

**Selected Euro-Area Countries:
The Determinants of Growth: The Experience in the Southern European
Economies of Greece and Portugal**

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SELECTED EURO-AREA COUNTRIES

The Determinants of Growth: The Experience in the Southern European Economies of Greece and Portugal

Prepared by Athanasios Vamvakidis and Luisa Zanforlin (EU1)

Approved by the European I Department

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I. INTRODUCTION AND SUMMARY

1. Greece and Portugal are the two countries with the lowest GDP per capita in the European Union (EU), but during the 1990s, their income gaps shrank significantly. However, the convergence path of the two economies in recent decades has been quite different.
2. Following rapid growth in the 1960s and the first half of the 1970s, the Greek economy was set apart from most European economies by its weaker growth performance, up until the mid-1990s. Real per capita GDP in Greece grew by only 1 percent on average in the 1980s and the first half of the 1990s. Slow growth increased the gap between Greece's per capita income and other developed economies; the ratio of purchasing power parity (PPP) adjusted per capita GDP in Greece compared with that in the United States declined from 53 percent in 1980 to 47 percent in 1995; during the same period, this ratio increased from 45 percent to 49 percent in Portugal, from 45 percent to 63 percent in Ireland, from 53 percent to 55 percent in Spain, while it remained about constant at 74 percent in Italy. However, during the second half of the 1990s, real per capita GDP in Greece grew by an average 2.7 percent per annum, compared with 1.9 percent in the euro area.
3. Portugal's growth picked up decisively after structural reforms took place in the middle of the 1980s and in the wake of EU membership in 1986. This period marked a strong catch up of per capita GDP vis-à-vis the other EU countries, after growth had stagnated since the early 1970s following political and economic turmoil. During the period 1986–90, Portugal's GDP grew by 5.4 percent per annum against 0.9 percent in the previous five years, but then slowed together with the rest of Europe in the early 1990s. As in Greece, by 1995 growth had picked up to levels above the EU average.
4. This paper reviews the recent growth experience of the Greek and Portuguese economies and their determinants, comparing it with the rest of the euro area as well as a large set of other economies. Estimates from fixed effects panel and cross section regressions are used to estimate how changes in economic policies and structural reforms have been translated into growth during the period 1980–1999. These estimates help to explain the slow growth performance of the Greek economy in the period from 1980 up to the mid-1990s, and the acceleration of growth in recent years. They also provide some understanding of how structural changes in the Portuguese economy contributed to initiating the catch-up process at an earlier stage than in Greece. The paper combines these results with more traditional estimates of potential growth, with a view to assessing the growth outlook for the Greek and Portuguese economies.
5. The main findings of the paper are as follows:
 - Comparisons of the main growth determinants seem to explain why Greece grew more slowly than the rest of the euro area during the 1980s and the beginning of the 1990s, and faster in the late 1990s, and how Portugal entered a catch up path soon after reforms in the mid-1980s. An important factor explaining the different

experience of the two countries is that the Greek economy was less integrated with the world economy than Portugal, which has historically been more open than the average EU economy. In both countries macroeconomic instability accompanied by relatively extensive state controls of the economy may have slowed growth during the last two decades. In Portugal, relatively low levels of education in the past and, in Greece, low levels of economic freedom compared with other EU economies may have significantly hindered growth.

- For most growth determinants, Greece is still lagging behind the rest of the euro area, despite progress during the second half of the 1990s. This explains the lack of convergence of the Greek economy to the euro area up until the mid-1990s. On the contrary, in Portugal, many indicators are close to euro-area averages but the convergence process is far from completed. This poses the question on what factors will drive convergence in Portugal in coming years. In both countries, significant market-oriented economic reforms, which started in Greece in the early 1990s and in Portugal after the mid-1980s, improved growth performance during the 1990s.
- In addition, temporary factors related to convergence in interest rates in the context of participation in the European Economic and Monetary Union (EMU) appear to have had a substantial impact on economic growth in both countries during the late 1990s.

6. The results suggest that, for Greece, further progress in structural reforms—privatization and domestic market liberalization—and in integration with the world economy, as well as a stable macroeconomic outlook are necessary to maintain its recent relatively fast growth performance. In the case of Portugal, increased domestic market liberalization, fiscal reform, and investment in human capital are among the factors that could influence positively growth in the medium term. If no further progress in the growth determinants takes place, their current levels imply potential growth of 2.6 percent for Greece, which is significantly lower than recent growth rates of about 4 percent—driven partly by temporary factors such as interest rate convergence to the euro-area level. The paper also compares these growth regression results with more traditional estimates of potential output in Greece. For Portugal, initial estimates from the growth regressions suggest potential growth rates of around 3 percent. However, the paper also raises some doubts that such growth rates could be sustained, absent further reforms. Notably, productivity increases in recent years have been very small. In addition, labor participation rates are high, unemployment is low, and investment and capital shares are above European averages, thus limiting increases in potential growth from further factor accumulation.

II. GROWTH IN GREECE AND PORTUGAL DURING RECENT DECADES

A. Greece

7. The growth experience of Greece has been uneven in recent decades.¹ Real per capita GDP grew by 7 percent on average per year in the 1960s, partly as a result of migration to the urban areas, and by 4.5 percent in the 1970s (5.1 percent in the first half and 3.9 percent in the second half). The investment share of GDP was at about 31 percent during these two decades. However, rapid growth did not prove to be sustainable. Real per capita growth, which decelerated in the second half of the 1970s, fell to 1.2 percent per year and the investment to GDP ratio to an average of 24 percent during the 1980s. Per capita real GDP growth fell further to 0.5 percent on average in the first half of the 1990s, but increased to an average of 2.7 percent during the second half, and is estimated at 3.8 percent in 2001 (4 percent in terms of real GDP). Despite recent progress, per capita income remains low compared to other developed economies—about two thirds of the euro-area average and half of the U.S. level in PPP adjusted terms. Productivity growth contributed little to output growth in Greece during the 1980s and the early 1990s; but there is some evidence of a pick-up in recent years (see below).

8. From the supply side, Greece is a service-oriented economy, and increasingly so in recent decades. The shares of agriculture and industry to total production declined in recent decades, from 12 and 30 percent respectively in 1980, to about 7 and 20 percent by 1999, while the share of services increased to 73 percent. As a result, expanding services have been the main contributor to growth in recent decades. On the demand side, growth in recent decades, including the recent acceleration in the end of the 1990s, has been evenly driven by both consumption and investment.

9. Government policies have shifted over the last decade from heavy intervention in the economy to a market-oriented approach. In particular, government policies before the 1990s were characterized by a strongly interventionist stance, as reflected in a range of fiscal incentives, directed credit, wage controls, a large degree of state ownership in sectors that were considered strategic, such as telecommunications, energy, and banking, and strict capital controls. Despite some reform attempts, these policies prevailed through the latter half of the 1970s and much of the 1980s.² However, during the 1990s, and particularly in the years approaching EMU participation, the government introduced important structural reforms, including privatization of large state companies, deregulation and privatization in the banking sector, liberalization steps in the telecom and energy sectors, financial market liberalization, and abolition of capital controls.

¹ For a discussion of the growth performance of the Greek economy in recent decades see also Alogoskoufis (1995).

² See Lutz (1998).

10. Recent reforms have contributed to higher growth in Greece since the mid-1990s—Greece has been growing above the euro-area average since the second half of the 1990s. Total factor productivity (TFP) growth is estimated to have increased from about zero in the first half of the 1990s to 2 percent in the second half. However, fast growth in recent years may have been also influenced by temporary nominal convergence forces, such as the interest rate convergence and the depreciation of the Greek Drachma that took place before entrance to the EMU.

B. Portugal

11. As in Greece, recorded growth was robust in Portugal during the sixties and early seventies, with per capita GDP increasing by 50 percent in the 1960–1973 period. This period was characterized by low government deficits and small increases in public consumption, but by a strong increase in external openness, with the trade share to GDP nearly doubling over the period. However, such high rates of growth also proved not to be sustainable. The investment share hardly grew at all in this period and inflation increased. The economic and political turmoil that followed the political revolution in 1974, together with the program of nationalization that was undertaken in 1975 brought growth to a standstill. After a new government brought under control rising budget deficits, macroeconomic stabilization appeared to have put Portugal on a catch-up path with the rest of Europe: in the 1985–90 period Portugal narrowed its output gap, by a quarter with respect to Greece and by 15 percent with respect to that of the euro-area average, in terms of real GDP per capita.

12. In the early 1990s the government introduced a program of market-oriented reforms in compliance with EU directives, which was intensified in the period leading up to EMU. However, as in Greece—although less sharply—growth slowed in the early 1990s, coinciding with a European-wide downturn. Also as in Greece, growth picked up in the second half of the decade, in excess of 3 percent. Despite the significant catch-up process, productivity growth remained sluggish through the nineties, and recent gains might be reflecting temporary convergence effects in the run up to the EMU. With the economy at nearly full employment, and if Portugal's investment share remains at the euro-area average, the current growth rates may not be maintained in the medium term, unless productivity increases significantly.

13. In Portugal, as in Greece, the supply side has historically been dominated by services, which accounted for over 60 percent of GDP during 1980–99, with the agriculture and the industrial sectors slowly declining. Trade-related services, tourism and financial sector services have been the strongest contributors to growth.

14. Also as in Greece, the early 1990s were a period of market-oriented reforms for Portugal, in adherence with EU membership, reducing the role of the state in the economy. Many sectors underwent significant liberalization and deregulation and the state ownership in the telecommunication, energy and banking sectors was reduced significantly through privatization.

III. THE DETERMINANTS OF GROWTH: GREECE AND PORTUGAL VERSUS THE EURO AREA

15. The empirical literature on growth broadly agrees on the main determinants of growth, but the size of their impact remains under dispute. This section discusses the main growth determinants based on recent empirical research and their values in Greece and Portugal, compared with the euro area. The next section provides more formal tests of the contribution of each of these determinants to growth in Greece and Portugal during the last two decades, based on estimates from a growth model.³

16. Drawing on results of the empirical growth literature, the focus is on the following growth determinants, covering the period 1980–1999 (Table 1):⁴

- *Convergence factor (the logarithm of per capita real GDP in the initial year of the period under consideration).* Greece and Portugal each have about two thirds the euro-area average GDP per capita measured in PPP-adjusted U.S. dollars as of 1999, and, therefore, both these countries should be experiencing faster growth rates due to convergence forces, keeping everything else constant, and according to the neoclassical growth theory. As noted above, these gaps in terms of GDP per capita compared to the euro-area average were considerably larger in 1970.
- *Demographic developments (population growth).* Population growth in both Greece and Portugal has been relatively low, although in Greece it is slightly above the euro-area average.⁵ High population growth has been found to be negatively correlated with GDP per capita growth.⁶
- *Investment in physical capital (gross capital formation as a percent of GDP).* Greece's and Portugal's shares of capital formation to GDP have been relatively close to the average in the rest of the euro area, with Greece at about 23 percent and Portugal around 24 percent on average over the 1980–99 period, against an euro-area average of 22 percent. The positive impact of investment on growth has been well documented in the empirical growth literature, and it has been found to be robust to

³ The two recent decades may be more relevant for implications on future growth prospects in the two countries.

⁴ For a detailed discussion on the main growth determinants see Fischer (1993) and Barro and Sala-I-Martin (1995).

⁵ Population growth in Greece may have been slightly higher in the 1990s than what available data indicate, according to preliminary results of the 2001 population census.

⁶ See Barro and Sala-I-Martin (1995).

extreme bounds analysis.⁷ Recent literature has found evidence of reverse causation, implying that countries with better growth prospects generate more investment.⁸

- *Investment in human capital (secondary school enrollment).* School enrollment ratios in Greece are close to the euro-area average. However, there is evidence of a shortage of graduates with information technology skills as well as of limited links between the education system and the labor market, which has resulted in oversupply of graduates in some sectors and undersupply in others (especially for the new economy sectors).⁹ Portugal's enrollment rates were relatively low in the beginning of the 1980s but the country made an enormous catch up effort. However, educational attainment indicators remain relatively weak, with average years of schooling in the population relatively low by EU standards, and with skilled labor shortages.
- *Macroeconomic policy—inflation.* High inflation was a major problem of the Greek economy in recent decades, but macroeconomic stabilization has been very effective in bringing inflation down in recent years. Consumer price inflation fell from an average of 25 percent in the 1980s to 2.6 percent in 1999, and is projected at between 3 to 4 percent in 2001, which is, however, still above the euro-area average. High inflation can be partly explained by the fiscal policy stance, which also contributed to recent price stabilization. The general government deficit increased from 4 percent to 23 percent of GDP in the period 1980–1990, but fell to an estimated surplus of 0.1 percent of GDP by 2001. High fiscal deficits up until the mid-1990s contributed to a public debt ratio to GDP of above 100 percent. In Portugal, high fiscal deficits, which averaged over 6 percent of GDP, contributed to inflation rates above 20 percent through the second half of the 1970s and during the 1980s, but the level of public debt remained contained. The structural reforms of the late 1980s, prudent fiscal policy and exchange rate targeting were successful in stabilizing prices.
- *Macroeconomic policy—government consumption.* In both countries, despite recent progress in fiscal consolidation the share of government consumption increased from 1980 to 1999, from 12 percent to 15 percent of GDP in Greece and from 14 percent to 19 percent in Portugal. Although these ratios are still below the euro-area average of about 20 percent, their increase may have taken resources away from more productive activities in both countries. Furthermore, in both countries, the increase in government consumption implied that the burden of the recent fiscal consolidation fell on revenues (general government revenues increased from 32 percent of GDP to

⁷ See Levine and Renelt (1992).

⁸ See Blomstrom, Lipsey, and Zejan (1996).

⁹ See Lutz (2001) and Vamvakidis (2001a).

44 percent in Greece during the 1990s, and from 37 percent to 43 percent in Portugal).

- *Trade openness (the ratio of exports plus imports of goods and services to GDP).*¹⁰ Greece and Portugal are both considered open economies based on a measure proposed by Sachs and Warner (1995), capturing many dimensions of protection. However, Greece is not as integrated in the world economy as Portugal and the rest of the euro area. Although Greece's trade in goods and services to GDP ratio increased from 41 percent in the 1980 to about 44 percent in 1999, it is still well below the euro-area average of 64 percent. This implies that although Greece benefits from being an open economy, it could grow faster if it were more integrated in the world economy.¹¹ Portugal's trade share has historically been higher than Greece's. In 1980, Portugal's trade share was over 60 percent of GDP, about 50 percent higher than in Greece, and while Greece's openness increased by 3 percentage points in the following twenty years, Portugal's increased by more than three times that amount, at well above the euro-area average. This implies that the positive growth effect from economic integration should have had a more significant effect in Portugal than in Greece.
- *Growth in partner countries (the export-weighted average real per capita GDP growth of trading partners, using the IMF-INS (Information Notice System) weights).* The real per capita GDP of Greece's and Portugal's trading partners each grew by 1.7 percent during the period 1980–99, compared with 1.8 percent in the rest of the euro area. Growth in the trading partners of an economy has been shown to result in faster domestic growth, with an elasticity as high as one.¹²
- *Economic freedom (an index of the extent that production and allocation decisions are determined via political mandates versus private enterprises and markets):*¹³ The

¹⁰ In the literature, openness has been measured using a variety of variables, each with its own share of criticism. The trade share is one of the most broadly used and robust measures (see Levine and Renelt, 1992).

¹¹ For a discussion of the positive impact of openness on growth see Krueger (1998) and Vamvakidis (2001b).

¹² See Arora and Vamvakidis (2001).

¹³ The economic freedom index is the weighted average of four factors: government enterprises and investment as a share of the economy (32.7 percent), the extent of price controls (33.5 percent), the top marginal tax rate and income threshold at which it applies (25 percent) and the use of conscripts to obtain military personnel (8.8 percent). Source: Gwartney, Lawson and Samida (2000).

economic freedom index measures the use of markets in the production and allocation process. It takes a value between 0 to 10, with 10 given to countries with the highest economic freedom. In Greece, the index increased from 2.1 in 1980 to 4.6 in 1997 (the latest available observation). However, this is still below the average of 5.1 in the rest of the euro area, and 7.9 percent in Ireland. In Portugal this index reached 5.5 percent at the end of the 1990s from only 1 in the early 1980s, reflecting the success of the economic liberalization policies undertaken in the beginning of the decade, and was possibly one of the strongest contributors to growth in recent years.

17. Comparisons of the main growth determinants are suggestive of why Greece grew more slowly than the rest of the euro area during the last two decades. The Greek economy was less integrated with the world economy, was relatively more controlled by the state, and had on average higher inflation, partly explained by higher fiscal deficits. Although some of these gaps have become smaller in recent years, Greece is still lagging behind the rest of the euro area, which has partly held back the expected positive growth effect from convergence forces. Furthermore, although Greece's investment in physical and human capital compares well with the rest of the euro area, quantitative indicators do not necessarily capture quality dimensions that may matter more for growth. As noted above, the educational system does not address in a satisfactory way the needs of the labor market, and the allocation of available funds to investment, at least up until the mid-1990s, might not have been the most efficient given the high extent of state control in the economy.

18. Comparing growth determinants for Portugal, inflation rates have also been historically higher than in the rest of the euro area, while secondary school enrollment ratios were lower and the economy was relatively more controlled by the state. However, the catch up in recent decades has been noticeable, as most of Portugal's indicators have converged to euro-area averages. This also would imply that, in the future, the main factor expected to be driving growth will be the income convergence process itself.

IV. THE DETERMINANTS OF GROWTH: FIXED-EFFECTS AND CROSS-COUNTRY ESTIMATES

19. This section provides two sets of estimates of the growth determinants discussed in the previous section, and uses them to explain growth during the two recent decades in Greece and Portugal. A cross-country, fixed-effects growth regression for the period 1980–99, using five-year averages, is used to estimate the impact on growth of several variables.¹⁴ Furthermore, a cross-country, OLS regression, which uses an average for each variable in each country for the whole 20-year period is used to project potential growth rates for the two countries. These estimates could shed light on the factors that drove growth in the Greek

¹⁴Since the effect of different factors may vary for different countries, the estimates provide an order of magnitude, rather than a precise measure of the impact of a particular policy on growth in the Greek and Portuguese economies.

and Portuguese economies during the two recent decades, as well as provide medium-term growth projections in the two economies. The regressions include all countries with available data, a total of 101 economies (Appendix). All data are from the World Development Indicators (World Bank, 2001), except if indicated otherwise.

20. Growth models have been estimated in a large number of other studies, including those cited in the previous section. We replicate this estimation here for three main reasons: first, as noted above, these estimates will help the discussion of the determinants of growth in Greece and Portugal; second, most studies have estimated such models up until the first half of the 1990s—including the second half of the 1990s should provide some insights into understanding a period in which Greece and Portugal experienced relatively robust growth; and third, these results can be used to inform potential growth estimates of the Greek and Portuguese economies.

21. The estimates confirm earlier findings in the literature that higher investment shares, and more integration into the world economy, although statistically significant at the 10 percent level, are positively correlated with growth (Table 1).¹⁵ In addition, fast growth in the trading partners of a country translates into faster domestic growth. An economy with free markets tends to grow faster, although this estimate is not statistically significant in the cross-country regression—the reason may be the loss of variation when a 20-year average of the economic freedom index is used in the cross-country regression. Lower inflation is also positively correlated with growth, although with an estimate close to zero—driven by episodes of hyperinflation—and statistically significant only in the cross-country regression. High government consumption is correlated with lower growth, but although its estimate is relatively high and statistically significant in the fixed effects regression, it is not statistically significant in the cross-country regression. To control for the negative correlation between country size and the trade share, the cross-country regression includes real GDP, which turns out to be statistically significant, but this result is sensitive to changes in the specification of the model.¹⁶ The secondary school enrolment ratio has a positive but not statistically significant estimate, suggesting that quantitative indicators may not be fully capturing the quality dimensions of human capital investment. Finally, the results indicate the existence of conditional convergence, since the coefficient of the initial GDP per capita is negative and statistically significant, and a negative impact of fast increase in population on growth, although statistically significant only in the cross-country regression.

¹⁵ For the impact of openness on investment see Levine and Renelt (1992) and Vamvakidis (1999).

¹⁶ For the interaction between openness and country size (GDP) see Alesina and Wacziarg (2000).

A. Greece

22. For Greece, the fixed effects estimates can explain the increase of per capita GDP growth during the second half of the 1990s to 2.7 percent, from 0.5 percent in the first half. Based on the changes in the growth determinants in Greece during this period, per capita GDP should have grown faster by 1.9 percentage points in the second half of the 1990s compared with the first half (see figure). Therefore, 0.8 percentage points of per capita GDP growth during this period are unexplained by the model (annual growth was faster than forecasted in the model by 0.8 percentage points).

23. If Greece had achieved the levels of the rest of the euro area for openness and freedom of markets during the second half of the 1990s, the growth of its per capita GDP would have been faster, based on the fixed effects estimates, by an additional 0.7 percentage points (0.2 percentage points from having more free markets and 0.4 percentage points from being more open). If Greece had achieved the levels of these variables in Ireland, the fastest growing euro-area economy during this period, its per capita GDP would have grown faster by 3.1 percentage points (0.4 percentage points from having more free markets and 2.7 percentage points from being more open).

24. On the growth path in Greece in the earlier periods, while the model does not explain the acceleration of GDP per capita growth from an average of 0.4 percent in the first half of the 1980s to an average of 2.1 percent in the second half—according to the model, growth should have accelerated by only 0.1 percent—it explains most of the deceleration of growth to 0.5 percent in the first half of the 1990s—according to the model, growth should have decelerated by a further 0.3 percentage points.

25. According to the model estimates, the movements in the growth of Greece's trading partners explain a significant part of the movements in Greece's growth. The acceleration of growth in Greece in the second half of the 1980s and the second half 1990s and the deceleration of growth in the first half of the 1990s are, to a relatively large part, explained by similar movements in Greece's trading partners growth.

26. Using the estimates from the cross-country regression, the forecasted per capita real GDP growth rate for Greece is 1.7 percent for the period 1980–99, compared with 1.4 percent actual growth. This implies that growth during this period was 0.3 lower than what would have been expected based on the model estimates.

B. Portugal

27. For Portugal, the estimated fixed effects growth model would be consistent with an increase in the growth rate by 2.1 percentage points in the second half of the 1980s, thus leaving a large unexplained residual of 2.6 percentage points in that period. It is likely that this relates in part to the economic crisis of 1984/85, which is not controlled for in the model. For later periods, the model performs better. It explains a decline in growth by 2.8 percentage points from the late 1980s to the early 1990s compared with the actual decline of

3.2 percentage points, and an increase in growth by 1.6 percentage points for the second half of the 1990s against an actual increase of 1 percentage point. The largest contributions to growth in Portugal during these decades came from continued domestic market liberalization (freedom index), increases in openness, and growth in trading partner countries, with increases in public consumption bringing a negative contribution.

28. Over the twenty year period, the estimated cross section model explains 2.2 percentage points in per capita real GDP growth in Portugal, against an actual increase of 2.6 percent. This implies that overall, growth in Portugal has been higher than forecasted in the model.

V. POTENTIAL OUTPUT

29. The cross-country growth regression framework can be used to project GDP growth in Greece and Portugal, based on the values of the growth determinants in the two economies and the estimates of their impact on growth.¹⁷ The results of this exercise can then be compared with other estimates of potential output, for example, based on a production function framework—assuming a Cobb-Douglas technology with two factors, capital and labor—and the Hodrick-Prescott (HP) filter—a univariate statistical method that removes short-run fluctuations, resulting in a series whose smoothness is determined by a parameter choice.¹⁸ Estimates of potential output can inform assessments to what extent observed growth rates are due to more permanent versus temporary factors. This is currently an important issue in both Greece and Portugal. For example, the strong acceleration of growth in Greece and Portugal during the second half of the 1990s raises the question if potential growth has increased, or temporary factors have been driving growth. Potential growth estimates could shed light on whether a fundamental change has actually taken place in the two countries in recent years, or if growth should be expected to fall again to its lower historical average.

A. Greece

30. Growth in Greece since the mid-1990s has been in part supported by macroeconomic and structural reforms, which allowed convergence forces to take effect. Progress in market liberalization and privatization, as well as price stability and fiscal consolidation in the second half of the 1990s supported investment and increased productivity. The investment share increased from 19 percent of GDP in the mid-1990s to 23 percent at the end of the decade, while total factor productivity (TFP) growth is estimated to have increased from

¹⁷ The projected population growth is added to the forecast as the model is in terms of GDP per capita growth.

¹⁸ For a detailed discussion of the methodologies to estimate potential output and its estimates for Greece in the period 1960–1998, see Lutz (1998).

slightly negative to about 2 percent during the same period (see tabulation below). The growth contribution of employment was relatively small during this period, and remains only slightly positive.

Growth Accounting, 1981–2000

	1981-85	1986-90	1991-95	1996-2000	1981-2000
Real GDP growth	1.3	1.9	1.3	3.3	2.0
Contributions of:					
Capital	1.4	1.0	0.9	1.2	1.1
Labor	-0.5	0.5	0.4	0.2	0.1
TFP	0.3	0.4	-0.1	1.9	0.7

31. However, the strong acceleration of growth in Greece since the mid-1990s has also been driven by temporary factors. Growth has been supported by the decline of interest rates to euro-area levels—the three-month T-bill rate has declined from above 10 percent in 1998 to less than 4 percent in 2001, while longer-term rates largely converged in anticipation of euro-area entry in 2000—from above 10 percent at the beginning of 1998 to less than 6 percent by the end of 2000 (movements were similar in real terms). For example, using estimates based on the Oxford Economic Forecasting Model (OEF), growth without interest rate convergence effects would have been lower by 1.5 percentage points in 2001. Although interest rates continued falling in 2001, together with the rest of the euro area, interest rate convergence has fully taken place and its growth impact is estimated to be largely completed by the end of 2002.

Potential Real GDP Growth of the Greek Economy, 2002

Based on:	
Forecast from growth regression	2.6
Cobb-Douglas production function (without structural break in TFP)	2.5
Cobb-Douglas production function (with structural break in TFP in mid-1990s)	3.7
Hodrick-Prescott filter	3.6

32. All estimates indicate potential output growth in Greece was below actual growth in recent years. Estimates from the cross-country regression framework suggests that, based on the current values of the growth determinants in Greece, projected long-term growth is 2.6 percent. Estimates based on a production function suggest potential growth of 2½–3¾ percent. The higher estimates assume TFP growth would continue at its 1.9 percent annual pace of the second half of the 1990s (versus an average of 0.7 percent over the last two decades); such high TFP growth seems unlikely, however, if the acceleration was partly supported by temporary factors such as interest rate convergence to the euro-area average. The HP filter results in a relatively high estimate for potential growth in Greece at

3.6 percent, but this is partly driven by the relatively large weight the HP filter gives to recent observations. In all, the results suggest that growth is unlikely to continue around the 4 percent recorded in recent years, unless structural reforms are intensified.

B. Portugal

33. Estimating a Cobb-Douglas production function for Portugal, several studies found capital shares slightly higher than in other developed countries. Extending a model estimated by Litghart (1999) to cover more recent data, Portugal's GDP growth can be decomposed as follows for the period 1980–2000:

Growth Accounting, 1981–2000

	1981-85	1986-90	1991-95	1996-2000	1981-2000
Real GDP growth	0.9	5.4	1.7	3.3	2.8
Contributions of:					
Capital	1.9	1.9	2.0	2.1	2.0
Labor	0.4	1.0	0.1	0.8	0.6
TFP	-1.5	2.4	-0.4	0.4	0.3

34. This analysis suggests that most of Portugal's growth can be explained through the factor accumulation process, leaving little impact on growth from increases in TFP. The average TFP increase during the 1990s is close to zero, and only the productivity gains obtained in the early years of the integration process account for positive productivity increases over the two decades. Looking ahead, the reliance on factor accumulation as an engine of growth is likely to be limited in Portugal: investment and capital shares are above the euro-area average, participation rates are high, and unemployment is low, limiting potential contributions from rising labor inputs. As a result, Portugal's convergence process depends on its future ability to improve productivity: estimates suggest potential growth of between 2.7 percent and 3.1 percent, depending whether TFP would stabilize on the average for the 1990s or whether recent increases in TFP will continue.

Potential Real GDP Growth of the Portuguese Economy, 2002

Based on:	
Forecast from growth regression	3.1
Cobb-Douglas production function (1980-2000 estimate)	2.9
Assuming TFP growth as in the 1990s	2.7
Assuming TFP growth as in 1996-2000	3.1
Hodrick-Prescott filter	2.8

35. Using the cross section regression discussed in Section IV to project growth for Portugal, it emerges that, contrary to Greece, many of the growth determinants are already near the averages of the euro area. Thus, in terms of the growth regression, the main factor expected to drive growth in the future would be the income convergence process. According to the model, this effect would lead to a higher output growth of $\frac{1}{2}$ percentage point per year compared with the euro-area average.

36. According to the HP filter, potential output growth in Portugal was $2\frac{3}{4}$ percent in the second half of the 1990s, compared with $3\frac{1}{4}$ percent in the second half of the 1980s. The HP filter results have thus been converging to the potential output estimations obtained with the Cobb-Douglas production function.

37. While all estimates point to potential growth of around $2\frac{3}{4}$ –3 percent, some doubts remain if such growth rates can be sustained in coming years (see also the discussion in the forthcoming staff report for the 2001 Article IV Consultation with Portugal). As in the case of Greece, the recent growth experience of Portugal benefited from temporary effects, such as the significant decline in interest rates in the run up to EMU. Moreover, as discussed, the production function estimates suggest that continued convergence may require raising productivity growth well above the rates observed in recent years.

VI. CONCLUSIONS

38. Greece and Portugal, the two countries with the lowest GDP per capita in the EU, have succeeded in reducing their income gap in recent years. Although the convergence path of the two economies has been quite different, both have benefited from an acceleration of structural, market-oriented reforms, as well as interest rate convergence to the euro-area average in the second half of the 1990s.

39. Estimates from a growth regression help to explain the slow growth performance of the Greek economy up to the mid-1990s, and the acceleration of growth in recent years, and provide some understanding of how structural changes contributed to putting Portugal on a catch up process at an earlier stage than Greece. Over the past two decades, the higher level of openness and integration in world trade of Portugal as compared with Greece have been important in explaining differences in output performance in the two countries.

40. The results suggest that further progress in structural reforms is key in Greece to maintain the high growth rates observed in recent years. Despite the progress during the second half of the 1990s, Greece is still lagging behind the rest of the euro-area levels for most growth determinants. In contrast, many of the growth determinants in Portugal are close to euro-area averages after successful structural reforms, but achieving productivity increases will be crucial for strong medium-term growth.

Table 1. Growth Determinants in Greece, Portugal, and the Euro Area, 1980-99
(In percent, unless indicated otherwise)

	Greece				Portugal				Euro Area			
	1980-84	1985-89	1990-94	1995-99	1980-84	1985-89	1990-94	1995-99	1980-84	1985-89	1990-94	1995-99
Real per capita GDP growth	0.4	2.1	0.5	2.7	0.6	5.3	2.1	3.1	1.1	2.7	1.1	1.9
GDP per capita (constant 1995 US\$) 1/	9,606	9,965	10,692	11,242	7,381	7,525	9,949	10,820	17,880	19,017	21,916	25,761
Gross capital formation (in percent of GDP)	26.4	22.1	21.0	20.8	23.0	26.0	24.2	23.9	22.3	21.3	22.1	20.9
Consumer price inflation	21.8	17.2	16.2	6.0	22.8	12.5	9.1	2.9	9.1	3.4	3.9	1.8
Government consumption (in percent of GDP)	13.5	14.9	15.0	14.8	14.6	15.2	18.1	19.0	20.5	20.3	20.5	20.3
Population growth	0.7	0.4	0.7	0.2	0.7	-0.1	-0.1	0.2	0.2	0.3	0.5	0.2
Secondary school enrollment ratio	85.1	92.4	94.2	95.4	43.3	59.6	89.5	110.7	90.2	95.1	104.0	108.7
Trade (in percent of GDP)	41.9	47.1	44.7	43.2	65.0	68.2	65.5	68.0	58.2	56.7	53.9	59.9
Growth in main trading partners	1.2	2.2	1.1	2.0	1.1	2.6	1.0	2.3	1.3	2.4	1.1	2.2
Economic freedom index 1/	2.1	1.4	1.7	4.2	1.0	2.0	3.9	5.2	3.7	3.3	4.7	5.3

Sources: IMF, *International Financial Statistics* and *WEO*; World Bank, WDI databases; and Fund staff estimates.

1/ The initial observation for each five-year period.

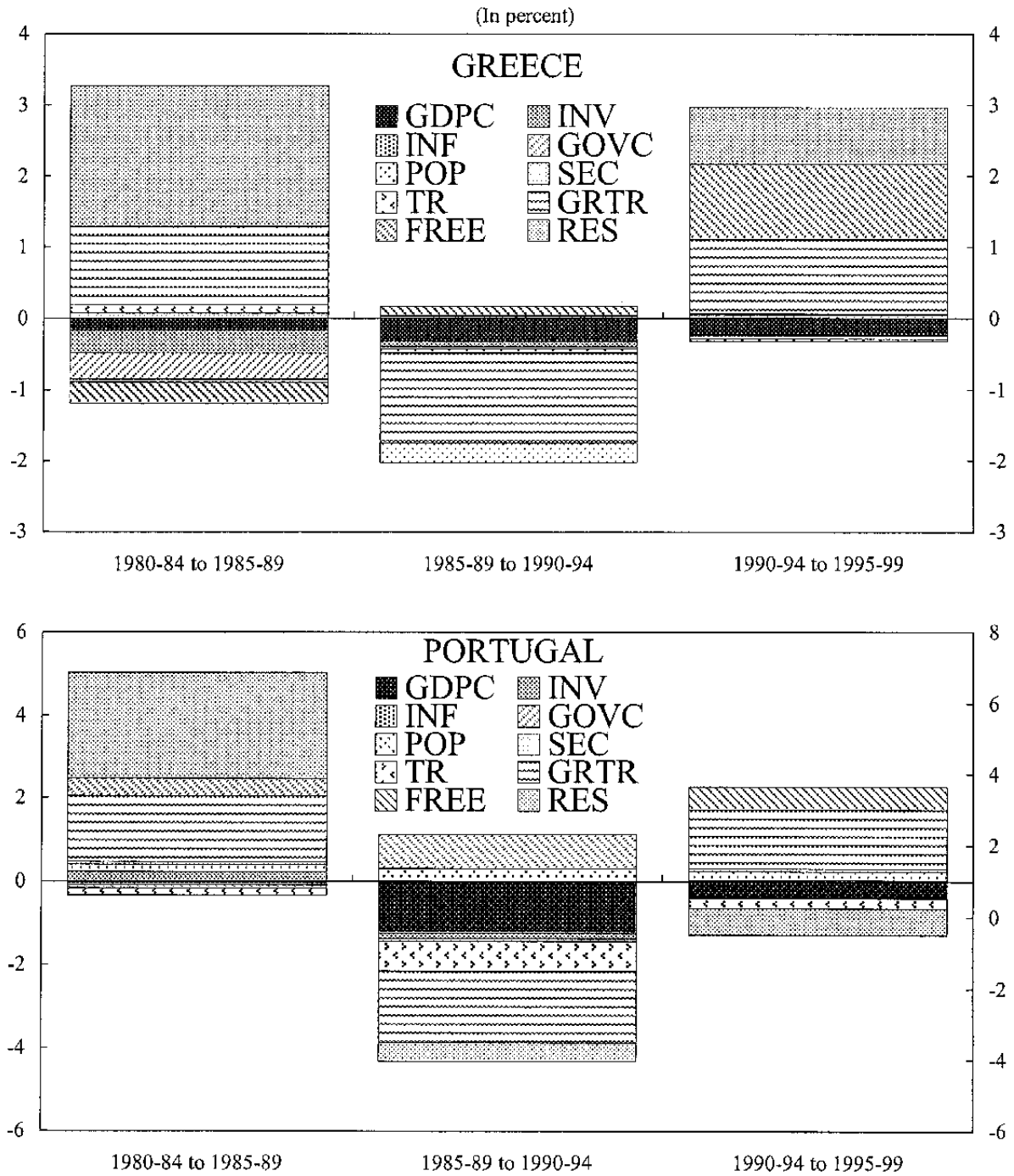
Table 2. Growth Regression, 1980-99 1/

	Fixed Effects	Cross Section
Constant		-5.39 (-2.20)
GDP (constant 1995 US\$)		0.33 (3.00)
GDP per capita (constant 1995 US\$)	-4.43 (-5.22)	-0.8 (-3.31)
Gross capital formation (in percent of GDP)	0.07 (1.83)	0.15 (4.47)
Consumer price inflation	-0.00 (-1.36)	-0.00 (-5.60)
Government consumption (in percent of GDP)	-0.25 (-4.29)	0.03 (0.81)
Population growth	0.11 0.32	-0.79 (-3.53)
Secondary school enrollment ratio	0.01 (0.65)	0.01 (1.02)
Trade (in percent of GDP)	0.02 (1.93)	0.01 (1.64)
Growth in main trading partners	1.11 (5.21)	0.78 (1.77)
Economic freedom index	0.42 (3.63)	0.13 (1.35)
R-squared	0.42	0.68
Standard error	1.61	1.16

Sources: IMF, *International Financial Statistics* and *WEO*; World Bank, WDI databases; and Fund staff estimates. A list of countries included in the regressions is provided in the Appendix.

1/ t-statistics, corrected for heteroskedasticity, are shown in parentheses.

Figure. The Determinants of the Change in the Growth of Per Capita GDP in Greece and Portugal, 1980-99 1/



Sources: IMF, International Financial Statistics; World Bank, WDI databases; and Fund staff estimates, based on the fixed effects panel regression reported in Table 2.

1/ GDPC: initial GDP per capita; INF: inflation rate; POP: population growth; TR: trade/GDP; FREE: economic freedom index; INV: investment/GDP; GOVC: government consumption/GDP; SEC: secondary school enrollment ratio; GRTR: growth in trading partners; RES: residual.

THE LIST OF THE 101 ECONOMIES IN THE GROWTH REGRESSIONS

ARGENTINA	GHANA	NIGERIA
AUSTRALIA	GREECE	NORWAY
AUSTRIA	GRENADA	PAKISTAN
BANGLADESH	GUATEMALA	PANAMA
BARBADOS	GUINEA-BISSAU	PAPUA NEW GUINEA
BELGIUM	GUYANA	PARAGUAY
BENIN	HONDURAS	PERU
BOLIVIA	HUNGARY	PHILIPPINES
BRAZIL	ICELAND	POLAND
BURKINA FASO	INDIA	PORTUGAL
BURUNDI	INDONESIA	SAMOA
CAMEROON	IRELAND	SAUDI ARABIA
CANADA	ISRAEL	SENEGAL
CENTRAL AFRICAN REP.	ITALY	SIERRA LEONE
CHAD	JAMAICA	SINGAPORE
CHILE	JAPAN	SOUTH AFRICA
CHINA, P.R.: MAINLAND	JORDAN	SPAIN
CHINA, P.R.:HONG KONG	KENYA	SRI LANKA
COLOMBIA	KOREA	SWEDEN
CONGO, REPUBLIC OF	MADAGASCAR	SWITZERLAND
COSTA RICA	MALAWI	SYRIAN ARAB REPUBLIC
COTE D IVOIRE	MALAYSIA	THAILAND
CYPRUS	MALI	TOGO
DENMARK	MALTA	TRINIDAD AND TOBAGO
DOMINICAN REPUBLIC	MAURITANIA	TUNISIA
ECUADOR	MAURITIUS	TURKEY
EGYPT	MEXICO	UGANDA
EL SALVADOR	MOROCCO	UNITED KINGDOM
FIJI	MOZAMBIQUE	UNITED STATES
FINLAND	NEPAL	URUGUAY
FRANCE	NETHERLANDS	VENEZUELA, REP. BOL.
GABON	NEW ZEALAND	ZAMBIA
GAMBIA, THE	NICARAGUA	ZIMBABWE
GERMANY	NIGER	

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