressures for a faster pace of innovation and efficiency gains in the domestic economy. For example, it has no sector like the export-oriented electronics in Ireland that could serve as a leading source of growth. If the country is not going to pursue the traditional route of using the tradable goods sector as the driving force for growth, it needs to articulate an alternative approach based on a rapid upgrading of domestic services industries.

comparable average from the OECD in the mid-1990s is 1.60 (OECD, 1998b, table f7.2)

²⁹ On the other hand, the effort to reduce the public sector deficit over the past half decade has not translated into an equivalent rise in national saving. As indicated in the earlier discussion of saving, the relationship has been severely distorted by the combination of a large public debt and very rapid rates of inflation that make it difficult to judge the true underlying level of private saving.



References

- Alogoskoufis, George. 1995. "The Two Faces of Janus: Institutions, Policy Regimes, and Macroeconomic Performance in Greece," *Economic Policy* (April): 149-92.
- Barro, Robert J., and Jong-Wha Lee. 1994. Sources of Economic Growth," *Carnegie-Rochester Conference Series on Public Policy* 40: 1-46.
- Barry, Frank (editor). 1999. *Understanding Ireland's Economic Growth*, MacMillan Press Ltd.
- Christodoulakis, Nikos M., Sophia P. Dimeli, and Tryphon Kollintzas. 1996. "Basic Facts of Economic Development in Post-war Greece," *Economic Policy Studies*, 1, 71-103 (*in Greek*).
- Collins, Susan M., and Barry Bosworth. 1996. "Economic Growth in East Asia: Accumulation Versus Assimilation," *Brookings Papers on Economic Activity*, 1996:2.:135-203.
- Demekas, Dimitri G., and Zenon, G. Kontolemis. 1996. "Unemployment in Greece: A Survey of the Issues," IMF Working Paper, WP/96/91.
- Easterly, William, and Sergio Rebelo. 1993. "Fiscal Policy and Economic Growth," in *How Do National Policies Affect Growth?* Bank of Portugal and World Bank.
- Eichengreen, Barry. 1994. *Institutions and Economic Growth: Europe After World War II*. Discussion Paper 973. London: Centre for Economic Policy Research (October).
- _____. 1996. "Institutions and Economic Growth: Europe After World War II", in Nicholas Crafts and Gianni Toniolo (eds.), *Economic growth in Europe since 1945*. Cambridge: Cambridge University Press, pages 38-72.
- Eurostat. 1998. *Enterprises in Europe: Fifth Report*, Luxembourg: Office for Official Publications of the European Community.
- Federation of Greek Industries, 1999 and earlier years. *The State of the Greek Economy in 1998* (Athens).
- Fisher, Stanley. 1993. "The Role of Macroeconomic Factors in Growth," *Journal of Monetary Economics* 32 (3): 485-512.
- Giannitsis, Tassos. 1993. "World Market Integration: Trade Effects and Implications for Industrial and Technological Change in the Case of Greece," in Harry Psomiades and Stavros Thomadakis (eds.), *Greece, the New Europe, and the Changing International*

Order (New York: Pella for the Center for Byzantine and Modern Greek Studies, Queens College, City University of New York, 217-256.

International Monetary Fund. 1999. *Greece: Staff Report for the 1999 Article IV Consultation*, IMF Web page.

International Monetary Fund. 2000. *Ireland: Staff Report for the 2000 Article IV Consultation*, IMF Web page.

Koedijk, Kees, and Jeroen Kremers. 1996. "Market Opening, Regulation, and Growth in Europe," *Economic Policy*, vol. 23 (April):443-68.

Kanellopoulos, Costas N. 1997. "Pay Structure in Greece, 1974-94," Discussion paper No. 65. Centre of Planning and Economic Research, Athens.

Kollintzas, Tryphon and Vangelis Vassilatos. 1996. "A Stochastic Dynamic General Equilibrium Model for the Greek Economy," *Economic Policy Studies*, 1, 109-125 (in Greek).

Kollintzas, Tryphon and Vangelis Vassilatos. 2000. "A Small Open Economy Model with Transaction Costs in Foreign Capital," *European Economic Review*, 44, 1515-1541.

Krystaloyanni, Alexandra. 2000. *Financial Intermediation and Economic Growth: A Calibrated Model for Greece*. Ph.D. Dissertation, Department of Economics, The University of Reading.

Larre, Benedicte and Raymond Torres. 1991. "Is Convergence a Spontaneous Process? The Experience of Spain Portugal and Greece," *OECD Economic Studies*, No 16,169-98.

Maddison, Angus. 1989. *The World Economy in the 20th Century*. Paris: OECD Development Studies.

_____. 1995. *Monitoring the World Economy, 1820-1992*. Paris: OECD Development Studies.

Mihail, Dimitrios. 1995. "The Productivity Slowdown in Postwar Greece," *Labour* vol. 9 (2):189-205.

National Statistical Service of Greece. 1998. *National Accounts of Greece: 1988-1997*. (Athens)

Organization for Economic Co-operation and Development. 1999. *The Employment Outlook: June 1999*, Paris: OECD.

Sachs, Jeffrey D., and Andrew Warner. 1995. "Economic Reform and the Process of Global Integration," *Brookings Papers on Economic Activity*, 1:1995, pp. 1-118.

Tsakalotos, Euclid. 1998. "The Political Economy of Social Democratic Economic Policies: the PASOK Experiment in Greece," *Oxford Review of Economic Policy*, vol14 (1), pp.114-38.

Tsaliki, Persefoni. 1991. *The Greek Economy: Sources of the Growth in the Postwar Era*. Westport, Conn.: Greenwood, Praeger.

United Nations. 1993. *Industrial Statistics Yearbook, 1991*. Vol. I (New York: United Nations).

World Bank. 1993. *The East Asian Miracle: Economic Growth and Public Policy*. New York: Oxford University Press.

Appendix I

Construction of the Growth Accounts

Growth accounts provide a framework for decomposing economic growth into the contribution of factor accumulation and a residual measure of gains in the efficiency with which the factors are used. We used data from the OECD to construct indexes of real output, the capital stock, and a measure of the education-adjusted labor force of Greece and thirteen other member states of the European Union for the period of 1965-98. We define the growth in total factor productivity, denoted by $a(t)$, as the growth in output, $q(t)$, less the share-weighted growth of the factor inputs, $k(t)$ and $l(t)$:

$$(1) \quad a(t) = q(t) - s_k k(t) - s_l l(t).$$

As much as possible, we have focused on the business sector, excluding the general government sector from our measures of output, the capital stock and employment. Except for Greece, the national accounts data are drawn from the OECD Statistical Compendium. The data for Greece are from the National Statistical Office. Output is defined as real GDP of the business sector, and labor inputs include employees and the self-employed. Furthermore we have used data on the number of years of schooling, compiled by Barro and Lee (1994), to adjust for changes in the educational skills of the workforce.³⁰ Thus, the index of labor inputs is actually employment times the index of educational attainment. The index of capital inputs is also based on the OECD estimate of the capital stock in the business sector.³¹

The final step involved the specification of the weights for aggregating the factor shares. In a competitive economy those weights could be represented by factor-income shares that would vary across countries and time. However, for most of the countries we did not have measures of factor shares that incorporated the labor input of the self-employed. Instead, national accounts data will typically assign the income of the self employed to the capital input. Thus, we opted to use a fixed capital income share of 0.3 with constant returns to scale.³² While this is a restrictive assumption, it is unlikely to have a significant effect on the results because there is little evidence of a secular trend in factor shares of those countries that provide income estimates. Thus, we report our results in a form that decomposes the logarithmic growth in output per worker (q/l) into the contribution of the growth of physical capital per worker (k/l), the growth of education per worker (h) and the growth of total factor productivity (a).

$$(2) \quad q/l = \alpha(k/l) + (1 - \alpha)h + a$$

³⁰ In effect we used a relationship between the wage rate and years of schooling to weight the proportions of a country's adult population that had attained different levels of schooling ranging from primary through the tertiary level. Details of the construction of the index are given in Bosworth and Collins (1996).

³¹ We had to construct estimates of the capital stock for Greece, Ireland, Portugal and Spain. For all four countries, the capital stock is set to 1.5 times GDP in 1960 and cumulated forward with a geometric rate of depreciation of 5 percent per year. We have made no allowance for land since variations in agricultural land would have only a small effect on the estimates.

³² Angus Maddison (1987, p.659)

Appendix II

The Revised National Accounts

Conclusions about the pattern of economic growth in Greece are severely hampered by the low quality of the available statistical series. In recent years, the National Statistical Service of Greece (NSSG) has undertaken a comprehensive revision of the national accounts to bring them into line with the standards of the European System of Accounts (ESA).³³ That revision began with 1988 and resulted in a large upward revision in the level of the Greek GDP, 22 percent in 1988, largely as a result of increased efforts to capture the role of the informal sector. However, the distribution of the revisions among the major expenditure categories and major industries on the income side suggests a very diverse set of discrepancies between the old and new accounts.

In addition, the NSSG has undertaken to provide a revised set of historical accounts that extend back to 1960. However, the historical revisions incorporate some major changes in the pattern of Greek economic development over the prior quarter century. Those changes are highlighted in the various panels of figure A1 which show the ratio of the new to the old series for several components of the national accounts. First, on the expenditure side, the largest percentage revisions are made for investment which is raised by approximately 50 percent; but whereas the adjustment tails off in nominal terms as the investment series is extended back to 1960, it remains large in volume terms. Thus, there are significant changes in the estimated price deflators, as well as the expenditures themselves. Smaller percentage adjustments are made for consumption of the private and public sectors, but there are very large revisions of in the external trade data for the early 1980s, exceeding 25 percent in some cases.

The revisions are equally large for the GDP of the major industrial sectors. For both industry and services the percentage adjustment to the level of output is large in the late 1980s, but it is gradually reduced as the revisions extend back in time. In addition, the magnitudes of the revisions are similar in both the nominal and real data. The real puzzle lies with the series for agriculture. In nominal terms, the level of agricultural output has been revised down, but the general trend of output has been maintained. The volume measure, however, reports a dramatic new interpretation of the trend of Greek agricultural output. Real output has been left unchanged for the late 1980s, but doubled relative to the old series in the 1970s. Thus, while the old series implied a slowly growing agricultural sector throughout the 1960-90 period, it is now shown to have expanded very rapidly up to the 1980s and then collapsed to less than half its prior size within a six-year period. At the same time, any statistical discrepancy between the expenditure and income-side measures of the accounts has been subsumed into the individual series. As a result, the largest revisions to real GDP by industry are in agriculture; whereas the nominal revisions are concentrated in services and industry. This result seems puzzling in view of the revisions to the expenditure-side estimates.

³³ This analysis is based on the revised set of national accounts as published in August of 1998. More recent changes have been made to convert to ESA95. However, those changes do not significantly affect growth rates for the real magnitudes.

Appendix III The Greek-Irish Comparison

Both Ireland and Greece are examples of economies that languished throughout the 1970s and 1980s with average income levels near the bottom of the European distribution. They are similar in that both have made major efforts over the last decade to restructure their economic policies, and they have both received liberal financial assistance upon entry to the European Union. Yet, Ireland stands out with an extraordinary degree of success in the 1990s. Why the difference and does it have any implications for the future direction of Greek policies?

The surge of growth in Ireland is unusual because of the large role played by the increase in labor inputs, which fully accounts for the post-1993 acceleration. In the 1993-99 period, output grew at an average annual rate of 8.8 percent and employment expanded at a 5.5 percent rate. This reflected both a very high initial rate of unemployment – 15 percent of the labor force – and an atypical demographic situation. Ireland is among the youngest countries in Europe with a low old-age dependency rate, and a rapidly growing population of labor force age. The improving economic situation has also promoted a large reversal of net migration, as prior emigrants respond to an improved labor market situation. The result was an extraordinary growth in the pool of potential workers. In contrast, Greece has much less potential for expanding the workforce. Its population is among the oldest in Europe with a growth rate of only about one percent annually. Unemployment has increased in the 1990s, but it is still well below the peak reached in Ireland; and the labor force participation rate is only modestly below that of Ireland.

An acceleration of productivity growth is a surprisingly small part of the Irish story. The growth of labor productivity in the business sector has remained relatively constant at about 4 percent per year for more than three decades. There is an implied acceleration of MFP growth when it is calculated as a residual because capital accumulation did not keep pace with the expansion of employment.³⁴ In the lack of emphasis on capital accumulation, Ireland has also been much different than the rapidly growing Asian economies.

As summarized by the IMF, the research on the Irish boom has emphasized four factors: (1) outwardly-oriented trade and investment policies, (2) the advent of the single market in Europe, (3) a fiscal consolidation that began in 1987, and (4) large inflows of EU structural funds that were used in the 1990s to upgrade the physical infrastructure.³⁵

The primary source of the Irish boom is a simple demand side boom, led by very rapid growth in exports, and accommodated by an extremely plentiful supply of labor. The country has pursued an open trade and investment policy since the early 1960s, making it difficult to identify that policy change as the cause of the current boom. However, the adoption of the European single market program in the early 1990s made Ireland even more attractive as a base for American companies that wanted to expand their European operations. While a common language was a strong draw, Ireland also has relatively open, unregulated labor markets (see figure 9), and a new social consensus that translated into wage moderation and a reduction in labor market strife after 1987. According to the OECD, *relative* unit labor costs in Irish

³⁴ While there is little evidence of acceleration in productive growth, the trend growth rate is very high relative to other countries, and it exceeds that of Greece by a wide margin.

³⁵ International Monetary Fund (2000, p. 6), OECD (1999b), and F. Barry (1999).

manufacturing declined at an average annual rate of 5 percent in the period of 1985-98 (See Figure A2).³⁶

In addition, FDI flows into Ireland have averaged in excess of 6 percent of GDP in the 1990s – in part because of attractive tax and other financial incentives offered by the government. 47 percent of manufacturing employment is in plants owned by foreigners (1995), and 24 percent is in U.S. owned plants. Ninety percent of the output of foreign-owned firms is exported compared to 34 percent for Irish-owned firms.³⁷ The result for Ireland has been a demand-side boom led by a very rapid expansion of exports to Europe. Total exports have soared from 57 percent of GDP in 1990 to 88 percent in 1999. The export sector is centered around skilled-labor intensive industries such as electronics, software, and pharmaceuticals.

In contrast, there has been a substantial deterioration of Greek competitiveness. As mentioned previously, exports have declined as a proportion of GDP over the past 20 years, Greece is steadily losing market share within the EU, and FDI has averaged only about one percent of GDP. Furthermore, by most measures, there has been a relative deterioration in the price competitiveness of Greek exports (Figure A2). While relative unit labor costs in manufacturing have been roughly constant, the real exchange rate, as measured by the Morgan-Guaranty trade-weight index, has appreciated by about 20 percent since the late 1980s. As mentioned earlier, the restrictive regulatory environment surrounding Greek labor markets also makes it a relatively unattractive location for foreign firms.

Improvements in educational attainment are often cited as a factor behind the acceleration of growth in Ireland. The OECD reports a large gap in the educational attainment of younger relative to older workers, and that gap is used as an indicator of changing human capital or improvements in the quality of the workforce. Somewhat surprisingly, the pace of educational improvement, measured on the same basis, is even more rapid in Greece. As shown in table 4, Greece has a slightly lower overall proportion of the population age 25-64 with a secondary education, but the gap between workers aged 25-34 and 55-64 is even larger. Greece appears to be doing slightly better than Ireland in terms of the proportion of its population with a University-level education. However, Ireland spends a larger share of its GDP on educational institutions, 5.3 percent in 1995, than Greece, 3.7 percent.³⁸

Greece has also undertaken a fiscal adjustment program comparable to that of Ireland, although it started much later, 1995 compared to 1987. However, a substantially larger portion of the Greek adjustment was in the form of tax increases rather than expenditure reductions. There is a similar difference in the timing of the shift in monetary policy to a lower inflation regime. Ireland, together with some other countries that have enacted reform programs, provides evidence of a significant lag between the achievement of macroeconomic stabilization and a pickup of economic growth. It may be that with the passage of time, the results for Greece will also look more favorable; but we are more inclined to believe that the significant difference is in the role of the foreign sector.

Finally, Greece and Ireland have received large transfers from the European Union. Both countries are recipients of funds under the Common Agricultural Policy; but the claim has been

³⁶ An alternative measure of the real exchange rate, the Morgan-Guaranty trade-weighted index, is basically unchanged between 1987 and 1999.

³⁷ OECD (1999b, p. 55).

³⁸ OECD (1998b, table B1.1a).

made in several studies that the regional policy (The Regional Development Fund and the Cohesion Fund) provided substantial benefits to Ireland in improving the infrastructure. The funds were used to finance improvement in the road and rail system, and contributed to the expansion of education and job training programs. The long-run increase in aggregate supply is estimated in these studies at about 2 percent of GDP.³⁹ However, the optimistic assessments of the Irish experience are based on the application of assumed rates of return to the expenditures rather than any direct evidence of a contribution to growth. On that basis, we could reach a similar conclusion for Greece since the magnitude of the transfers has been comparable as a percent of GDP.

However, these funds are inherently fungible, and the critical question is the extent to which the transfers similar substituted for domestic finance. According to OECD data, government investment fell sharply in Ireland during the 1980s as a share of GDP and remained depressed in the 1990s. Government investment has remained relatively at a relatively constant 3 percent share of GDP in Greece since accession to the EU, slightly above that of Ireland in the 1990s.⁴⁰ Thus, it is not evident that the EU transfers represented a net addition to infrastructure investments in either country

In summary, while Greece and Ireland offer many interesting similarities and contrasts, Greece is not likely to follow the Irish path of relying on export-led growth. Nor does it have a similar situation with respect to the supply of labor. Its population of labor-force age is expanding relatively slowly, and it currently has a much more regulated labor market.

³⁹ Barry and others, 1999.

⁴⁰ For Greece, fixed investment in the general government sector averaged 2.8 percent of GDP in the 10 years prior to EU accession, 2.9 percent in 1981-90, and 3.4 percent in 1991-2000. Meanwhile, net EU transfers were 2.3 percent of GDP in 1981-90 and 4.4 percent in 1991-2000. The failure of investment to rise in line with the growth of transfers suggests a large amount of substitution with domestic funds.

Table 1: Sources of Growth, by Country and Period

annual percent change

Period	Growth of Output per worker	Contribution by Component			
		Physical Capital per worker	Education per worker	Multi-Factor Productivity	
				Total	Shift-Effect ^a
Greece					
1960-00	3.6	1.8	0.5	1.3	1.0
1960-73	9.7	4.2	0.4	4.9	1.5
1973-00	1.0	0.7	0.5	-0.3	0.7
1973-80	2.1	1.2	0.9	-0.3	1.0
1980-90	-0.3	0.4	0.4	-1.1	0.6
1990-00	1.4	0.5	0.4	0.6	0.5
Spain					
1965-00	3.2	1.3	0.5	1.3	1.0 ^b
1965-73	6.0	1.7	0.6	3.5	1.8 ^b
1973-00	2.4	1.2	0.5	0.7	0.6
1973-80	3.1	1.8	0.8	0.1	0.8
1980-90	2.6	0.9	0.4	1.3	0.7
1990-00	1.6	0.9	0.3	0.4	
Portugal					
1960-00	3.4	1.9	0.5	1.0	0.6
1960-73	7.5	3.9	0.4	3.1	0.9
1973-00	1.5	0.9	0.6	0.0	0.4
1973-80	0.8	0.9	0.8	-1.0	0.6
1980-90	1.8	0.8	0.6	0.4	0.7
1990-00	1.7	1.0	0.5	0.3	-0.1
Ireland					
1961-00	4.1	0.3	0.4	3.4	0.3 ^b
1961-73	4.9	0.2	0.2	4.4	0.2 ^b
1973-00	3.8	0.4	0.4	3.0	0.4
1973-80	4.0	0.5	0.3	2.7	0.3
1980-90	4.7	0.9	0.6	3.1	0.2
1990-00	2.8	-0.3	0.3	2.8	0.6
European Average					
1965-00	2.8	1.0	0.4	1.5	0.3 ^b
1965-73	5.1	1.5	0.3	3.1	0.2 ^b
1973-00	2.2	0.8	0.4	1.0	0.4
1973-80	2.3	1.0	0.5	0.6	0.3
1980-90	2.3	0.8	0.4	1.1	0.2
1990-00	2.0	0.7	0.3	1.1	0.6

Source: OECD, Bank of Greece, Bank of Portugal, and author's calculations.

a: Effect of employment shifts, sectoral data extend only to 1997.

b. Period is from 1960 on.

Table 2. Saving and Investment Balance, 1960-97

percent of GDP

Component	1960-69	1970-79	1980-89	1990-97	1995-97
National saving	21.4	29.9	22.4	17.7	16.7
Private	17.8	27.9	27.9	24.1	21.3
Government	3.6	2.0	-5.5	-6.5	-4.6
Foreign saving (-ca)	2.0	0.7	2.0	2.6	2.5
Gross capital accumulation	23.4	30.6	24.4	20.3	19.2
Fixed investment	21.8	26.7	23.1	20.2	19.2
Private	15.8	20.7	17.4	15.4	14.1
Residential	7.0	10.5	8.9	6.3	5.4
Business	8.8	10.2	8.5	9.1	8.7
Government	5.9	6.0	5.7	4.9	5.0
Inventory accumulation	1.6	3.9	1.3	0.0	0.1

Source: National Statistical Office of Greece.

Table 3. Macroeconomic Indicators for Greece

annual average

Period	Growth of GDP	Inflation CPI	Unemployment Rate	Budget Balance ^a	Current Account Balance ^a	Real Exchange Rate
1960-70	8.5	2.1	5.1	0.7	-2.6	na
1970-80	4.6	14.3	2.2	-1.6	-3.9	91.3
1980-85	0.1	20.7	6.7	-8.7	-5.5	102.3
1985-90	1.2	17.3	7.4	-12.1	-3.1	95.7
1990-95	1.2	13.9	9.1	-11.7	-1.4	106.3
1995-98	3.1	6.1	10.2	-6.1	-3.3	113.7
1999 ^e	3.4	2.7	10.3	-1.8	-2.9	114.9
2000 ^e	4.0	3.1	10.2	-0.8	-3.7	113.1

Source: Central Bank of Greece, International Monetary Fund, JP Morgan.

a: As share of GDP

e indicates estimate

Table 4. Specific Level of Education Attained, by Age Group (1996)

percent of population

	Greece	Ireland	Portugal	Spain	OECD Average
At least upper secondary education					
Age 25-64	44	50	20	30	60
Age 25-34	66	66	32	50	72
Age 35-44	52	54	24	34	65
Age 45-54	36	38	15	20	55
Age 55-64	22	30	9	11	42
At least university-level education					
Age 25-64	12	11	7	13	13
Age 25-34	16	14	11	19	15
Age 35-44	14	11	9	15	14
Age 45-54	11	9	6	10	12
Age 55-64	6	6	4	6	8

Source: OECD. 1998. *Education at a Glance: OECD Education Indicators*, Paris.http://www.oecd.org/els/edu/Eag98_OLD/index.htm

Table 5. Infrastructure Indicators in Selected Industries

	Telecommunications, 1995		Phone Charges, 1996 PPP's	
	Mainlines per 100 inhabitants	Degree of Digitalization ^a	Business Charges ^b	Residential Charges ^c
Ireland	36.7	79.0	1176.7	601.0
Portugal	36.1	70.0	1661.3	714.0
Spain	38.5	56.0	1207.7	538.0
Greece	49.4	35.3	1159.0	605.6
OECD	47.2	82.8	893.8	408.5
	Airlines^d, 1996		Railways, 1994	
	Transported Passenger km / employee	Revenue tonne -km / employee	Productivity ^e	Revenue per employee
Ireland	n.a.	n.a.	163.0	35.0
Portugal	1157.0	135.0	486.0	12.2
Spain	1155.0	138.0	569.7	21.3
Greece	850.0	93.0	160.2	6.1
OECD	1868.3	290.3	525.4 ^f	31.6 ^f
	Postal System (1998)		Electricity	
	% Delivered Within 3 days	Objects per employee (thou)	GWh/ Employee	
Ireland	56.1	65.4	n.a.	
Portugal	52.1	65.5	1.2	
Spain	48.1	65.4	3.5	
Greece	11.9	42.9	1.5	
OECD	60.7	62.4	6.6	

Source: Mylonas and Joumard (1999).

a: Percent of digital mainframes on the fixed network.

b: Average annual spending by a business user, based on a common basket of calls, 1995 US\$ excluding tax

c: Average annual spending by a residential user, based on a common basket of calls, 1995 US \$ excluding tax

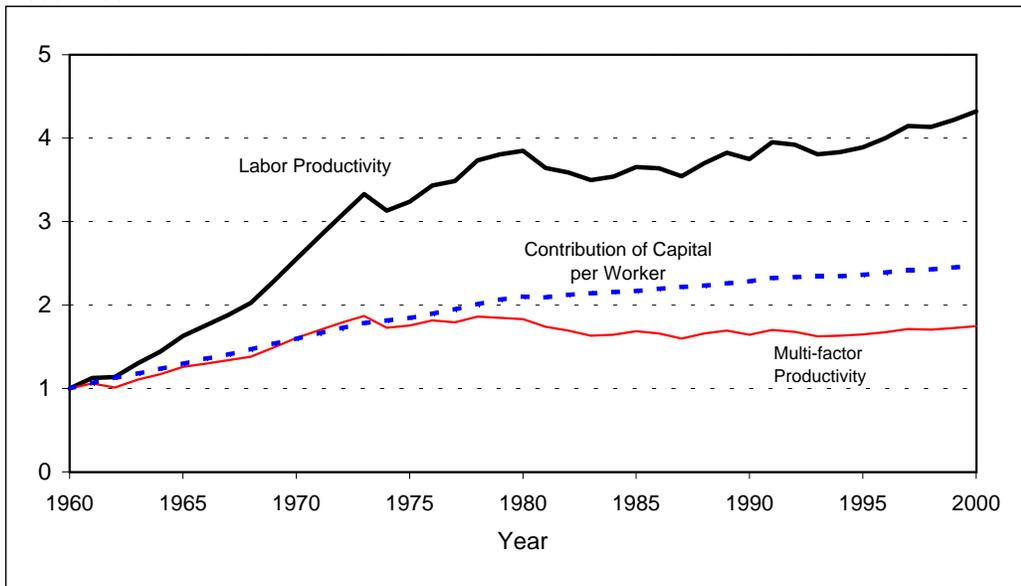
d: Countries represented by national airline. OECD is average of Lufthansa, Air France, British Airways & Delta Airlines

e: Productivity is traffic unit per employee, i.e. (passengers-km plus tons-km)/employees

f: Average of 11 European countries

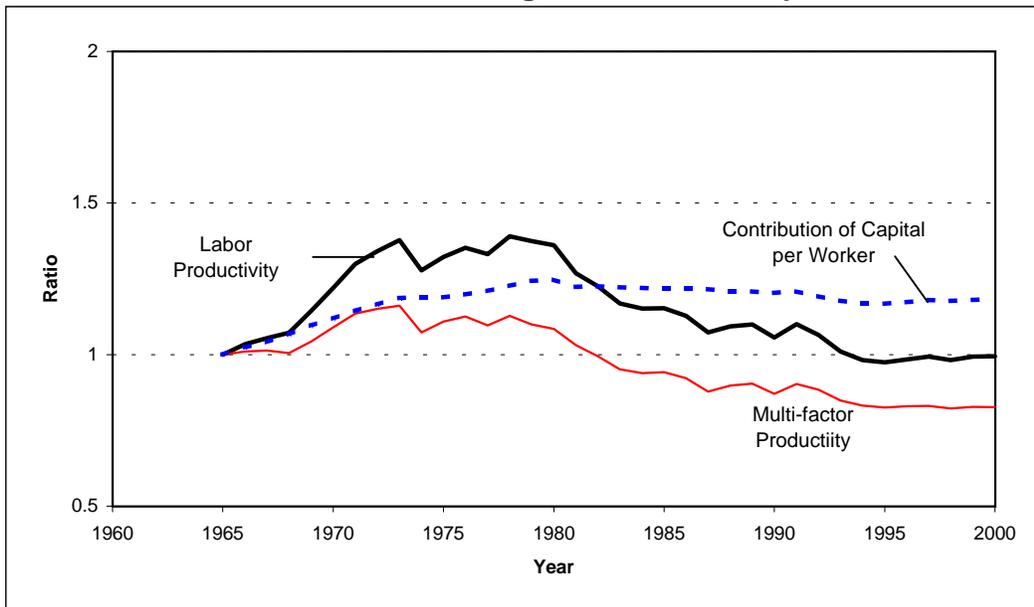
Figure 1a. Output per Worker and its Components, Greece, 1960-2000

1960=1.00



Source: Data of the OECD, Bank of Greece, and Authors' calculations. Note that capital per worker includes improvements in education

Figure 1b. Relative Performance of Output per Worker and Its Components, Greece Relative to an Average of Thirteen European Countries

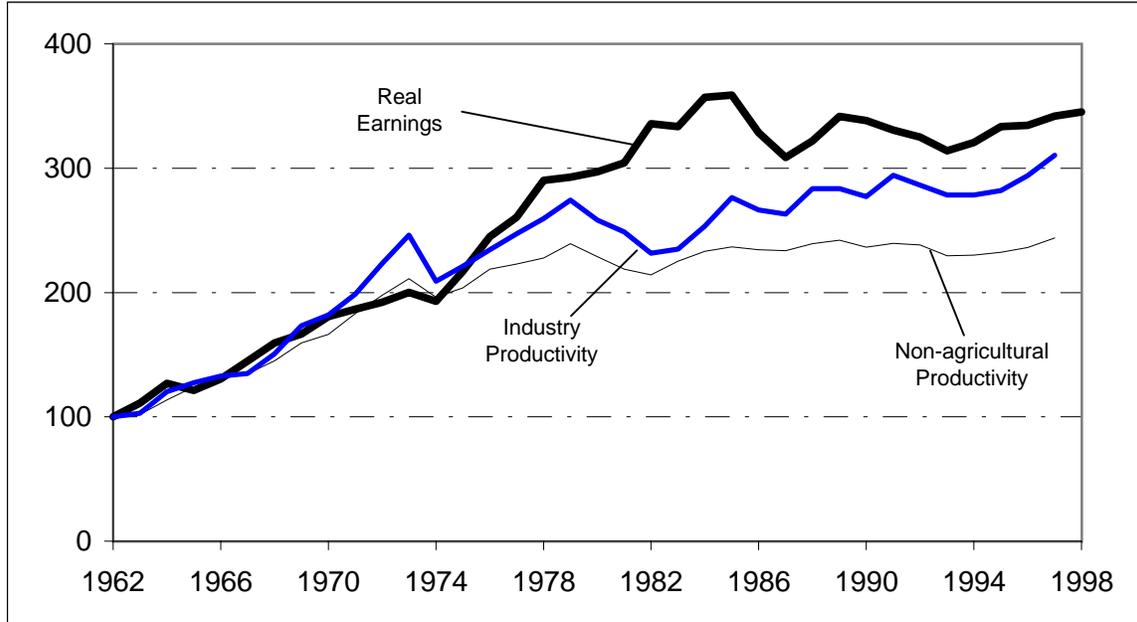


Source: OECD and authors's calculations.

The average is based on thirteen countries for which the data extended back to 1965:

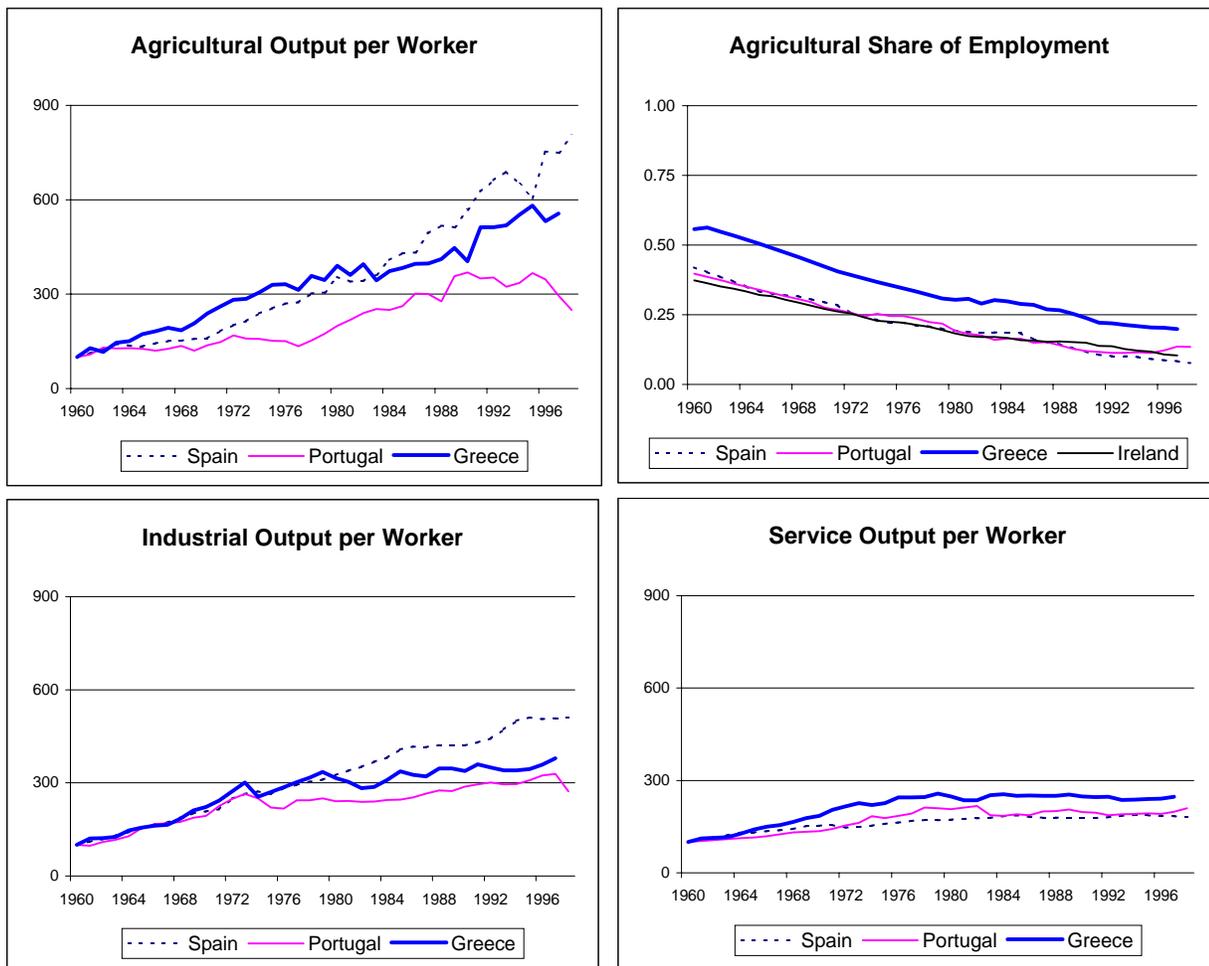
Austria, Denmark, Finland, France, Germany, Great Britain, Ireland, Italy, Norway, Portugal, Spain, Sweden, and Switzerland.

Figure 2: Real Earnings and Labor Productivity in Greece, 1962-1998



Source: OECD, Bank of Greece. Earnings are deflated by the CPI.

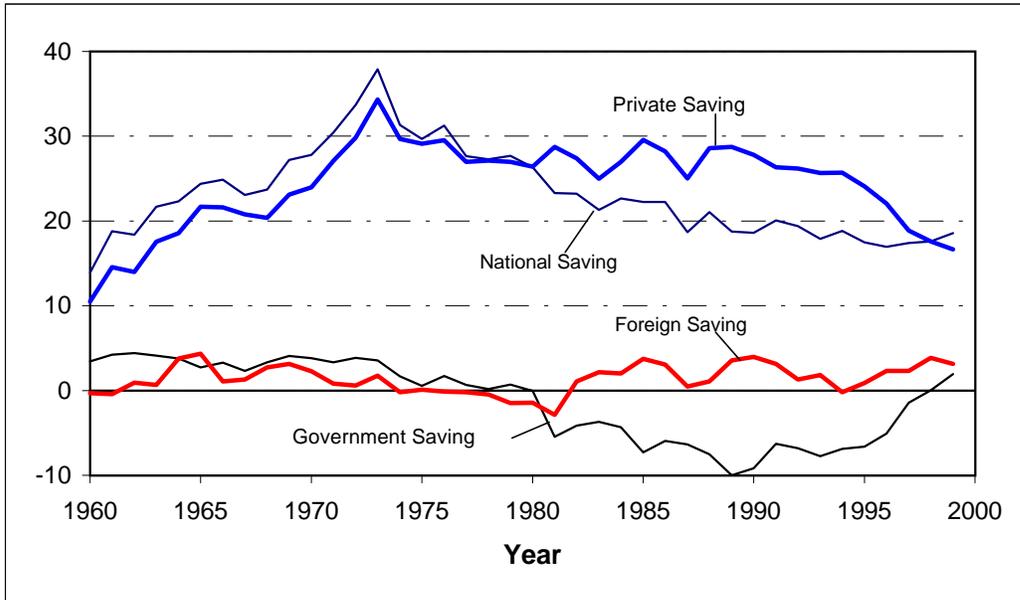
Figure 3: Output per Worker by Sector in Greece, Spain, and Ireland, 1960-97



Source: OECD, Bank of Greece, National Statistical Service of Greece, Bank of Spain, and Bank of Portugal.

Figure 4a. National Saving and Its Components, 1960-99

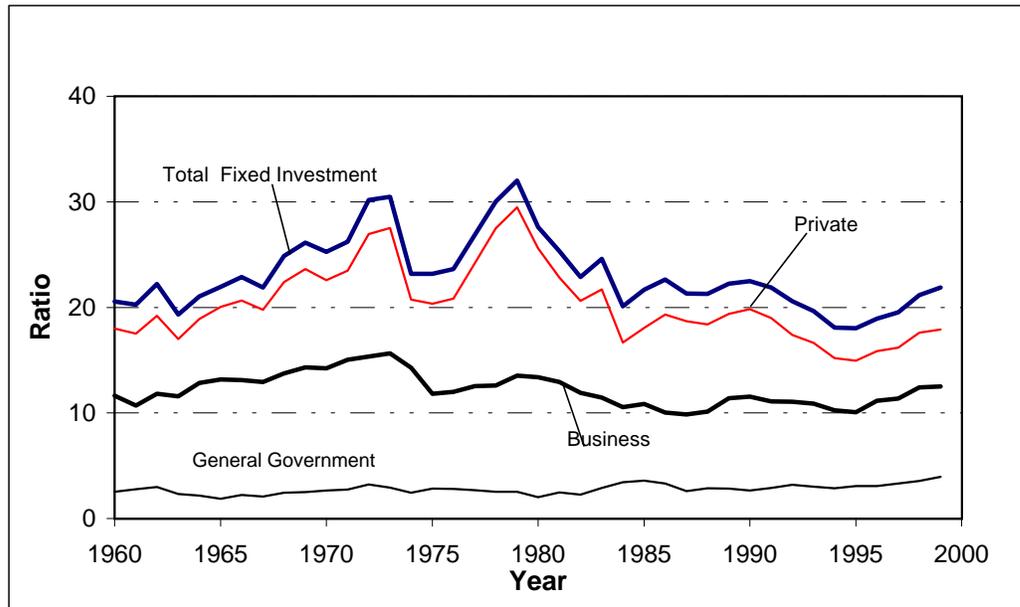
percent of GNP



Source: National Statistical Service of Greece, macroeconomic data on the basis of ESA95, 1960-99

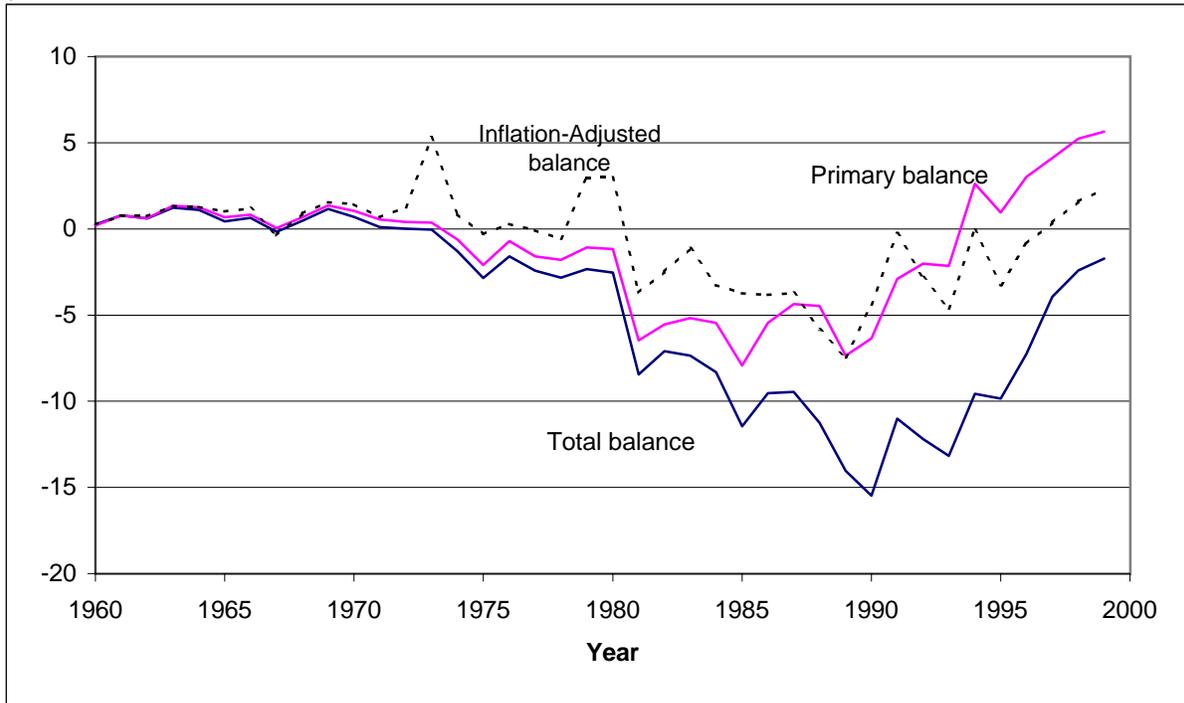
Figure 4b. Total Investment and Its Components, 1960-99

percent of GNP



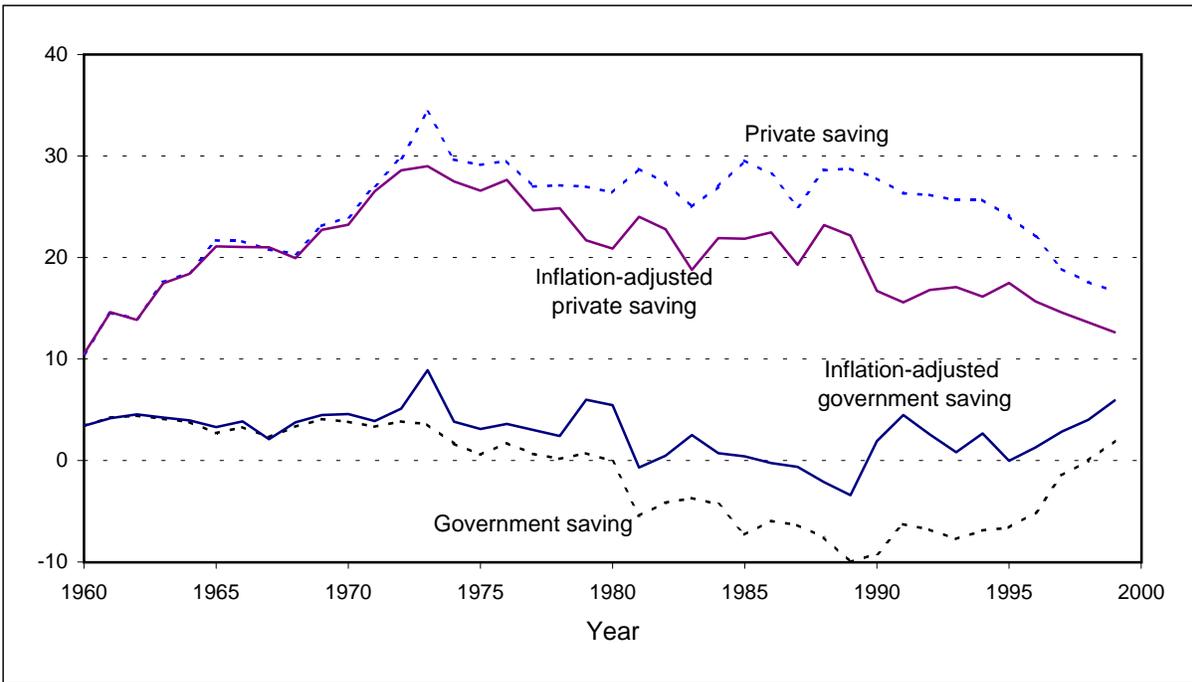
Source: National Statistical Service of Greece, macroeconomic data on the basis of ESA95, 1960-99

Figure 5: Government Budget Balance, Primary Balance, and Inflation-Adjusted Balance percent of GDP



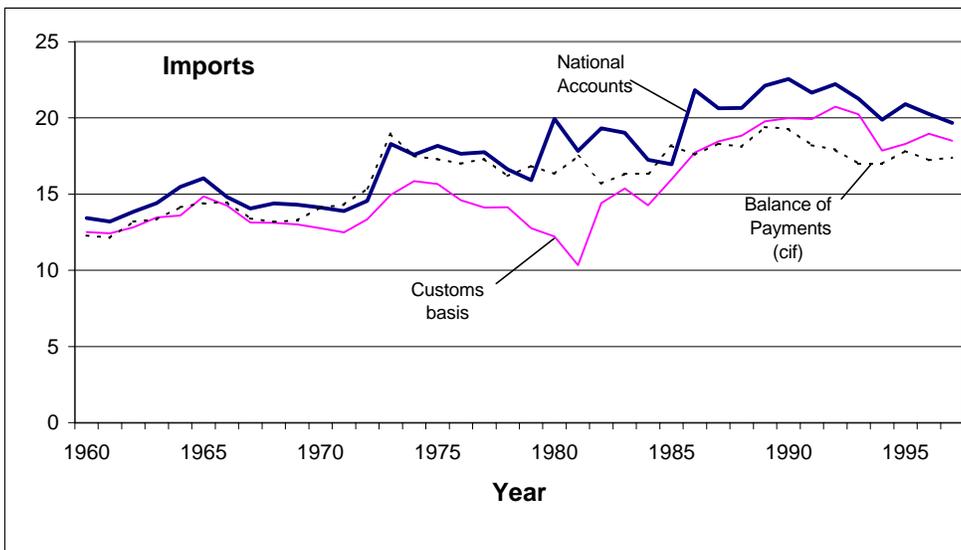
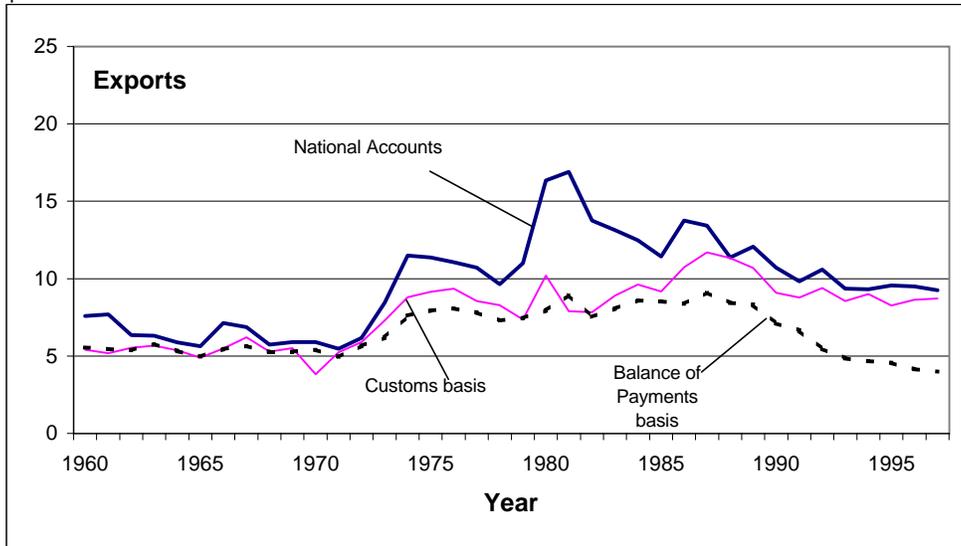
Source: Bank of Greece and Ministry of National Economy data diskettes.

Figure 6. Inflation-Adjusted Government and Private Saving, Greece, 1960-99
% of GDP



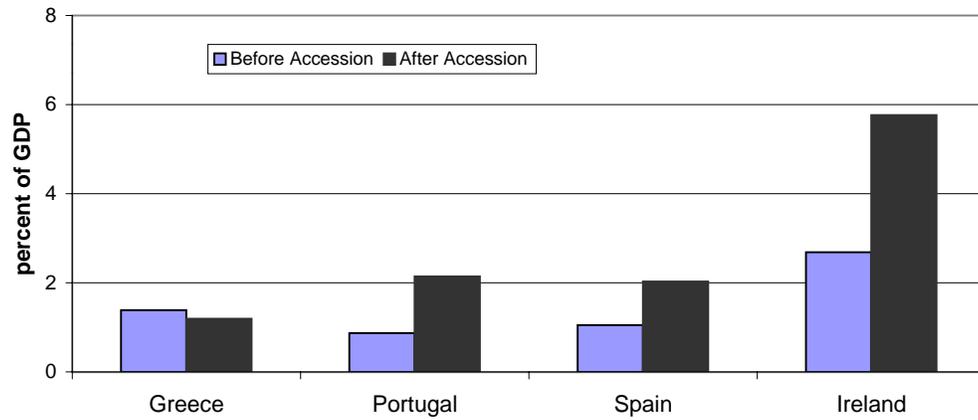
Source: Bank of Greece and Ministry of National Economy data diskettes.

Figure 7. Alternative Measures of Non-Fuel Exports and Imports, 1960-97
percent of GDP



Source: National Statistical Service (1999).

Figure 8. Average FDI Inflows Before and After Accession to the European Community



Membership dates: Greece-1981, Portugal-1986, Spain-1986, Ireland-1973

Note: Before is average of 5 years before accession to the EC, after is average of the first five years in EC

Figure 9a. Employment Protection and Growth in Output per Worker, 1980-1997

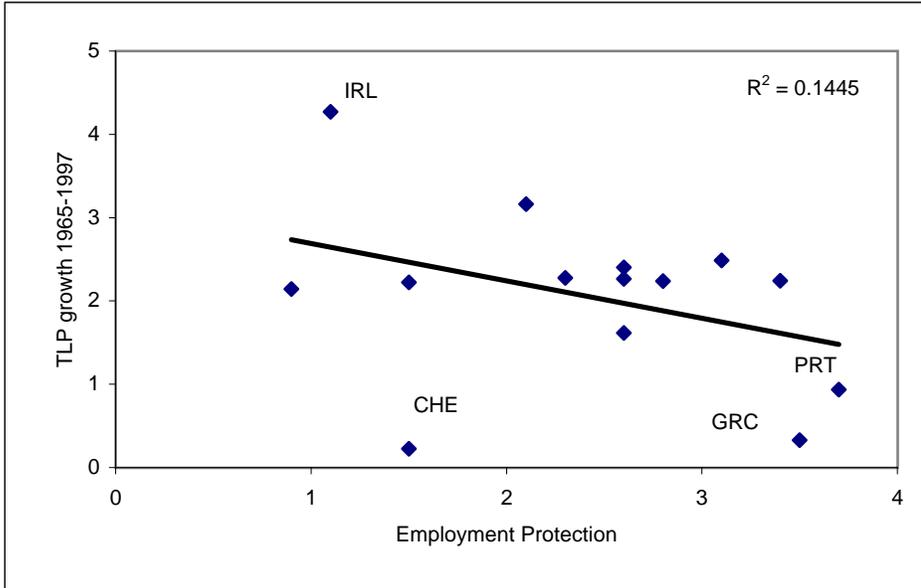
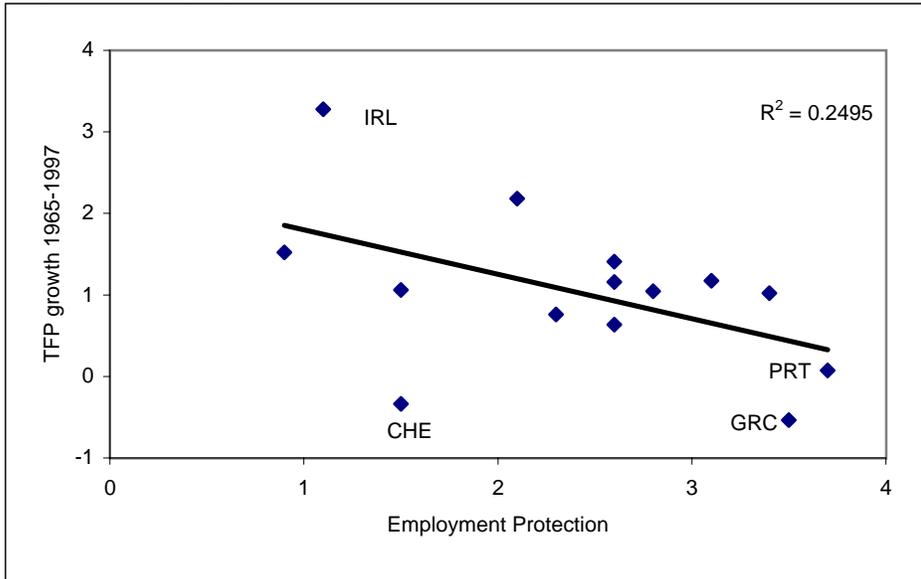
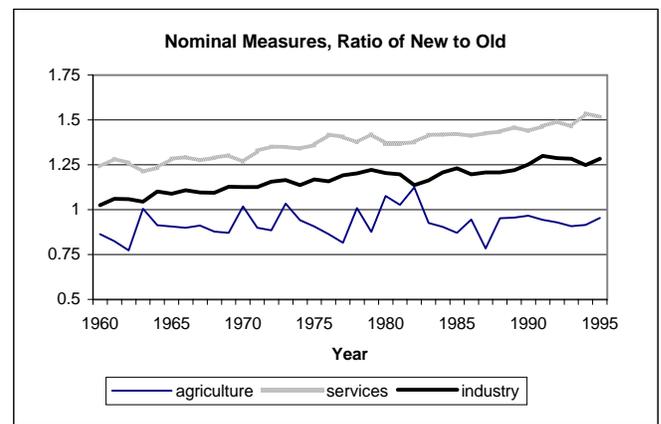
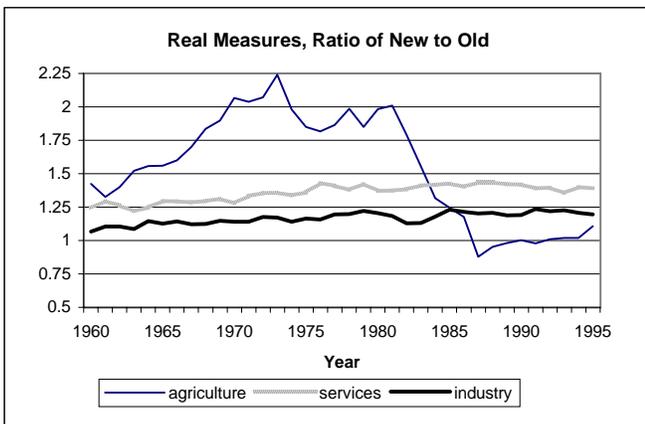
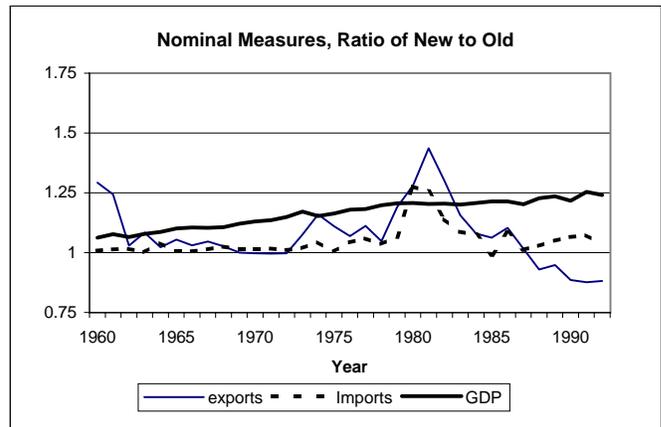
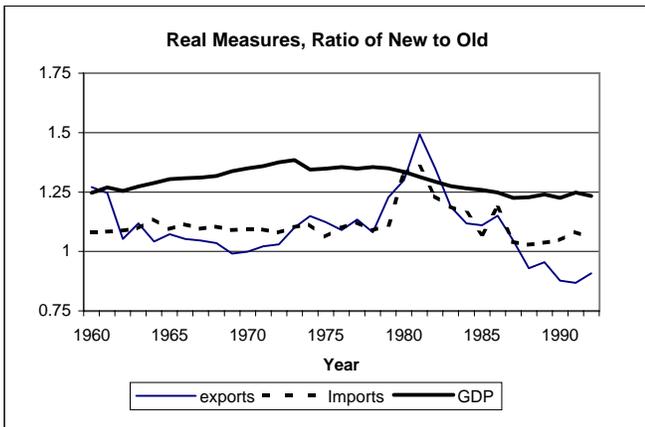
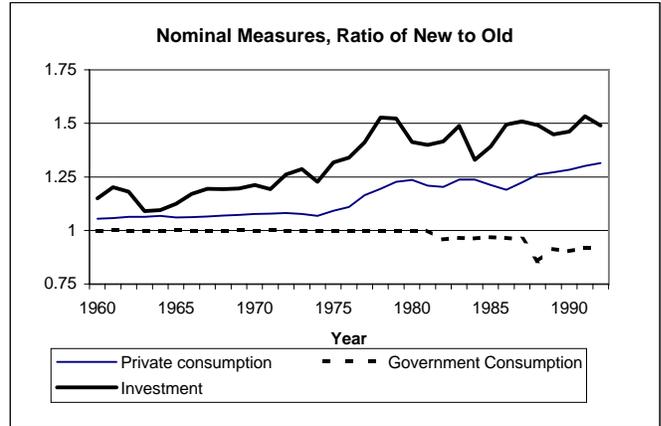
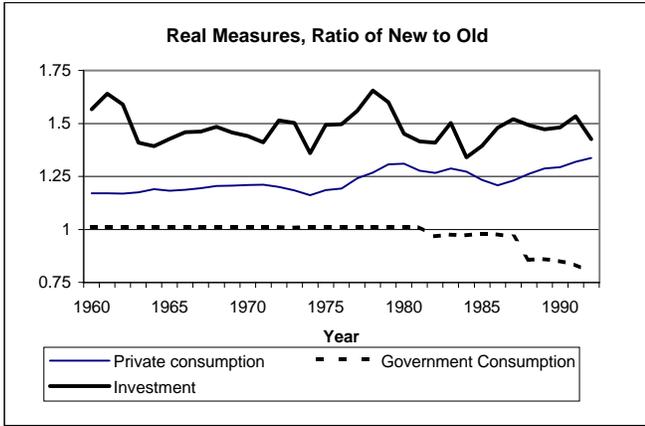


Figure 9b. Employment Protection and Growth in TFP, 1980-1997



Source: OECD (1999) and authors' calculations.

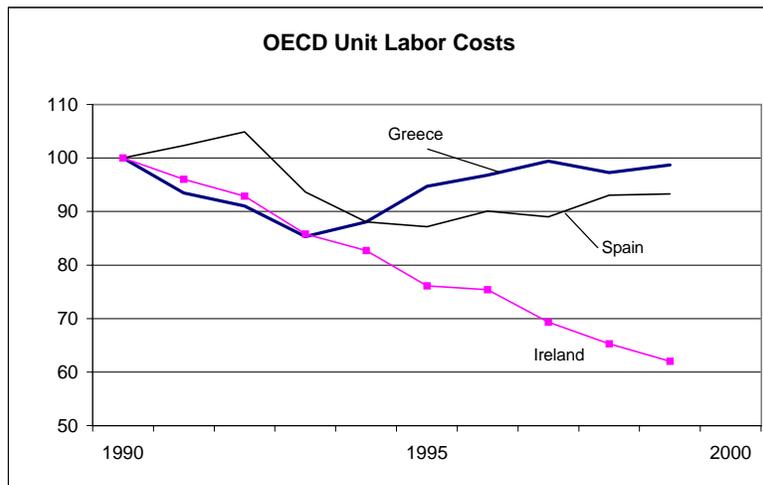
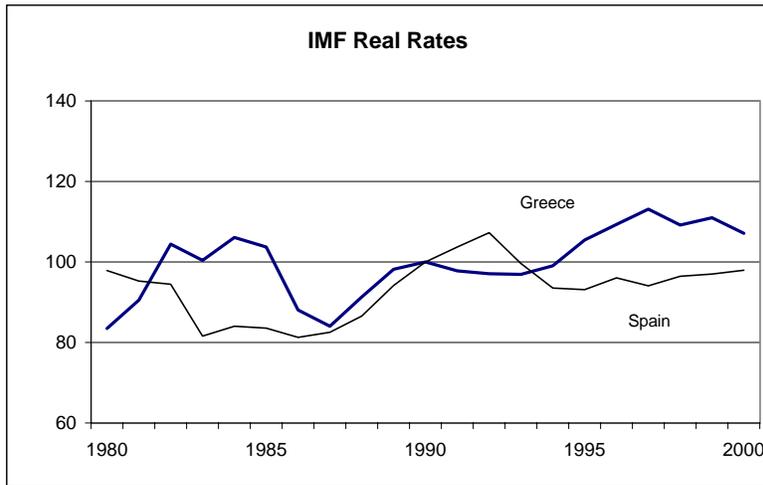
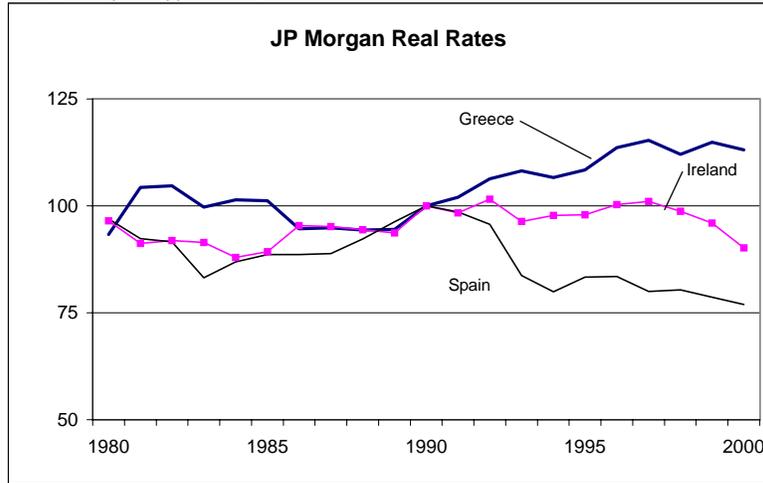
Figure A1. Comparison of National Accounts Data on Base of 1988 and Base of 1970



Source: National Statistical Service of Greece data of August 1998 and authors' calculations.

Figure A2. Alternative Exchange Rate Measures

Index, rise equals appreciation, 1990 = 100



Sources: JP Morgan web site, for trade-weighted exchange rates; International Monetary Fund, International Financial Statistics CDROM; and OECD, Economic Outlook Database.