Why growth rates differ in the long run: capital deepening, productivity growth and structural change in Portugal, 1910-1990

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Abstract

This paper has two main purposes. The first is to define and describe the main cycles of growth and convergence of the Portuguese economy, during the twentieth century

The second purpose of the paper is to explore the causes of economic growth and slowdown over the century, within a growth accounting framework. We conclude that the acceleration of growth after World War II was due to capital deepening and total factor productivity growth and that the downturn after 1973 can be ascribed to the decline in factor productivity growth.

The paper proceeds by exploring the causes of the post-1973 slowdown in factor productivity. We propose an explanation that is based on the effects of structural change in the industrial sector, which was induced by the increasing integration within the European Union market.

1. Introduction

Throughout most of the nineteenth century, the levels of income per capita of the poor economies of the western European periphery diverged from those of the first industrializers. Contrarily, over the twentieth century, there was a convergence of incomes per capita within the continent. Convergence, however, occurred with different degrees of intensity and it was mostly concentrated in the period from 1950-73. This period has been studied more deeply, particularly in a cross-country comparative perspective. Yet, our understanding of the causes behind changes in convergence rates can be increased by paying attention to changing patterns of economic growth within a single country, in a long run perspective.[1]

Within the European periphery, Portugal had a particularly good performance over the twentieth century.[2] That performance can be partially explained by the fact that the country was spared from the direct effects of World War I. Portuguese economic growth was also less affected than other European countries by the contraction of international trade and capital flows that followed the New York 1929 crash. Truly, emigration and revenues from colonial trade were severely diminished through the impact of the Great Depression in Brazil and Africa.[3] But the fact is that, during the 1930s, Portugal faired better than Spain, which was ravaged by civil war. Portugal was also not directly affected by World War II, contrarily to what happened to Greece, which also suffered the effects of a civil war in the late 1940s. After World War II, Portugal engaged in the emerging international institutional framework, which regulated and fostered the resurgence of the international economy, and Spain and Ireland followed about one decade later.[4]

Traditional explanations of growth and slowdown of the Portuguese economy have put more emphasis on internal factors and, in particular, on economic policy options, which would have shifted in important ways. To start with, the financial indiscipline that characterized the Republican period (1910-26) would have been responsible for alleged economic stagnation. The emergence of the Estado Novo, in 1933, although it enhanced monetary and financial stability did not lead to higher levels of economic growth, according

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[1] See Prados and Sanz (1996), on Spain, and Ó Gráda and O'Rourke (1996), on Ireland. See also van Ark (1996b).
[2] On Portuguese growth performance over the twentieth century see Lains (1994). See also Mateus (1998).
[3] Lains (1998).
[4] See Leitão (2001).

to some authors, because of agrarian and industrial policy options, which would have shifted domestic resources towards the 'wrong' sectors. Contrarily, growth resumed after World War II because, contrarily to the previous period, the dictatorship government imposed a 'strategy aimed at economic growth and structural change'.[5] The higher growth of the post World War II period is also traditionally attributed to the fact that Portugal was a founding member of the EFTA, which implied a shift towards open trade policies. Again, the economy did not expand as much as it could have done, because opening up policies were not backed by a more interventionist stance by the government, which kept the budget balanced, for most of the years to the end of the dictatorship, in 1974.[6] The slowing down of economic growth that followed is frequently attributed to the revolution and the nationalization spree in 1975. Contrarily, the European Union, which Portugal joined in 1986, and privatization would have set the economy on the good direction again. The relation between changes in trends in economic policy and changes in trends in economic growth and convergence is however weaker than it is often posited.[7]

But some economists have questioned the dominance of internal factors in shaping the pattern of growth of the Portuguese economy. Silva Lopes (1996), recognizes that both internal and external factors were relevant for 'the acceleration of economic development, macroeconomic stability and increasing openness of the economy [during 1950-73]' but he stresses that 'it was above all because of foreign stimuli that the Portuguese economy expanded as it did and became more open to foreign relations'. The same author holds that economic growth slowdown after 1973 was also mainly a consequence of 'external factors'.[8] In order to explain the change in the rhythm of growth after 1973, Marques Mendes (1993) argues that 'it was the reduction by half of the growth rate of the European Communities during the 1970s and 1980s that provides the fundamental explanation for the slowdown in reducing the income gap between Portugal and the centre'. Moreover, according to the same author, the 'complete halt in convergence can only be explained by the fact that Portugal run into balance of payments problems and has suffered terms of trade losses during the [1971-92] decades'.[9]

This paper deals with the causes of Portugal's long-run economic performance during the twentieth century. We want to detect the causes for changes in rates of growth and

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[5] Marques (1988, pp. 23-26). See also Rosas (2000, Chap. 2).
[6] Pereira de Moura (1973)
[7] See Costa Lobo (2000).
[8] Silva Lopes (1996, pp. 17 and 23).
[9] Marques Mendes (1993, p. 13).

convergence over the century. We use parameters from augmented Solow models in order to estimate the effect of inputs on growth and the size of changes in total factor productivity growth over the twentieth century. The remaining of the paper is organized as follows: the next section sets down the main periods of growth and convergence of the Portuguese economy; section 3 analysis the contribution of the growth of factor inputs and productivity on overall economic growth, within a growth accounting framework; section 4 discusses the causes of slowdown of economic growth after 1973; section 5 presents the main conclusions of the paper.

2. *The comparative performance of the Portuguese economy*

The evolution of the Portuguese economy during the twentieth century has some common points with the evolution of the European economy. In particular, Portugal was affected by the international financial disequilibrium in the period after World War I and took part in the general economic expansion in the second post-war period, which ended in 1973. But trends of economic growth and fluctuations in Portugal and the rest of Europe also show many important differences. Graph 1 depicts an index for the growth of Portugal's real income per capita and for the growth of an unweighted average income per capita for nine European economies.[10] Table 1 shows annual growth rates between peak years of the two GDP series.

Table 1 – Growth of real income per capita in Portugal and Europe, 1910-1990
(peak-to-peak annual growth rates; per cent)

Portugal		Average 9	
1910-1934	1.57	1913-1929	1.35
1934-1947	1.15	1929-1939	1.28
1947-1973	5.03	1939-1973	2.67
1973-1990	2.32	1973-1990	2.05
1910-1990	2.77	1913-1990	2.08

'Average 9' is based on an unweighted average index for the following European countries:
UK, France, Belgium, the Netherlands, Germany (West Germany to 1991), Italy,
Denmark, Norway and Sweden. Peak years defined in relation to a log-linear time trend.
Sources: Batista *et al.* (1997), Pinheiro *et al.* (1997) and Maddison (1995 and 2001).

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[10] Namely: the United Kingdom, France, Germany (West Germany to 1991), Belgium, Netherlands Italy, Sweden, Denmark and Norway.

GRAPH 1 ABOUT HERE

During World War I, both the Portuguese and the European economies were in a depressive cycle, and income per capita reached a trough at the end of the war. From then on, the two indices increased, but the European index peaked in 1929, whereas Portugal's income growth peaked in 1934 (although there was a blip in the series in 1927). A period of stagnation followed this peak and it lasted down to the end of World War II. This periodization contrasts sharply to what one could expect from the stabilization program that followed the advent of the Estado Novo. Stagnation in Portugal's income series lasted throughout the 1930s, but growth resumed shortly after, and another peak in the income per capita series was reached in 1947.[11] Portuguese economic growth was comparatively high during World War II, whereas the European economy, as represented by our average index for nine countries, was negatively affected by the war and it hit a trough in 1945. However, the recovery started earlier in Europe, where economic growth resumed immediately after 1945. In contrast, the Portuguese economy remained virtually stagnant from 1947 to 1950. From then on, economic growth expanded consistently in the nine more developed European economies, as well as in Portugal, until a new and coincident peak was reached in 1973. After 1973, there was an inflexion of the index for the average of nine European countries, rather than a period of slowdown, to 1986, followed by rapid growth, to 1998, which was also the case of Portugal.[12]

Table 2 shows growth rates according to Maddison (1995)'s phases of economic development in the twentieth century. We may observe there that Portuguese income per capita increased at a faster pace than the index for the average of Europe in every phase, except during 1929-38 and 1973-86. The table also shows growth rates for Spain and Greece. Within this group of countries, Portugal had a better performance in the interwar period and that was mainly due to the fact that international and civil wars affected Spain and Greece. During the second post war period, growth rates in these three countries were pretty much similar, with Greece expanding at a slightly higher rate. After 1973 the Portuguese economy

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[11] Our income per capita series is a linked index of the series from Batista *et al.* (1997) and Pinheiro *et al.* (1997), which are based on direct evaluations of output. The alternative series from Nunes *et al.* (1989) is an indirect estimate, based on the evolution of government revenue and expenditure, and imports, and fluctuates accordingly. The indirect estimate implies a steep decline of income per capita from 1910 to 1921 and a steep recovery thereafter. Yet, it also shows a decline in the trend growth rate after 1932. See Lains and Reis (1991).

[12] Portugal had one of the highest variances of income per capita growth within the 15 European Union countries, in 1965-94. See Pinto Barbosa *et al.* (1999, pp. 154-9).

faired better. Finally, Table 2 shows data for Ireland, which depicts a different pattern of growth throughout the twentieth century.

Table 2 – Growth of real income per capita in the European periphery, 1913-1998
(Maddison's phases of development; annual growth rates between 3-years averages; per cent)

	Portugal	Spain	Greece	Ireland	Average 9
1913-1929	1.35	1.65	2.45	0.33	1.39
1929-1938	1.28	-3.53	1.50	0.87	1.16
1938-1950	1.56	1.48	-2.72	0.94	1.00
1950-1973	5.47	5.63	5.99	2.98	3.55
1973-1986	1.52	1.31	1.75	2.47	2.01
1986-1998	3.45	2.65	1.39	5.42	1.88
1913-1950	1.40	0.31	0.51	0.66	1.21
1950-1973	5.47	5.63	5.99	2.98	3.55
1973-1998	2.40	1.92	1.59	3.81	1.95
1913-1998	2.79	2.20	2.29	2.19	2.06

Notes and sources: see Table 1

Table 3 reports income convergence rates for the same growth periods (see also Graph 2).[13] As shown in that table, Portugal's rate of convergence, during the period from 1950 to 1973, was quite exceptional, at 1.94 per cent per year. Over the periods from 1913 to 1950 and from 1973 to 1998, the Portuguese economy also converged but only slightly. Convergence after the 1973 oil crisis, however, was concentrated in the years between 1986 and 1998. The Portuguese rate of convergence during the 1950-73 was inferior to that of Spain and Greece, whereas convergence in the period from 1986 to 1998 was higher. Ireland was as, again, an exceptional case.

GRAPH 2 ABOUT HERE

Following the period of higher growth and convergence, from 1950-73, Portugal's income per capita growth entered a new period of slower growth, which lasted to the present times. However, after 1973, the trend growth rate of the Portuguese economy was higher than the trend growth before 1950. Graph 3 shows clearly the higher trend growth after 1973.

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[13] We consider *absolute* rates of convergence, which do not take into account differences in growth potential or in steady state growth rates, which are contemplated by estimates of *conditional* convergence, as defined by Barro and Sala-i-Maritn (1995). Aguiar and Figueiredo (1999) show a positive and significant rate of conditional convergence for the Portuguese economy in the long-run (1870-1990), taking into account the initial income level and degree of openness of the economy.

Portugal fits what Crafts and Mills (1996) termed the 'reverse Janossy hypothesis'. In other words, despite the slowdown in Portuguese economic growth after 1973, the rate at which the economic increased after 1973 was higher than the rate of economic growth before the 1950-73 period. The Janossy hypothesis implies that reconstruction from war damage had an important role in the high growth levels observed in the 1950-73 period and that the rates of economic growth would return to the levels previous to the war. That did not happen in most European economies, including Portugal. Such a result implies that during the period of high growth there was a 'greater accumulation of technological capability', as well as infrastructures and economic institutions, which helped the increase in the trend growth for the Portuguese economy.[14]

Table 3 – Convergence of real incomes per capita in the European periphery, 1913-1998
(Maddison's phases of development; annual growth rates between 3-years averages; per cent)

	Portugal	Spain	Greece	Ireland
1913-1929	-0.04	0.26	1.04	-1.04
1929-1938	0.12	-4.64	0.33	-0.29
1938-1950	0.55	0.47	-3.69	-0.06
1950-1973	1.85	2.01	2.36	-0.546
1973-1986	-0.49	-0.69	-0.26	0.45
1986-1998	1.54	0.76	-0.48	3.48
1913-1950	0.19	-0.89	-0.69	-0.54
1950-1973	1.85	2.01	2.36	-0.55
1973-1998	0.44	-0.03	-0.36	1.82
1913-1998	0.72	0.14	0.23	0.13

Notes: convergence defined according to:

$$\phi = [(y_i / y9)_{(t+1)} / (y_i / y9)_{(t)}]^{[1/(t+1-t)]}$$

where y_i is income per capita for the 4 countries in the table and y9 is the average for the United Kingdom, France, Germany (West Germany to 1991), Belgium, the Netherlands Italy, Sweden, Denmark and Norway.
Source: see Table 1.

GRAPH 3 ABOUT HERE

Portuguese economic growth slowdown after 1973 can be attributed both to domestic and to external causes. A simple counterfactual static exercise can help us in determining how much of the slowdown can be attributed to the slowdown of the European economy, and how much to domestic factors. In fact, if domestic factors had not changed after 1973, the rate of

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[14] Crafts and Mills (1996, pp. 416-7).

convergence to the level of the average for the nine European countries can be assumed as constant, at 1.85 per cent per year. In that case, Portugal's income per capita in 1998 would amount to 90.6 per cent of the average for the nine more developed countries, instead of the actual ratio of 64.8 per cent. In other words, if the rate of convergence had not declined, Portugal's rate of economic growth during 1973-98 would have been 3.84 per cent, instead of the actual growth of 2.40 per cent. This simple exercise implies that about equal parts of the decline in 3.07 percentage points of the rate of growth of the Portuguese economy, after 1973, from 5.47 per cent to 2.40 per cent per year, can be ascribed to the decline in Portuguese rate of convergence (i.e. 1.44 p.p. = 3.84 - 2.40 per cent), and to the decline in the rate of growth of the 'European' economy (i.e. 1.63 p.p. = 5.47 - 3.84 per cent).[15]

In the appropriate comparative framework, the slowdown of the Portuguese economy after 1973 appears less spectacular and is at least partially explained. In fact, in the decades following 1973, the trend rate of growth of the economy was higher than it had been before the period of rapid growth. Moreover, as shown by a comparison of rates of convergence, Portugal's slowdown was in a large part due to the decline in the rate of European economic growth. Such conclusions imply that domestic factors explain about half of Portugal's economic growth slowdown.[16]

3. Accounting for economic growth

Neo-classical growth theory attributes the sources of output growth to the accumulation of human and physical capital and to exogenous technological change. The sources of growth are measured through a production function with constant elasticities. According to Maddison (1995 and 1996), growth accounting models explains fairly well the catching-up process of western European income levels (United Kingdom excepted) to that of the USA, which is the country with the highest average productivity level in the twentieth century. The model shows that most European economies converged because they had higher

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[15] A similar conclusion may be reached following Dowrick and Nguyen (1989, Table 6) growth rates adjusted for the catch-up effect. In fact, the adjusted growth rate for Portugal was 30 per cent of the actual growth in 1950-60 (1.32 vs. 4.39), 69 per cent in 1960-73 (4.40 vs. 6.41) and 49 per cent in 1973-85 (0.70 vs. 1.42).

[16] The domestic component of the variance of the rate of growth of the Portuguese economy declined after 1973, according to Pinto Barbosa et al. (1999, pp. 157-9), due to the increase in trade and to the better tuning of macroeconomic policies within the EU. This is in accordance with our findings.

growth rates of *both* capital stock and total factor productivity, in 1950-73, than the USA.[17] That was also the case of Spain, in the 1965-90 period.[18]

Table 4 sets down the evidence on the growth of inputs for Portugal. The data shows that both human and physical capital expanded more rapidly after 1947. In the case of human capital, which is measured as the average years of schooling of the active population, it increased by 2.08 per cent per year, in the 1910-34 period, 1.14 per cent, in 1934-47, 2.47 per cent, in 1947-73, and 4.83 per cent, in 1973-90. The rate of growth of physical capital doubled twice between 1910 and 1973, from 1.25 per cent per year, in 1910-34, to 3.89 per cent, in 1934-47, and 7.73 per cent, in 1947-73. After 1973, the rate of growth of capital stock declined but it still remained higher than it was before World War II.

Table 4 – Growth of factors and GDP, 1910-1990
(peak-to-peak annual growth rates; per cent)

	Labour	Human capital	Capital	GDP
1910-1934	1.00	2.08	1.25	2.17
1934-1947	1.31	1.14	3.89	2.09
1947-1973	0.70	2.47	7.73	5.17
1973-1990	0.05	4.83	5.21	3.92

Notes: 'Labour' is total employment estimated as 95% of active population, to 1925, and total number of hours worked of employed population, thereafter. The weekly number of hours worked declined from 48.5 hours in 1925 to 40 hours, in 1990.
'Human capital' is the average years of schooling of active population (according to Barro and Lee, 1993), based on Census data;
'Capital' is the stock of capital based on the growth of gross domestic capital formation (residential capital excluded).
Sources: Computed from Mateus (1998, Electronic Data Set, File 'cn_h_sl', Sheet L). See also Mateus (1998, Apêndice estatístico).

Table 5 shows the growth accounting for twentieth century Portugal, which is based on an 'average production function'[19] by Nehru and Dhareshwar (1994). The first striking conclusion we may draw from the table is that total factor productivity growth did not have a paramount role in accounting for Portuguese economic growth during the century. The highest contribution of the growth of factor productivity was in the 1910-34 period, whereas in 1934-47 it was slightly negative. The comparatively small contribution of productivity growth in Portugal in the period to 1973 contrasts with what happened in the rest of western

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[17] See Maddison (1995, pp. 40-9). See also Denison (1967), Dowrick and Nguyen (1989), Crafts and Toniolo (1996) and Crafts (2000).
[18] See Prados and Suarez (1996, p. 359).

Europe. Portuguese economic growth was more dependent on capital deepening. That happened particularly in the period from 1934-47, but also in 1947-73 and 1973-90, when capital growth accounted, respectively, for 49.9 and 44.3 per cent of domestic output growth.[20] The contribution of human capital growth was relatively small in the years to 1973 and it increased to 41.0 per cent during the last period in the table. The contribution of total factor productivity declined after 1973. This is in accordance to what happened elsewhere in Europe.[21]

Table 5 – Growth accounting for Portugal: sources of growth and output growth, 1910-1990

	Annual growth rates					As percent of output growth			
	Labour	Human capital	Capital	TFP	Output	Labour	Human capital	Capital	TFP
1910-1934	0.33	0.70	0.42	0.72	2.17	15.4	32.1	19.2	33.3
1934-1947	0.44	0.38	1.30	-0.02	2.09	20.8	18.2	62.0	-0.10
1947-1973	0.23	0.82	2.58	1.53	5.17	4.5	15.9	49.9	29.7
1973-1990	0.02	1.61	1.74	0.56	3.93	0.5	41.0	44.3	14.2

Notes: Sources of growth are based on factor growth rates from Table 4 weighted by factor shares of 1/3, according to Nehru and Dhareshwar (1994). See Mateus (1995b, Tab. 9) and Mateus (1998, Apêndice estatístico).
Sources: see Table 4

Portugal's growth accounting shows that the country's growth experience was more akin to what happened in most of the Asian 'tigers', in the second post war period.[22] This form of 'extensive growth' was also common to some eastern European countries such as Czechoslovakia and East Germany and was in opposition to the '"intensive growth" model which was predominant in western Europe during the post-war period.'[23] After 1973, the contribution of capital growth to total output growth declined only slightly and the decline in the rate of growth of total output can be ascribed mainly to the decline in the contribution of total factor productivity growth. If Portugal's total factor productivity growth had not declined during 1973-90, by 1 percentage point, the rate of total output growth during would

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[19] Temple (1999, p. 120).
[20] For growth accounting exercises with similar conclusions for Portugal, see César das Neves (1994), Silva Lopes (1996), Amaral (1998) and Mateus (1998).
[21] van Ark and Crafts (1996, pp. 5-6).
[22] See Mateus (1995b).
[23] van Ark (1996b, p. 298).

have been 4.90 per cent per year (i.e. 3.93 + 0.97 per cent), which is close to the rate of the two decades prior to 1973.

Afonso (1999) provides an alternative model where output growth is a log-linear function of investment per worker, imports of machinery per worker, and exports per worker. The author also adds as an exogenous variable average TFP growth of the Europe Union (12 members), in order to capture the convergence effect.[24] According to this author, in the 1960-73 period, the growth of the Portuguese economy was led by the growth in capital stock and total factor productivity. The contribution of these two factors of growth added to 93.4 per cent of output growth. Afonso (1999) concludes further that the growth of total factor productivity was mainly due to the growth in the labour 'efficiency', which was positively affected by the four exogenous variables in his model. On the other hand, the contribution of the growth of capital 'efficiency' is negligible. For the 1974-85 period, the author finds out a reduction in the explanatory power of capital deepening and labour productivity growth, and a negative contribution of capital productivity. For the period after 1986, capital and total factor productivity are again the two main sources of growth, although at a lower rate of total output growth.[25] The findings by Afonso (1999), regarding the declining contribution of factor productivity growth, after 1973, are in accordance with the findings based on the growth account exercise presented in Table 5.

Levine and Renelt (1992) propose an alternative model to estimate elasticities of income growth with respect to of a series of exogenous variables, including initial income levels, for a sample of 103 countries in the 1960-85 period. Crafts and Toniolo (1996) use one of Levine and Renelt's equations in order to 'consider what new growth theory might suggest for the speeding up and slowing down of European growth' in the three Maddison's phases of development for the twentieth century.[26] The chosen equation is based on a regression where income per capita growth rates is explained by the initial income per capita in relation to the US level, the investment ratio, secondary and primary enrolment ratio, the ratio of government expenditure to GDP, and population growth.[27] The Levine-Renelt model predicts considerably well the growth of the European economies during 1923-38 and 1950-73, but it underestimates growth for 1973-89. The major differences between the periods before and

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[24] See Afonso (1999, pp. 59-64).
[25] Afonso (1999, pp. 74-82).
[26] Crafts and Toniolo (1996, pp. 17-8). The Levine and Renelt (1992) model is an augmented Solow model of the Mankiw, Romer and Weil (1992) type. See Temple (1999).
[27] Levine and Renelt (1992) have also tried with export share growth, but it proved to be statistically non-significant. See below.

after 1973 are the higher negative effect of the initial income per capita level, which has decreasing importance over the periods, as the average income of the sample of European countries got closer to the US level. Secondly, the government expenditure share also had a higher negative effect.[28]

Table 6 – Growth factors according to the Levine-Renelt model: Portugal, 1910-1990

	Levels				Contribution to growth (annual growth rates; per cent)			
	1910-34	1934-47	1947-73	1973-90	1910-34	1934-47	1947-73	1973-90
Constant	--	--	--	--	2.01	2.01	2.01	2.01
Initial income	0.245	0.302	0.208	0.448	-1.08	-1.33	-0.92	-1.98
Investment share	0.050	0.083	0.209	0.301	0.47	0.77	1.95	2.80
Second. enrol. ratio	0.018	0.057	0.177	0.622	0.02	0.07	0.21	0.75
Primary enrol. ratio	0.582	0.798	1.231	1.373	1.04	1.43	2.20	2.46
Government share	0.110	0.100	0.099	0.135	-0.70	-0.64	-0.63	-0.86
Population growth	0.803	1.089	0.201	0.770	0.06	0.09	0.02	0.06
Forecast growth	--	--	--	--	1.82	2.40	4.84	5.25
Actual growth	--	--	--	--	1.57	1.15	5.03	2.32

Notes: the contribution of each factor is taken from the parameters of the following equation (see Levine and Renelt (1992, Tab. 5, col. ii)

$$gyp = 2.01 - 0.69* \text{ inyp} + 9.31* \text{ inv} + 1.21 \text{ sec} + 1.79* \text{ pri} - 6.37* \text{ gov} + 0.08 \text{ gpo}$$
$$(0.83) \quad (0.12) \qquad (2.08) \qquad (1.17) \qquad (0.58) \qquad (2.03) \qquad (0.18)$$
$$N = 103; \qquad R^2 = 0.68; \qquad * = \text{statistical significant at the 0.05 level}$$

Sources: 'Initial income level' (inyp): relative income level Portugal/USA in the beginning of each period from Summers and Heston (1988). The value of the observation is the ratio in the table multiplied by the United States 1950 GDP per capita level (i.e. $US 6,401).
'Investment' and 'Government shares' (inv and gov): GDP shares in current market prices. From Batista *et al*. (1997, pp. 93-4), to 1952; and from Pinheiro *et al*. (1997, pp. 197-200), for 1953-90. 'Primary enrolment ratio' (pri): Ratio of enrolment in public (to 1940) and private (from 1941) primary schools as percent of 5-9 (to 1940) and 6-9 (from 1941) age groups. 'Secondary enrolment ratio' (sec): Ratio of enrolment in general public, general private (from 1917), professional public (from 1929) and professional private (from 1941) secondary schools as per cent of 10-19 (to 1940) and 10 to 17 (from 1941) age groups. Sources: Luciano, 2001 (to 1940) and Teixeira (1999, pp. 147-9) (from 1941) and Valério (2001, p. 55). All shares and ratios are averages for the periods indicated.
'Growth of income per capita' and 'Population growth' (gyp and gpo)*:* same as Table 1.
See also Crafts and Toniolo (1996, p. 18).

The Levine-Renelt model can be used in order to determine to what extent Portugal's growth performance was in accordance to a world 'norm'. The results for Portugal are shown in Table 6. We conclude from the data in that table that the Levine-Renelt model is a relatively good predictor for Portugal's income per capita growth in 1910-34 and 1947-73, although in the second period it slightly underestimates the actual growth rate (i.e. 4.84 vs. 5.03 per cent). However, the model does not account for the slowing of Portugal's economic

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[28] See Crafts and Toniolo (1996, Table 1.11).

growth during the interwar period and in the period after 1973. In fact, despite the reduction in the initial income gap and the increase in the government share, which have negative coefficients, the model predicts an increase in the annual growth rate of the Portuguese economy, from 4.84 to 5.25 per cent, whereas actual growth declined from 5.03 to 2.32 per cent. The reason for the best performance predicted by the model is that Portugal's investment and school enrolment ratios remained considerably high after 1973.

Clearly, in comparison to the European experience, Portugal's initial income per capita had a lower negative effect, which is due to the fact that the gap was larger in Portugal in relation to the US. The investment effect in Portugal was comparable to that of Europe, whereas the sum of the human capital effects was lower in Portugal, as was the government share effect. The estimates for 1973-90 depict Portugal as an outlier, as the forecast income per capita growth rate is 5.25 per cent per, whereas the actual growth was only 2.32 per cent. This indicates that the observed reduction in Portugal's income growth after 1973 cannot be attributed to the performance of neither the investment ratio, neither the investment in human capital as measured by the school enrolment ratios. It is important to note that the growth predicted by the Levine and Renelt model for Portugal during 1973-90 is close to the growth rate of the Portuguese economy, if the 1947-73 rate of convergence was maintained in the post-1973 period, which was pointed out previously (i.e. 4.89 per cent).

The coefficient for exports is not statistically different from zero in any of the equations of the Levine and Renelt model. This result seems to contradict the generally held assumption that foreign trade is a major factor of growth in small open economies, but is in accordance with further evidence on Portugal.[29] The openness to trade of the Portuguese economy, which was quite considerable, throughout the second half of the twentieth century, occurred in two phases. The first phase followed membership of EFTA and the ratio of foreign trade to GDP increased from about 17 per cent to 30 per cent, from 1960 to 1973. In the next period to 1986, the ratio remained constant. The second phase followed the entering of the EEC and, from 1986 to 1994, the ratio increased from 30 per cent to close to 55 per cent.[30] In 1994, Portugal ranked as the fourth most open economy in the European Union.[31]

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[29] Empirical tests on the export-led growth model have generally refuted a direct causality link between exports and growth. According to Levine and Renelt (1992) findings, trade and growth are linked through investment. Pereira and Xu (2000) find out that the link is through investment *and* employment. See also Pessoa (1998) on the negligible effect of openness on Portuguese economic growth throughout 1960-90.

[30] The ratio is defined as the average of exports and imports over GDP, from Silva Lopes (1996, Graph 4.1).

[31] See Pinto Barbosa *et al.* (1999, p. 149).

The fact that the increase in foreign trade was more rapid in the 1986-94 period which had slower growth than in the period 1950-73, is indicative of the small explanatory effect of trade in Portuguese growth. In fact, according to Marques Mendes (1993), the effect of European integration in Portugal's economic growth was relatively small. He estimates that the participation in EFTA and the 1972 trade agreement with EEC explains between 2 and 2.5 per cent of Portugal's growth of per capita income; and that the gains from joining the European Union accounted for 10.1 per cent of the income per capita growth.[32]

Both the growth accounting framework and the Afonso (1999) and Levine and Renelt (1992) models point to the conclusion that trends in investment ratios in respect to both physical and human capital explain the increase in growth rates after World War II, but they fail to explain the slowdown after 1973. In fact, there were significant investments in human and physical capital in the 1950-73 period, in Portugal, which either increased in the following period or only marginally declined. Yet, after 1973 there was a sharp decline in the overall rate of growth of the Portuguese economy. As mentioned in the previous section, only half of the decline in Portugal's income growth rate after 1973 can be attributed to the decline in the rate of growth of the European economy. We thus need to explain domestic factors of growth, which were in place in spite of the high physical and human capital investment ratios.

4. Structural change and economic growth slowdown

The single most important factor in Portuguese economic growth slowdown after 1973 was the decline in the rate of growth of total factor productivity. In this section we analyse the extent to which the productivity fall is related to changes in the structure of output. Table 7 shows the performance of total productivity in the three sectors of the Portuguese economy during the two development phases, before and after 1973. As shown there, the growth of total factor productivity fell from 2.64 per cent per year, in 1952-73, to 0.31 per cent, in 1973-91. The performance of factor productivity in the industrial and the services sectors was the main cause behind the fall in the growth of total factor productivity, as productivity growth in

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[32] Marques Mendes (1993, pp. 16-21). The European Union effect is measured through the impact of structural funds alone (see also Gaspar and Leite 1995). Aguiar and Figueiredo (1999) have concluded that Portugal's level of foreign trade ratio, relative to the average of seven more developed European countries, affected positively and significantly the rate of convergence of the Portuguese economy, over the long-run (1870-1990). Yet, they do not provide estimates for shorter periods.

the agricultural sector increased slightly after 1973.[33] Taking into account the behaviour of total factor productivity in the three sectors of the economy, we may conclude that the decline in the rate of growth of the Portuguese economy after 1973 was due to the decline in the performance of the industrial and the services sector.[34]

Table 7 – Sectoral sources of growth and output growth, 1952-91
(annual growth rates; per cent)

	Sources of growth			Output growth
	Labour	Capital	TFP	
GDP				
1952-73	0.37	2.80	2.64	5.80
1974-91	0.86	1.60	0.31	2.76
Agriculture				
1954-73	-0.33	0.94	0.47	1.09
1974-87	-1.14	0.66	2.23	1.76
Industry				
1954-73	1.02	4.37	3.00	8.38
1974-87	0.72	1.99	-0.90	1.81
Services				
1954-73	0.80	2.79	2.51	6.10
1974-87	2.10	0.96	0.10	3.16

Source: Neves (1994, pp. 72-73). The estimates in this table are not fully comparable to those of Table 5 above, most of all because they do not take into account the role of human capital.

In order to explain the fall in industrial factor productivity growth, we need to take into account the major distinctive features of growth in the periods before and after 1973.[35] The high levels of industrial growth during the period from 1960-73 were due to the expansion of external demand, induced by European growth and to Portugal's participation in EFTA, as well as to the overall favourable performance of the economy and, in particular, of domestic demand. According to Silva Lopes (1996), the growth of the industrial sector output in the period to 1973 was enhanced by growth inducing government policies, including the protection from foreign competition granted to some branches of industry, fiscal incentives, public investment in social overhead capital and in key capital intensive industrial sectors, as

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[33] Agricultural labour productivity growth during 1973-90 is associated with the decline in agricultural labour force, by –2.8 per cent per year. Both the decline in labour force and the increase in labour productivity were below rates for most western European countries. See Lains (1994, p. 939) and van Ark (1996a).

[34] The decline in total factor productivity in the services sector after 1973 was due to the decline in labour productivity, which is related to the sharp increase in the rate of growth of employment in the sector (see Lains 1994). That increase is related, on the one hand, to the incorporation of immigrant workers from the colonies, and to the post-1975 employment protection legislation.

[35] Lains (1994).

well as wage and price controls and low interest rates.[36] The joining of the EFTA meant the opening up to external competition, but the Portuguese government managed to negotiate gradual and selected reductions in tariff and other forms of domestic protection, whereas Portuguese industrial exports took advantage of the opening up of foreign markets.[37]

After 1973, there was a shift of the industrial sector towards the increase in the output of some more labour intensive sectors. In fact, the contribution of the foodstuffs and textiles sectors in the industrial sector increased, from 1950-73 to 1973-80, and even more to 1980-90. On the contrary, the contribution of more capital intensive sectors to total output growth declined. Foodstuffs and textiles accounted for half of total industrial growth, in 1973-80, and over 2/3, in 1980-90. The more capital-intensive sectors accounted for 42 per cent of industrial growth in 1973-80 and 30.7 per cent in 1980-90. It is worth noting that the performance of total factor productivity in the industrial sector was more favourable in the 1973-80 period than it was in 1980-90.[38] This indicates that the growth of the foodstuffs and textile sectors had a negative impact on industrial productivity growth, as compared to the impact of the more capital-intensive sectors.[39]

According to Peres Lopes (1994), Portugal's industrial labour productivity in relation to the United Kingdom's was comparatively higher in the 'traditional' sectors, namely, textiles, wearing apparel, leather and footwear, wood products, paper and electrical appliances. Moreover, relative productivity levels in these sectors declined over 1977-90, whereas it increased in the remaining industrial sectors.

To fully understand the causes of the fall of factor productivity growth in the industrial sector, after 1973, we have thus to explain what caused the observed shifts in the structure of the output. One of the main reasons for that shift was the increasing openness of the industrial sector to foreign trade. According to Pinto Barbosa *et al.* (1999), in 1993, the structure of Portugal's industrial sector was in tune with the structure of revealed comparative advantages. Yet, according to the same authors, labour productivity in the industrial sectors with better export performance and higher growth rates of output, was below the average of the sector.[40] The fact that the Portuguese industrial sector adapted to the changes in the structure of demand imposed by the increasing integration with the European Union economy, led to an

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[36] See also Centeno (1995) and Mateus (1998, pp. 194-8).
[37] Silva Lopes (1996, pp. 87-8). See also Macedo *et al.* (1988), Lains (1994), Amaral (1998) and Confraria (1999).
[38] Neves (1994, pp. 72-73).
[39] Lains (1994, p. 945).
[40] See Pinto Barbosa *et al.* (1999, pp. 282-4). The authors do not infer a *causal* relationship between

increase of the weight of industrial sectors with higher levels of comparative advantage. However, that was achieved at lower levels of labour and capital productivity. Such structural transformation led to a reduction in the average productivity level of the Portuguese industrial sector.

5. *Conclusions*

Economic historians have shown in the last decades that there is a wide diversity of economic growth experiences, across countries. Different experiences stem from the fact that the conditions for economic growth can be very different from country to country. Such conclusion has a corollary that has not been sufficiently exploited in long-term economic growth studies, which is that conditions for economic growth also vary substantially across time. The Portuguese experience of growth during the twentieth century is a good example of that.

Many authors have recognized that the *external* conditions for Portuguese economic growth changed throughout the century. Those changes are associated with transformations in the international and, in particular, in the European economy, which can be described as Maddison's phases of development. Yet, less attention has been paid to the fact that the *domestic* conditions for the growth of the Portuguese economy have also changed substantially. Although the consequences of changes in industrial, monetary and fiscal policies, as well as overall political conditions, have been largely accounted for, less attention has been paid to the possibility that economic conditions for growth have also changed in a substantial way.

The Portuguese economy went through an intensive process of structural transformation during the 1950-73 period. Whereas in 1950, Portugal was largely an agrarian economy, with about 50 per cent of the population employed in the agricultural sector, by 1973 the growth of the industrial and the services sectors had substantially transformed the economy. The sheer shift of labour from agriculture to the other sectors of the economy was a source of growth, as the labour productivity in agriculture was about half that of industry and services. This paper has put together evidence showing that high levels of investment in human and physical capital were the main instruments for rapid economic growth to 1973.

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export ratios and labour productivity. See also Crespo Faustino (1995) and Pita Barros (1997).

The fact that Europe was expanding rapidly was also of major help. After 1973, though, the overall conditions for growth were less favourable, as most of the gains from structural change had already been reaped. The fact that the European economy slowed down imposed further restrictions on rapid growth. However, after two decades of growth, the Portuguese economy was substantially different. Despite the fact that the potential effect of structural change on economic growth had died out, the fact was that the various forms of capital and capacities acquired in the period of rapid growth pushed the economy into a stage of higher trend growth rates. During this latter stage, the Portuguese economy is presently in a process of adaptation to the average structure of the European economy. That is a slow but probably sustained process.

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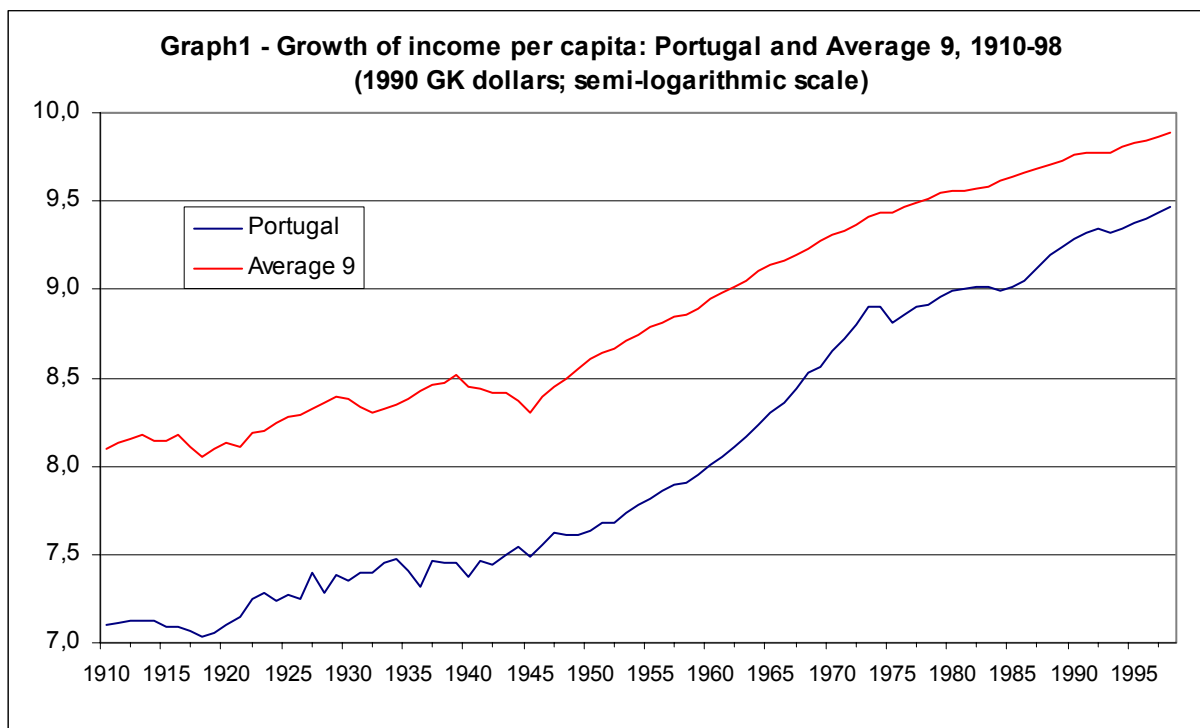
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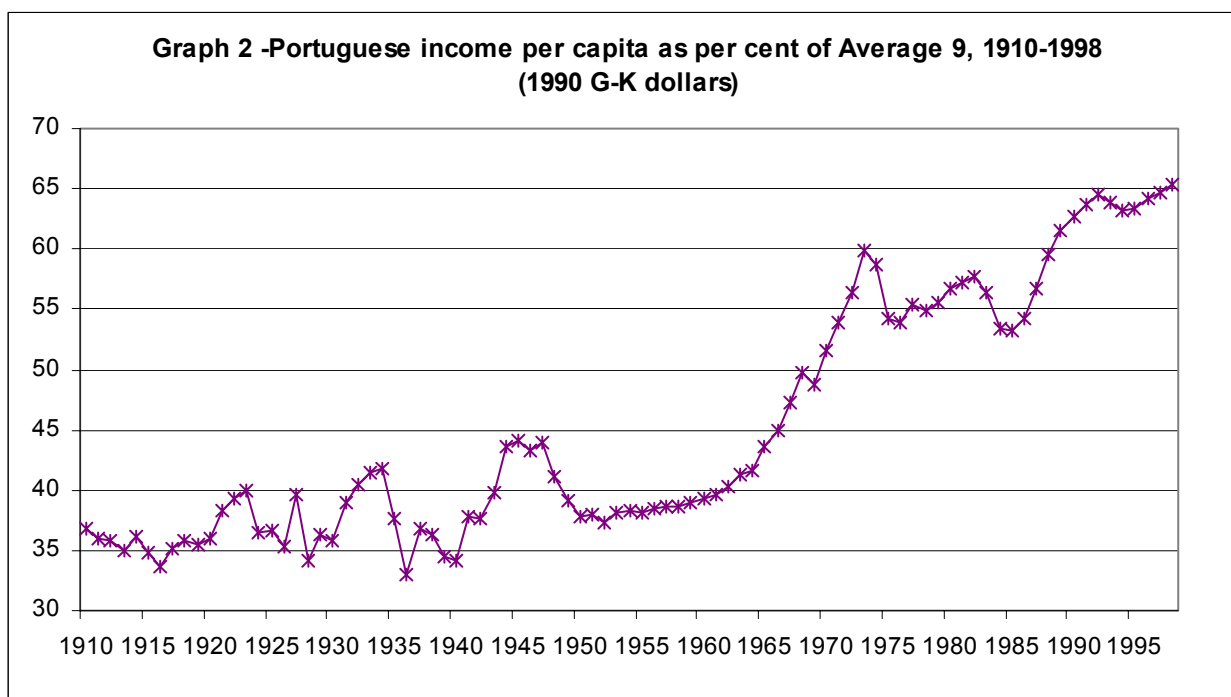
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Graph1 - Growth of income per capita: Portugal and Average 9, 1910-98
(1990 GK dollars; semi-logarithmic scale)

Sources and notes: see Table 1.

Graph 2 -Portuguese income per capita as per cent of Average 9, 1910-1998
(1990 G-K dollars)

Sources and notes: see Table 1.