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PORTUGAL

Selected Issues

Prepared by Paulo Drummond and Yuan Xiao (both EUR)
and Alessandro Giustiniani (MFD)

Approved by the European Department

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- The first essay compares developments in output, productivity and labor utilization in Portugal with other late converging economies in the euro area and explores sources of diverging productivity growth. Besides weak technological progress resulting from low investments in human capital, two other factors can help explain the recent deterioration in labor productivity: the poor performance of ICT producing and using industries and inefficiencies in labor and product markets that contribute to misallocation of resources.

- The second essay considers the short-run impact on output growth of the planned fiscal consolidation in Portugal. New estimates of the fiscal multipliers presented here largely confirm the existence of Keynesian effects in the past. However, given the current environment in Portugal and the features of the government's adjustment strategy, non-Keynesian effects could offset some of the traditional negative demand impact. Credibility of the adjustment program is critical to realizing these offsetting effects.

- The third essay looks at the Portuguese banking system, exploring competitive conditions and the sector's recent financial performance. Competitive conditions have intensified somewhat in recent years, and Portuguese banks have proven resilient to the slowdown of the economy. Interest margin compression has been offset by lower operating costs and enhanced efficiency. Although prudential indicators have improved, potential vulnerabilities remain, mainly owing to the high level of household and corporate debt as well as the significant concentration of banks' exposure across sectors (especially real estate) and borrowers.

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I. Catching-Up? Considerations Regarding Productivity Slowdown in Portugal[1]

A. Introduction and Main Findings

1. **After a fast catch-up from the early 1970s through the mid-1990s, income convergence has come to a halt in the last five years**. Until the mid-1990s, Portugal's labor productivity increased rapidly, only partly offset by a decline in relative hours worked. This mimicked, to some extent, the experience of other late converging economies (Finland, Greece, Ireland, and Spain), and led to a substantial improvement in Portugal's relative per capita GDP position. However, trend GDP per-capita growth in Portugal began to slow down markedly in the mid-1990s, trailing that of the euro area. This is a key concern, because with average per capita GDP about two-thirds of that in the euro area, even with a growth differential of 1 percentage point it will take 35 years for Portugal to catch up to the euro area average.

2. **These developments raise a number of important questions**. What explains the recent growth slowdown? To what extent has productivity growth deviated from the European average, and why? How does Portugal compare with other late converging euro-area economies in recent years? What explains developments in labor and capital utilization?

3. **To shed light on these questions this chapter uses a two-step approach**. First, it uses a growth accounting perspective to compare developments in output, productivity, and labor utilization in Portugal with other late converging economies in the euro area (Spain, Greece, Ireland, Finland).[2] Second, it explores sources of diverging productivity, including poor resource allocation and weak competition in labor and product markets.

4. **Several databases were used to produce the results discussed here**: aggregated data for the euro area and Portugal from the AMECO-European Commission database; industry-level data for selected euro area countries from the Groningen Center for Growth and Development (GCGD); and detailed data on factor utilization for Portugal, Greece, Ireland, Finland, and Spain also from the GCGD and the OECD.[3] While the quality of data

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[1] Prepared by Paulo Drummond.

[2] Economies with GDP per capita below that of the euro area as of 1995.

[3] To the extent possible, the cross-country comparisons in this paper use harmonized data from the same database for all countries. Yet, national accounts data could still differ due to different national methodologies in the calculation of investment flows, deflators (including the treatment of quality improvements in high-tech equipment), aggregation methods, and changes in labor quality.

on an individual country basis is not perfect, the joint databases used in this paper allow for a harmonious treatment of individual countries.

5. **Combining this information, the analysis yields the following considerations**:

- The favorable evolution of income growth from the 1970s to the mid-1990s in Portugal was associated with above-average productivity growth but also reflected a more moderate decline in the amount of hours worked than that experienced in other countries in Europe.

- From the mid-1990s, however, Portugal's widening income gap mirrors an incipient lag in terms of use of labor (hours worked) and a rising gap in labor productivity.

- While the economy has operated mostly in low-skill labor intensive sectors, and labor utilization has been historically high compared with other euro area countries, employment has not grown as rapidly as in the euro area in recent years and has lagged significantly other late converging economies. This has contributed to the lackluster growth performance in recent years. Lack of wage moderation in agreements between social partners and labor market rigidities which remained through the 1990s translated into rising unit labor costs growth well above other euro area countries and a loss of competitiveness.

- The deceleration in labor productivity in Portugal in the second half of the 1990s can be explained by both significantly slower capital deepening (the rate of growth in the capital-labor ratio) after the very high investment rates of the early 1990s and by efficiency losses in utilizing inputs (total factor productivity growth), which pushed labor productivity growth in Portugal below the rates in other late converging economies. Half of the decline in productivity growth (1.1 percentage points) can be explained by a reduction in the contribution from capital deepening. The remaining half results from deterioration in total factor productivity.

- Besides weak technological progress resulting from low investment in human capital, the paper argues two other factors help explain the recent deterioration in labor productivity in Portugal: the poor performance of ICT producing and using industries and inefficiencies in labor and product markets that led to poor utilization of resources. On ICT industries, output per hour continued to rise in Portugal in the second half of the 1990s, but Portuguese firms were unable to keep pace with growth experienced elsewhere. The productivity gap in these industries accounts for about 15 percent of the productivity growth decline in the second half of the 1990s. On weak competition in labor and product markets, while the available empirical evidence does not provide specific country estimates of the impact on productivity performance in Portugal, studies suggest the impact on productivity growth is greater the farther a country is from the technology leader.

6. **Section B lays down the stylized facts on GDP per capita and labor productivity for Portugal, comparing the recent evolution of these indicators with the euro area and a group of late converging economies**. Section C, discusses key sources of diverging productivity growth in Portugal.

B. Catching-up? GDP per Capita and Productivity Growth

7. **Trend capita GDP growth in Portugal began to decline markedly in the mid-1990s, bringing to a halt its convergence to the euro-area average** (Figure 1). This pattern of income convergence mirrored that of labor productivity growth, which declined steadily to under 2 percent (on average) in 1995–2004 and dropped below the euro area average for the first time early this decade (Figure 2). By 2004, labor productivity was only 55 percent of the euro area average, more than accounting for the relative income gap (Figure 3a).

8. **This growth pattern contrasts sharply with developments in other late converging economies where per-capita trend growth not only remained well above the euro-area average (Ireland) but in some cases even accelerated (Greece and Spain) in recent years** (Table 1 and Figure 1). Starting in the mid 1990s, as suggested by Van Ark et al (2002) and Blanchard (2004), there was a clear change towards lower productivity growth in most euro area countries (Figure 3b). Table 1 provides a decomposition of growth across European countries for the period 1995–2004. It shows two distinct groups. In most economies, relative labor productivity declined while hours worked increased only slightly, leading to a decline in relative GDP per capita. Portugal did not escape this general trend. It diverged for the first time from other late converging economies (Finland, Greece and Ireland), which experienced continued productivity gains and were able to improve their relative income positions, and Spain, which sustained income growth above the euro area average, despite a relative decline in productivity, due to improved labor utilization.

9. **Even if lower than in the euro-area as a whole, per capita GDP growth in Portugal did increase, on average, since the mid-1990s, when rising employment rates offset a deceleration in labor productivity and continued declines in average hours of work** (Table 2). Overall, in much the same fashion as the aggregate for the euro area, Portugal achieved an increase in its contribution from labor accompanied by sharp reductions in the contribution from productivity. The opposite movements of employment rates and labor productivity suggest that lower labor productivity growth in Portugal could be related to a shift toward more labor-intensive production methods. This could also be related to re-insertion of low-skilled unemployed individuals back into employment, as it has been the case in other European economies, although the evidence for this effect in Portugal is weak.

10. **With the economy operating mostly in low-skill labor intensive sectors, and labor utilization historically high compared with other euro area countries, it is not surprising that employment growth has lagged other late converging economies** (Figure 4). But low employment growth also reflected rapid growth in real hourly labor compensation (wages and non-wage labor costs), with the cost acceleration particularly pronounced in the second half of the 1990s. Real hourly compensation in Portugal grew more

than in the euro area and significantly more than in other late converging economies (Figure 5). This upward trend reflects the lack of wage moderation in agreements between social partners and was partly due to labor market rigidities, which remained through the 1990s (discussed below). Low unemployment rates helped fuel wage demands, which translated into rising unit labor costs growth.

11. **Breaking down labor productivity growth into the contribution of employment, capital and total factor productivity (TFP) shows that the productivity deceleration in Portugal in the last decade was due to a significant decline in capital deepening (slower increase in the capital-labor ratio) and lower TFP growth** (Table 3 and Figure 6).[4] Half of the 1.1 percent decline in productivity growth, can be explained by a reduction in the contribution from capital deepening. The remaining half results from deterioration in total factor productivity. While this mimics the general trend in the euro area, it diverges significantly from the acceleration in TFP and capital deepening growth in most other late converging economies (Finland, Greece, and Ireland).

C. Sources of Diverging Productivity Growth[5]

12. **A number of factors can help explain the growing productivity gap in Portugal**: poor performance of ICT producing and using industries; inefficiencies in labor and product markets that lead to poor utilization of resources; the recent growth of public sector employment; and weak technological progress resulting from low investments in human capital, R&D and information technology. The latter has been a focal point of the government's legislative program ("*Program do XVII Governo constitucional*, 2005–09") and has been discussed in detail elsewhere (EC Review, 2003). The government has also outlined important steps to start downsizing public employment. This section focus instead on the other two factors: the performance of ICT industries and inefficiencies of labor and capital markets as driving forces of the recent productivity slowdown, with likely complementarities between these factors.

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[4] Basic identity: $\Delta TFP = \Delta Y - \alpha \Delta L - (1-\alpha)\Delta K$, where, Y is real value added, L is total hours of work, K is the capital stock, and α is the share of labor compensation in total domestic income.

[5] This section is based on the *Industry Labor Productivity Database* from the *Groningen Growth and Development Center.* The database contains information on value added, employment and hours worked in the countries covered in this section for 56 separate industries between 1979 and 2002. For details on the methodology, see http://www.ggdc.net/dseries/60-industry.

Performance of ICT industries

The data suggest three broad trends:

13. **Among ICT producing industries, Portugal was an outstanding performer with double-digit productivity increases in large several high-tech industries in the 1980s and the first half of the 1990s** (Table 4).[6] [7] However, Portugal later began lagging the euro area and other late converging economies, with productivity growth falling to about 5.5 percent at an annual rate in the subsequent years. Portugal's technological shock began to moderate at the time it accelerated in other late converging economies.

14. **Among intensive users of ICT, the decline in productivity growth was partly reversed in the second half of the 1990s, but Portugal still underperformed compared to other late converging economies**. In these economies, ICT users in the services sector posted a strong surge in productivity growth, explaining the large difference in performance among countries.

15. **The productivity deceleration in ICT industries in Portugal was partly offset by an opposing trend in traditional non-ICT industries, which helped keep overall productivity growth above euro area levels**. In this category, labor productivity growth rose from 2.1 percent at an annual rate in the first half of the 1990s to 3 percent at an annual rate in the subsequent six years. In the euro area, the deceleration was of 1.2 percentage point, with the service industries in this category accounting for the majority of the discrepancy.

16. **In sum, while output per hour continued to rise in both ICT producing and using industries in Portugal in the second half of the 1990s, Portuguese firms were unable to keep pace with the growth experienced elsewhere**. The productivity gap in ICT producing industries can help explain the aggregate productivity gap vis-à-vis other late converging economies. It accounts for about 15 percent of the productivity growth decline in the second half of the 1990s. The overall effect is limited primarily by the low share of this sector in total value added (under 5 percent of GDP). Thus, other factors affecting efficiency gains in product and labor markets (discussed below) must be at play.

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[6] The list of by ICT classification follows the work in O'Mahony and Van Ark (2003).

[7] The industry data suggest a somewhat stronger deceleration in labor productivity in Portugal, by 2.2 percentage points since the first half of the 1990s, as opposed to 1 percentage point in the AMECO database.

Performance of Labor Markets

17. **Assessing the impact of labor adjustment costs on productivity in Portugal is difficult**. The aim here is to assess the impact of labor adjustment costs indirectly by examining whether labor market institutions and regulations are likely to be conducive to fast productivity growth. Recent empirical evidence suggests that high labor adjustment costs can lower incentives for firms to innovate or adopt new technologies with negative effects on productivity performance (Figure 7).

18. **Two studies (Scarpetta and Tressel, 2004; and Bassanini and Ernst, 2002) examine institutional factors affecting labor costs as possible drivers of industry-level productivity growth**. Their results suggest the effect of high labor adjustment costs (proxied by strict employment protection legislation, EPL[8]) on productivity growth is statistically significant but dependent on the structure of wage bargaining and the average size of firms. They estimate a correlation of -0.7 between the acceleration in productivity growth and employment protection legislation.

19. **The use of the EPL as a proxy for labor adjustment costs in Portugal is complicated, as restrictions may be less binding in practice than in the law**. However, dismissal restrictions do prevent labor adjustments in firms that are bound by the law. For other firms, EPL still tends to lead to high temporary employment and self-employment, which is not conducive to fast productivity growth: technological change is associated with skill upgrading of the labor force. Firms would refrain from innovating or even adopting new technologies if return on training is not guaranteed, thus slowing the catch-up process.

20. **The evidence suggests the negative impact of high labor adjustment costs on productivity is more intense for small- and medium-size companies and depends on the nature of wage bargaining systems**. This is because large firms may have greater ability to adjust to new technologies in spite of high labor adjustment costs by tapping into their internal labor supply. In addition, technological change is associated with skill upgrading of the labor force. Such upgrading is likely to take place through the internal labor market of firms (via training) if labor adjustment costs are high, because tapping into the external labor market is costly. But such upgrading, and thus the adoption of new technologies, will take place only if the bargaining system guarantees a high return on internal training. Otherwise, firms would refrain from innovating or even adopting new technologies, thus slowing the catch-up process.

[8] For a review of the employment protection legislation indicator as a useful indirect indicator of labor adjustment costs, see OECD Employment Outlook, 2004.

- Gomez-Salvador et al., (2004) suggest a model where dismissal restrictions hamper the efficient reallocation of workers, leading workers to remain longer in jobs. They control for firm size and show that high labor adjustment costs (proxied by EPLs) can reduce job creation. Blanchard and Portugal (2001) show that quarterly rates of job creation and destruction are significantly lower in Portugal (a high EPL country) than in the United States. Assuming technological change is associated with the skill upgrading of the labor force, restrictions on employers' ability to adjust their labor forces are likely to imply productivity losses.

- Takizawa (2003) calibrates such loss in labor productivity in a model for Portugal. He finds that a dismissal penalty and the associated slow pace of worker reallocation result in a great number of unproductive jobs that can cause substantial losses of labor productivity—up to 35 percent—and consumption. Although lower worker mobility induces job-specific investment that offsets part of the labor productivity and consumption losses, the size of this offsetting effect is modest.

21. **The latest EPL indicators for the year of 2003 suggest room for improvement with respect to the strictness of employment protection in Portugal** (Figure 7). Despite reform initiatives in the 1980s and 1990s, which eased some firing restrictions, Portugal still has the most regulations among industrial countries with respect to protection against individual dismissal. The new labor code that came into effect in December 2003 has eased the use of temporary employment and has given more leeway to introduce flexibility in collective agreements at the firm level regarding rules for fixed-term contracts and dismissals, but the reform was partial.[9] This suggests that further labor market reforms that lead to increases in human capital accumulation and better allocation of labor across alternative uses are likely to have a positive impact on productivity growth in Portugal (Figure 7).

Performance of Product Markets

22. **A growing body of research has attempted to link productivity differentials across countries with structural differences in the level of product market regulation at the individual country level**. This is not surprising, since lowering entry barriers and the regulatory burden for the creation of enterprises is likely to facilitate the replacement of less productive by more productive firms. Two channels are at play: a direct channel whereby

[9] The indicators of employment protection legislation focus on both regular and temporary contracts. Regulations for regular contracts include: i) procedural inconvenience that employers face when trying to dismiss a worker; ii) advance notice of dismissal and severance payments; and iii) prevailing standards of, and penalties for, unfair dismissals. Indicators of the stringency of EPL for temporary contracts include: i) the objective reasons under which they can be offered; ii) the maximum number of successive renewals; and iii) the maximum cumulated duration of the contract.

regulation can affect productivity growth on its own and an indirect channel whereby regulation hinders competition among the incumbents and thus reduces incentives for the adoption of new technologies. Blanchard (2004) suggests that barriers to firms' entry and exit in the retail sector in Europe could be behind the observed productivity differentials. European Commission (2003) stresses that gains from deregulation in terms of technological catching-up or from privatizations of state monopolies yield static efficiency gains with limited associated increase in TFP growth in the long term.

23. **While there is a broad consensus that product market deregulation may help reduce static inefficiencies, evidence that it can actually increase TFP growth in the long-term is scant**. Cross-country evidence on competition and productivity is limited and often confined to bivariate correlations. The more recent literature on this topic focus on the policy determinants of market competition and productivity performance.

- Bassanini et al (2001) examine bivariate correlations between indicators of regulation and growth. They find supporting evidence of a statistically significant impact of different indicators of the stringency of regulation in product markets on total factor productivity growth, with correlation coefficients for state control and barriers to entrepreneurship ranging from -0.3 to -0.6.

- Using objective economy-wide and industry-level indicators of product market regulations, Nicoletti and Scarpetta (2003) examine the impact of "barriers to entrepreneurship" and public ownership on productivity. They construct an index on a common (0-6) scale, from least to most restrictive. Their empirical evidence on the regulation-productivity link suggest two main results. First, that entry liberalization in services industries towards the OECD average is estimated to boost annual TFP growth in the overall business sector by about 0.1–0.2 percentage points in countries like Portugal. Second, they estimate a move to the OECD average share of state-owned firms in total value-added would boost annual TFP growth by 0.7 percentage points in European countries (like Portugal) that still have a large stake of business activities in public hands. Thus, greater product market liberalization (particularly in the large wholesale and retail trade) should add to efficiency gains of labor market reforms and increase TFP growth.

- OECD (2003) extends the analysis above to consider the indirect effect of regulations on productivity via a slower adoption of technologies. It finds that strict regulations have a statistically significant effect on productivity the further a country is from the technology frontier, possibly because they reduce the scope for knowledge spillovers.

24. **The latest product market indicators for 2003 suggest that even though privatization has proceeded in recent years, state control of business operations in Portugal remains significantly above industrial country levels**. This suggests that further privatization and greater competition, particularly in sectors such as energy, transportation, water, radio and television, and telecommunications are likely to have a significantly positive impact on productivity growth in Portugal.

Table 1. Portugal: PPP GDP per Person, PPP GDP per Hour, and Hours per Person

(1970 and 2004: Selected EU Countries 1/)

	GDP per capita			GDP per hour worked			Hours worked		
	1995	2000	2004	1995	2000	2004	1995	2000	2004
	(In percent)								
Late Converging 2/	56.9	61.8	65.4	77.9	81.1	81.2	73.9	76.3	81.2
Finland	68.6	72.9	75.7	90.4	92.6	97.6	75.9	78.7	77.6
Greece	47.6	47.6	53.2	65.4	66.4	67.3	72.7	71.6	79.0
Ireland	64.2	83.0	92.2	93.1	108.9	114.9	68.9	76.2	80.3
Portugal	47.4	48.0	46.2	55.6	58.0	52.3	85.4	82.7	88.3
Spain	56.8	57.7	59.9	85.1	79.7	74.1	66.7	72.4	80.9
Other Euro Area 3/	76.9	74.3	74.6	107.1	105.0	100.1	72.7	71.6	75.2
Euro Area 3/	72.0	69.0	69.2	103.9	101.0	95.4	69.3	68.4	72.6

1/ With respect to GDP per capita in the US. (U.S. = 100). Excludes Austria and Luxembourg.

2/ Defined as economies with GDP per capita below that of the euro area as of 1995.

3/ Excludes Austria, Belgium and Luxembourg.

Sources: European Union Ameco database, OECD, Economic Outlook and IMF World Economic Outlook.

Table 2. Portugal: Determinants of GDP per Capita Growth

(Annual rates, in percent)

	Euro area				**Portugal**				**Spain**			
	GDP per capita	Labor productivity	Employment rate	Average hours worked	GDP per capita	Labor productivity	Employment rate	Average hours worked	GDP per capita	Labor productivity	Employment rate	Average hours worked
1971-1980	2.7	3.7	-0.2	-0.8	3.6	4.9	-1.1	-0.2	2.5	4.9	-1.7	-0.6
1981-1990	2.1	2.4	0.4	-0.6	3.2	3.6	0.1	-0.4	2.6	2.8	0.8	-0.9
1991-1995	1.1	2.4	-0.6	-0.6	1.5	2.9	-0.8	-0.6	1.3	1.9	-0.4	-0.1
1996-2000	2.3	1.5	1.2	-0.3	3.4	3.1	1.6	-1.2	3.5	0.9	2.6	0.0
2001-2004	0.8	1.6	0.2	-1.0	-0.1	0.0	-0.3	0.1	1.8	0.8	1.2	-0.2
1996-2004	1.7	1.6	0.7	-0.7	1.9	1.8	0.8	-0.6	2.8	0.9	2.0	-0.1
	Greece				**Ireland**				**Finland**			
	GDP per capita	Labor productivity	Employment rate	Average hours worked	GDP per capita	Labor productivity	Employment rate	Average hours worked	GDP per capita	Labor productivity	Employment rate	Average hours worked
1971-1980	3.7	4.2	-0.2	-0.2	3.2	4.8	-0.5	-0.9	3.5	4.2	0.0	-0.7
1981-1990	0.2	0.5	0.6	-0.8	3.3	4.0	-0.5	-0.2	2.6	3.0	0.1	-0.4
1991-1995	0.5	0.7	-0.1	0.1	4.1	3.9	1.2	-0.9	-1.3	2.9	-4.1	0.1
1996-2000	3.2	2.6	0.7	0.0	8.6	5.5	4.6	-1.5	4.4	2.7	2.0	-0.3
2001-2004	3.7	3.0	0.4	0.3	3.5	4.1	0.6	-1.1	1.8	4.1	0.3	-2.4
1996-2004	3.4	2.8	0.6	0.1	6.4	4.8	2.9	-1.3	3.3	3.3	1.2	-1.2

Table 3. Portugal: Determinants of Labor Productivity Growth

(Annual rates, in percent)

	Euro area			**Portugal**			**Spain**		
	Labor productivity	Capital deepening	Total factor productivity	Labor productivity	Capital deepening	Total factor productivity	Labor productivity	Capital deepening	Total factor productivity
1971-1980	3.7	1.1	2.5	4.9	1.9	3.0	4.9	2.7	2.2
1981-1990	2.4	0.6	1.7	3.6	1.8	1.7	2.8	1.6	1.2
1991-1995	2.4	1.0	1.4	2.9	2.1	0.9	1.9	1.3	0.5
1996-2000	1.5	0.3	1.2	3.1	2.1	1.0	0.9	0.3	0.6
2001-2004	1.6	0.8	0.9	0.0	0.8	-0.7	0.8	0.9	-0.1
1996-2004	1.6	0.5	1.0	1.8	1.5	0.2	0.9	0.6	0.3
	Ireland			**Finland**			**Greece**		
	Labor productivity	Capital deepening	Total factor productivity	Labor productivity	Capital deepening	Total factor productivity	Labor productivity	Capital deepening	Total factor productivity
1971-1980	4.8	2.7	2.1	4.2	2.1	2.1	4.2	2.3	1.9
1981-1990	4.0	1.5	2.5	3.0	1.3	1.6	0.5	1.5	-1.0
1991-1995	3.9	1.1	2.7	2.9	1.3	1.6	0.7	0.6	0.0
1996-2000	5.5	1.3	4.2	2.7	-0.2	2.9	2.6	0.8	1.8
2001-2004	4.1	2.2	1.9	4.1	2.7	1.4	3.0	0.9	2.2
1996-2004	4.8	1.7	3.2	3.3	1.1	2.3	2.8	0.8	2.0

Table 4. Portugal: Labor Productivity Growth By ICT Classification

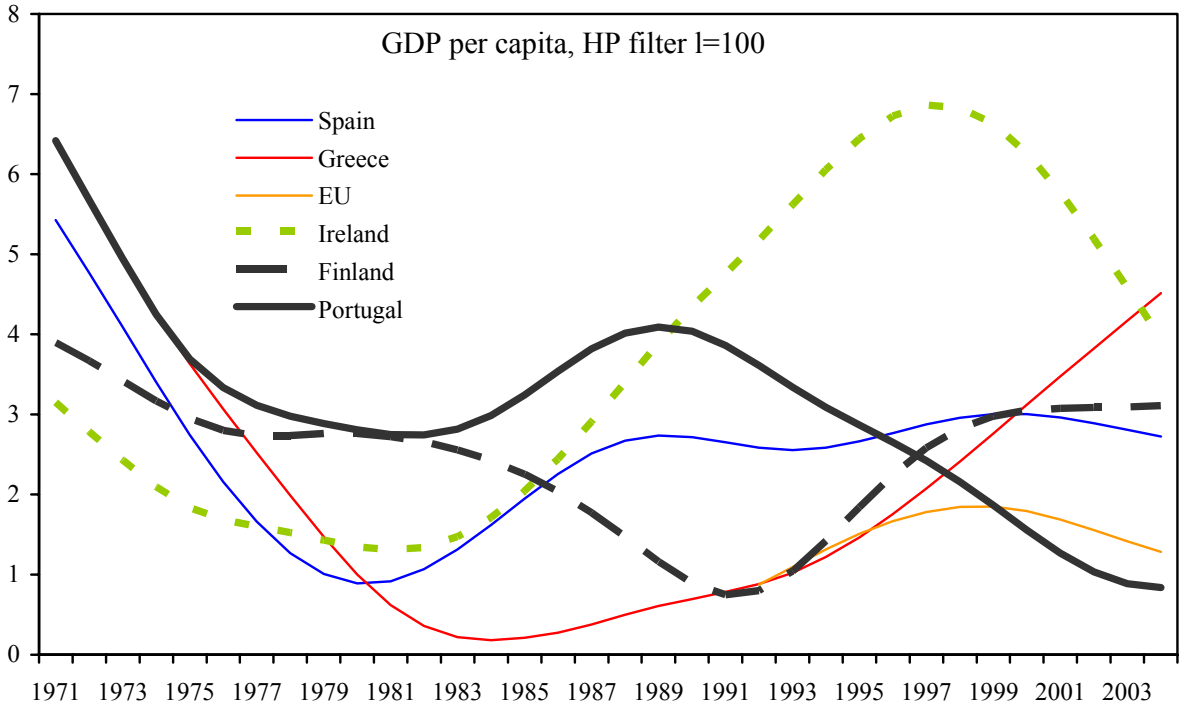
(In percent, at an annual rate)

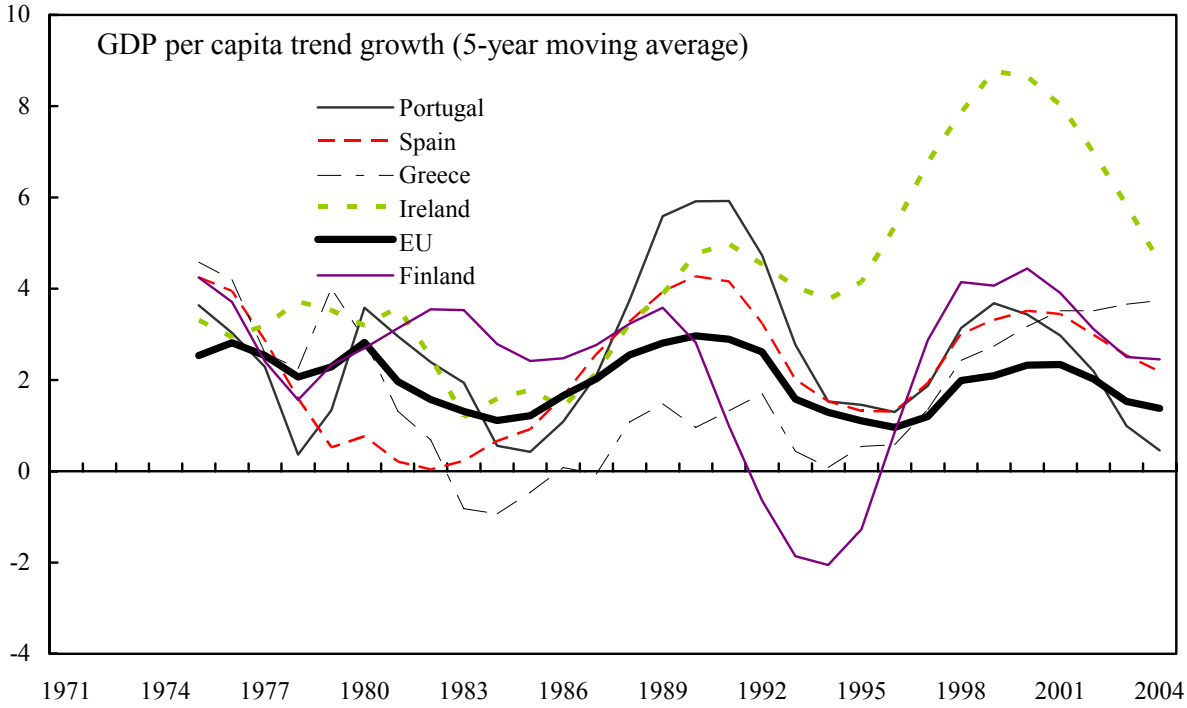
	ICT producing			ICT using			Non-ICT			Total		
	1979-1990	1990-1995	1995-2001	1979-1990	1990-1995	1995-2001	1979-1990	1990-1995	1995-2001	1979-1990	1990-1995	1995-2001
Late converging	8.9	8.0	8.7	2.5	0.5	2.6	2.9	2.4	2.5	3.3	2.5	3.4
Finland	8.3	6.2	9.8	3.9	1.4	0.4	2.9	3.0	1.1	3.5	3.2	2.3
Greece	5.4	4.2	6.7	0.2	-1.0	4.1	1.3	1.3	2.4	1.3	0.9	3.1
Ireland	9.9	15.7	17.6	2.9	1.5	5.7	4.1	3.7	5.3	4.7	4.3	7.8
Portugal	12.7	10.7	5.6	3.0	0.8	1.9	3.2	2.1	3.0	3.8	2.3	3.0
Spain	8.1	3.3	3.8	2.2	-0.3	0.9	3.0	2.2	0.5	3.1	1.8	0.8
Other Euro area	7.6	5.1	5.3	2.8	2.3	1.3	2.3	2.2	1.0	2.8	2.5	1.5
Euro area	7.7	5.0	7.3	2.5	1.9	1.7	2.1	2.1	0.9	2.6	2.2	1.5

Source: Industry Labor Productivity Database - EC and Groningen Growth and Development Center; Estevao (2004) and staff calculations.

Notes: Productivity is defined as real value added per hours worked. Detailed breakdown by ICT type as in IMF-Country Report 04/235.

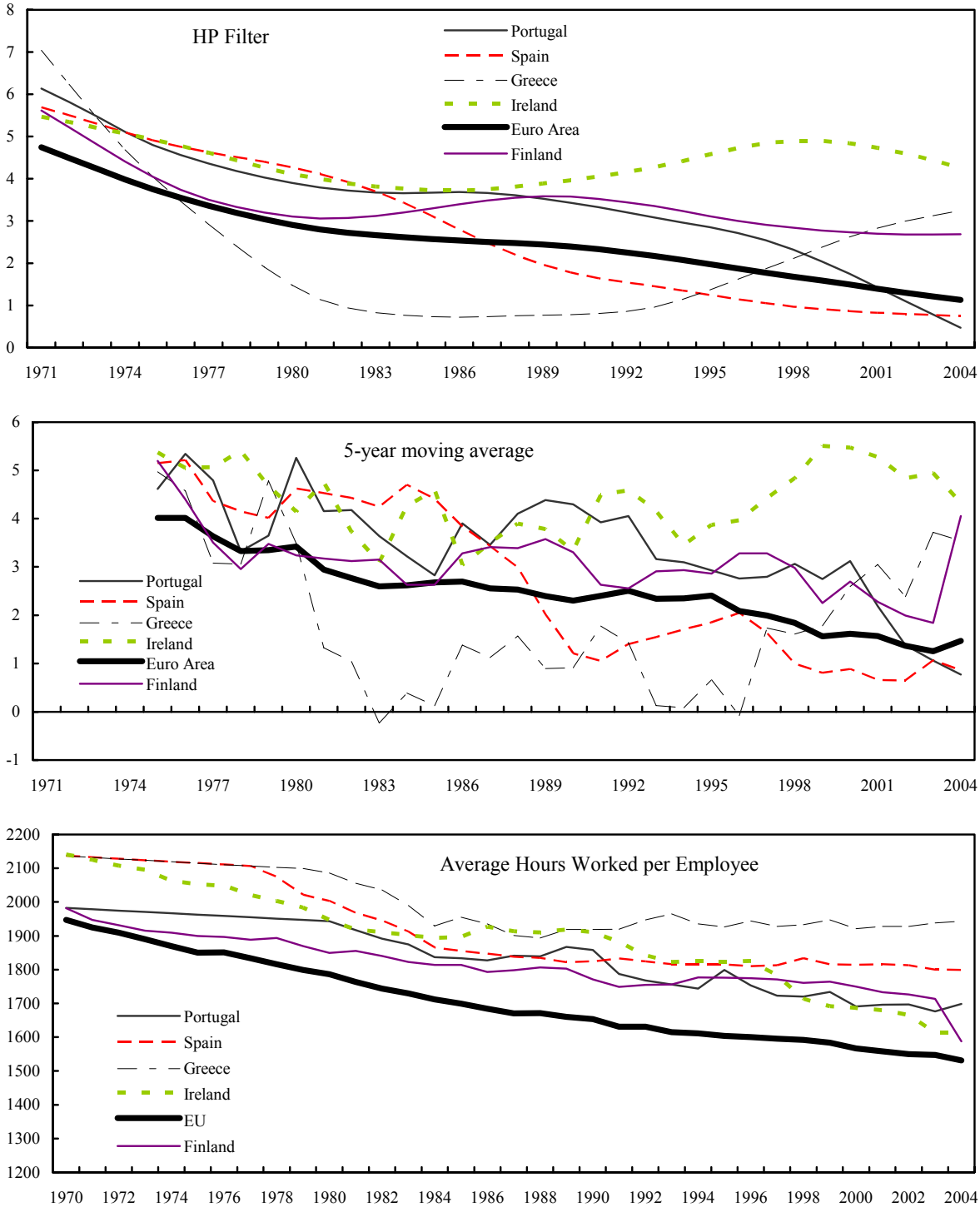
Figure 1. Portugal: GDP per Capita Trend Growth





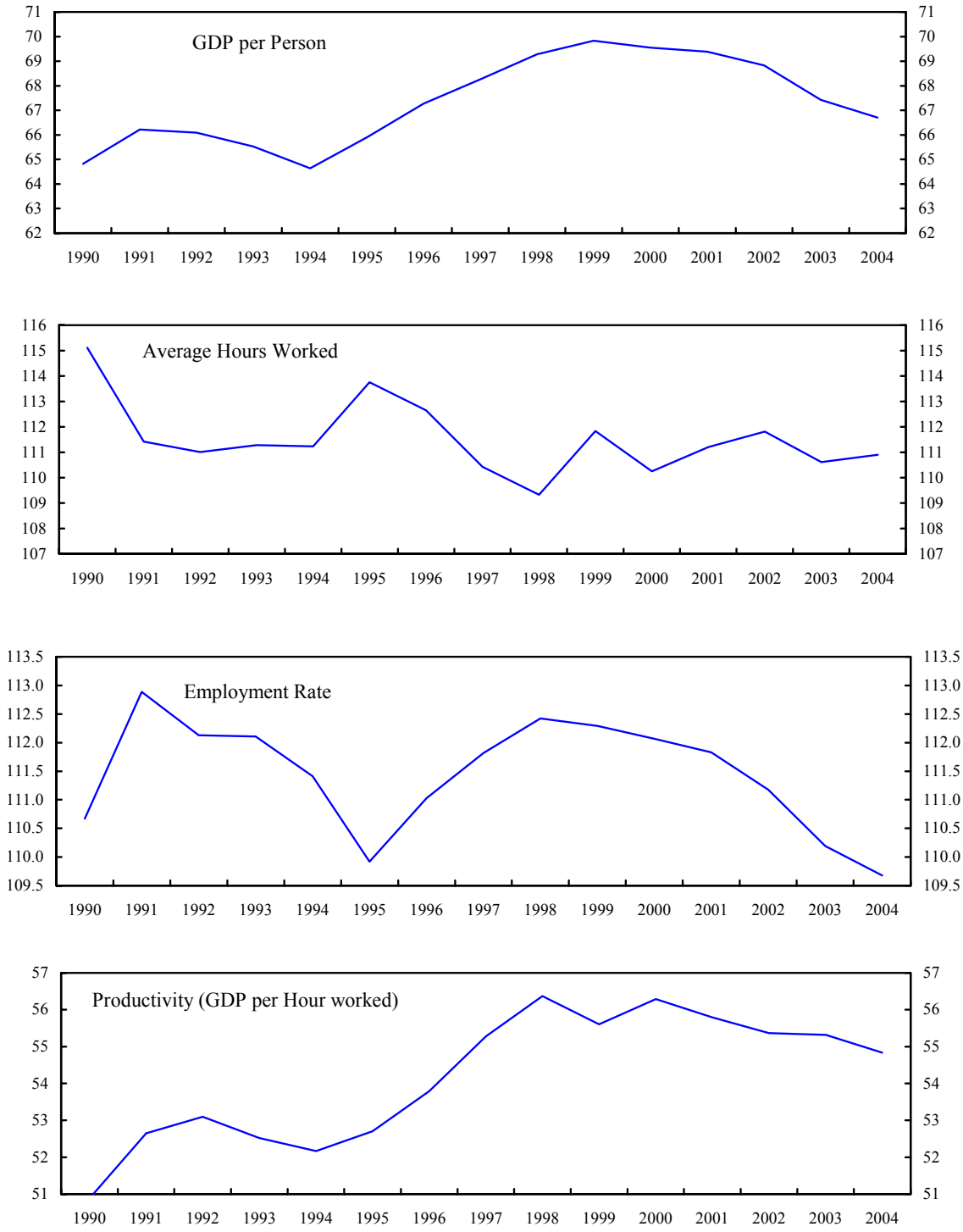
Source: European Commission - AMECO Database; OECD; staff calculations

Figure 2. Portugal: Labor Productivity Growth



Source: AMECO database; OECD; and staff calculations

Figure 3a. Portugal: Growth Components, 1990-2004
(As percentage of the Euro Area)



Source: Ameco

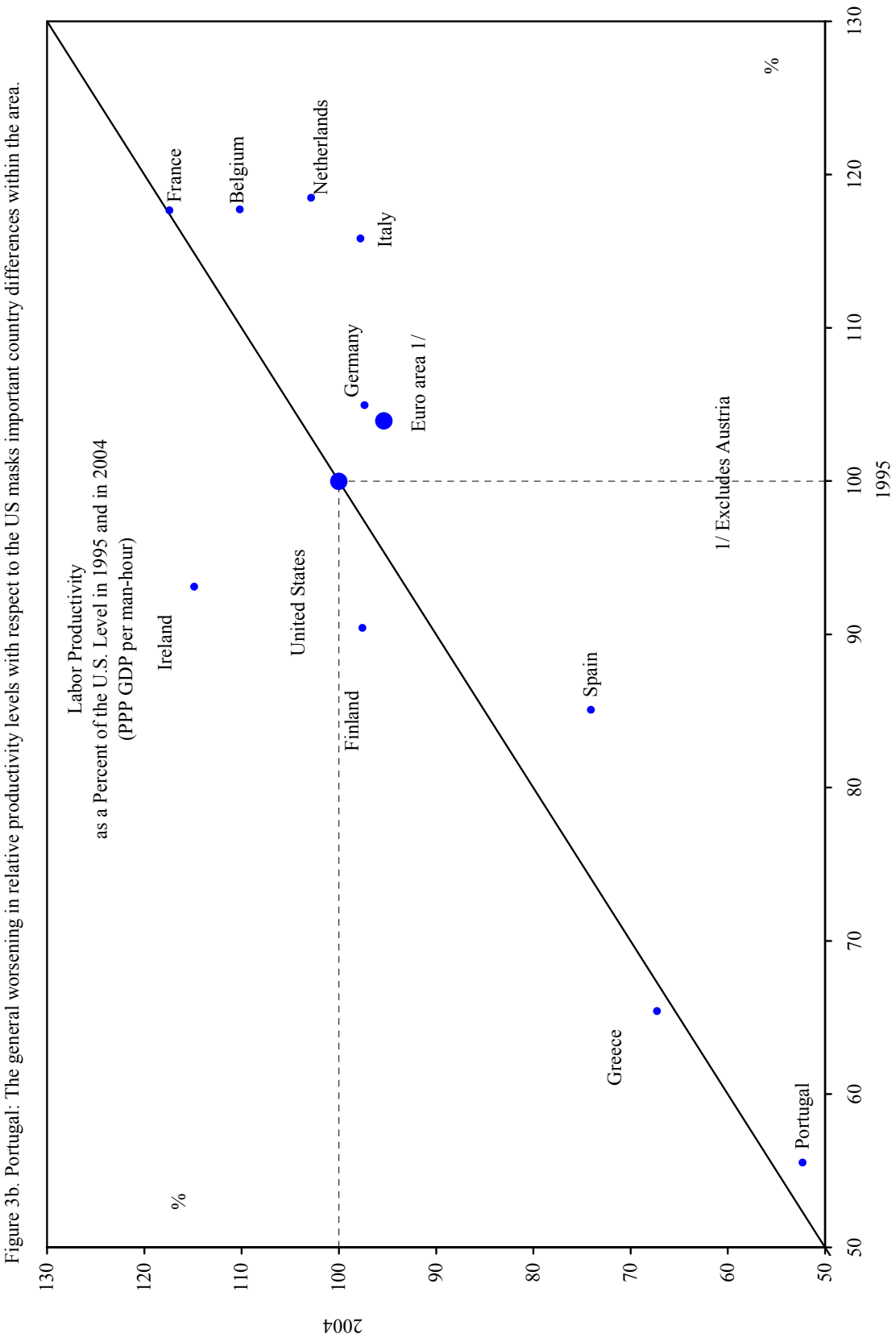
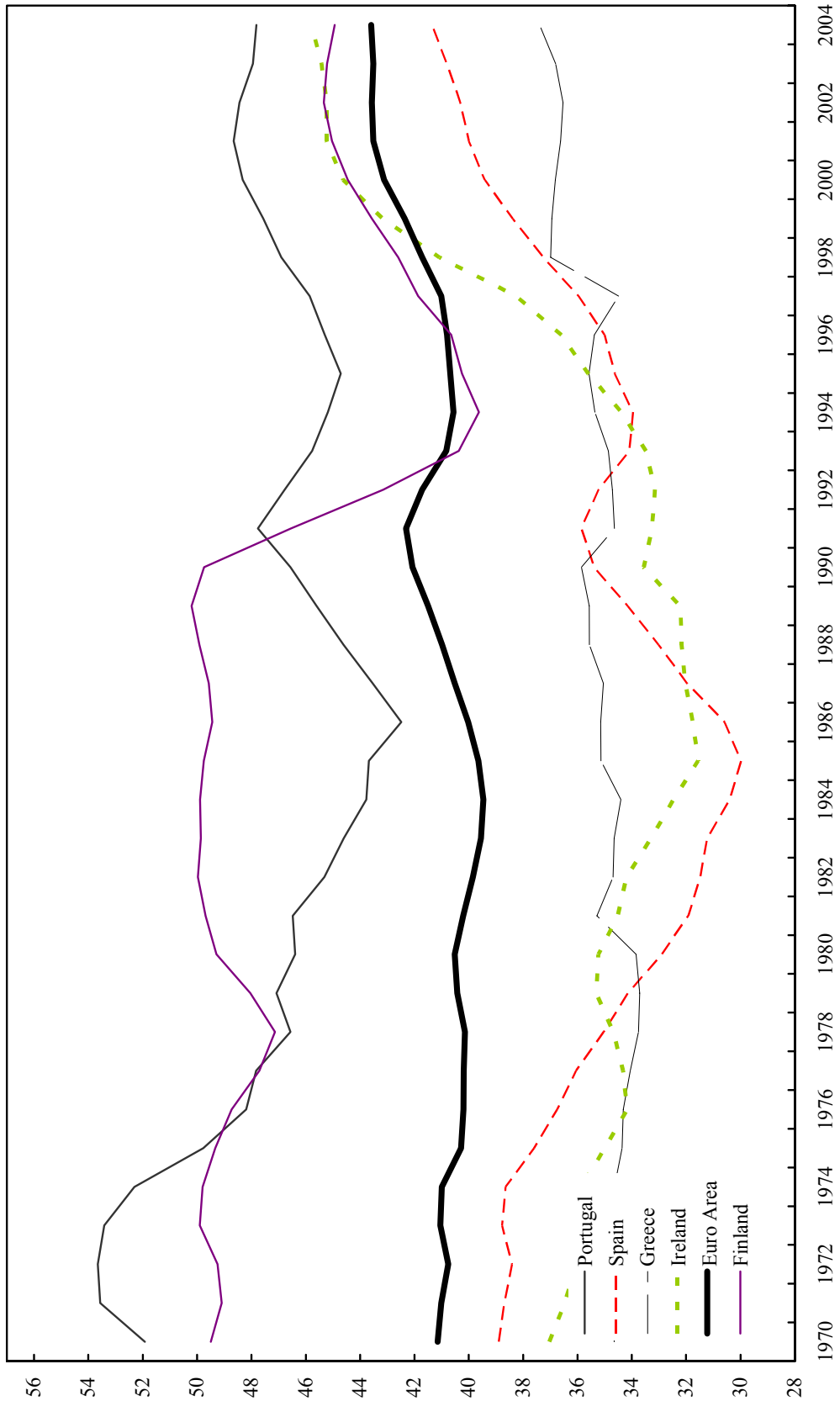


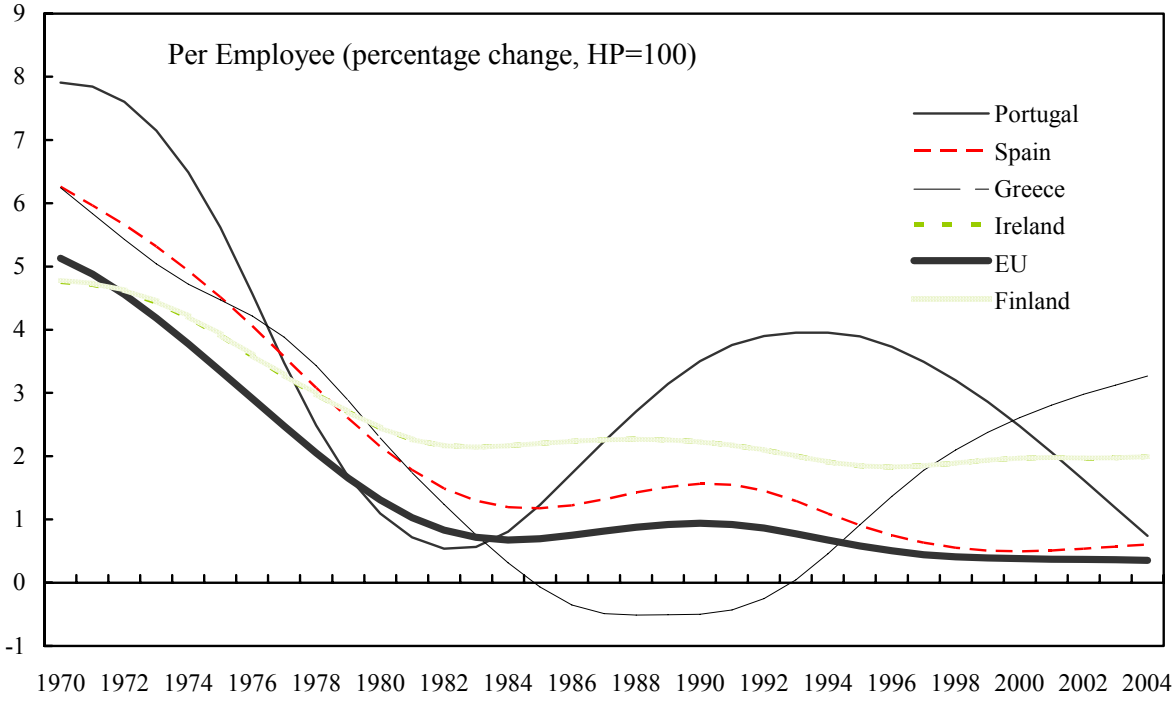
Figure 3b. Portugal: The general worsening in relative productivity levels with respect to the US masks important country differences within the area.

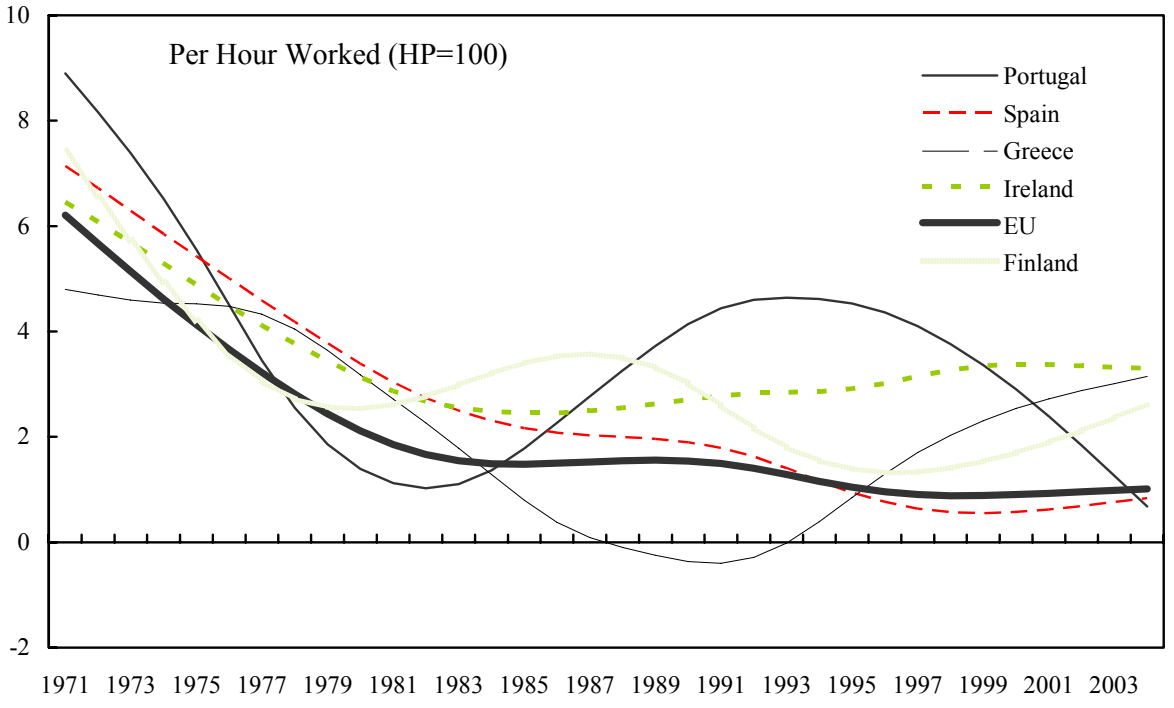
Figure 4. Portugal: Employment Rates (In percent of total population)



25.

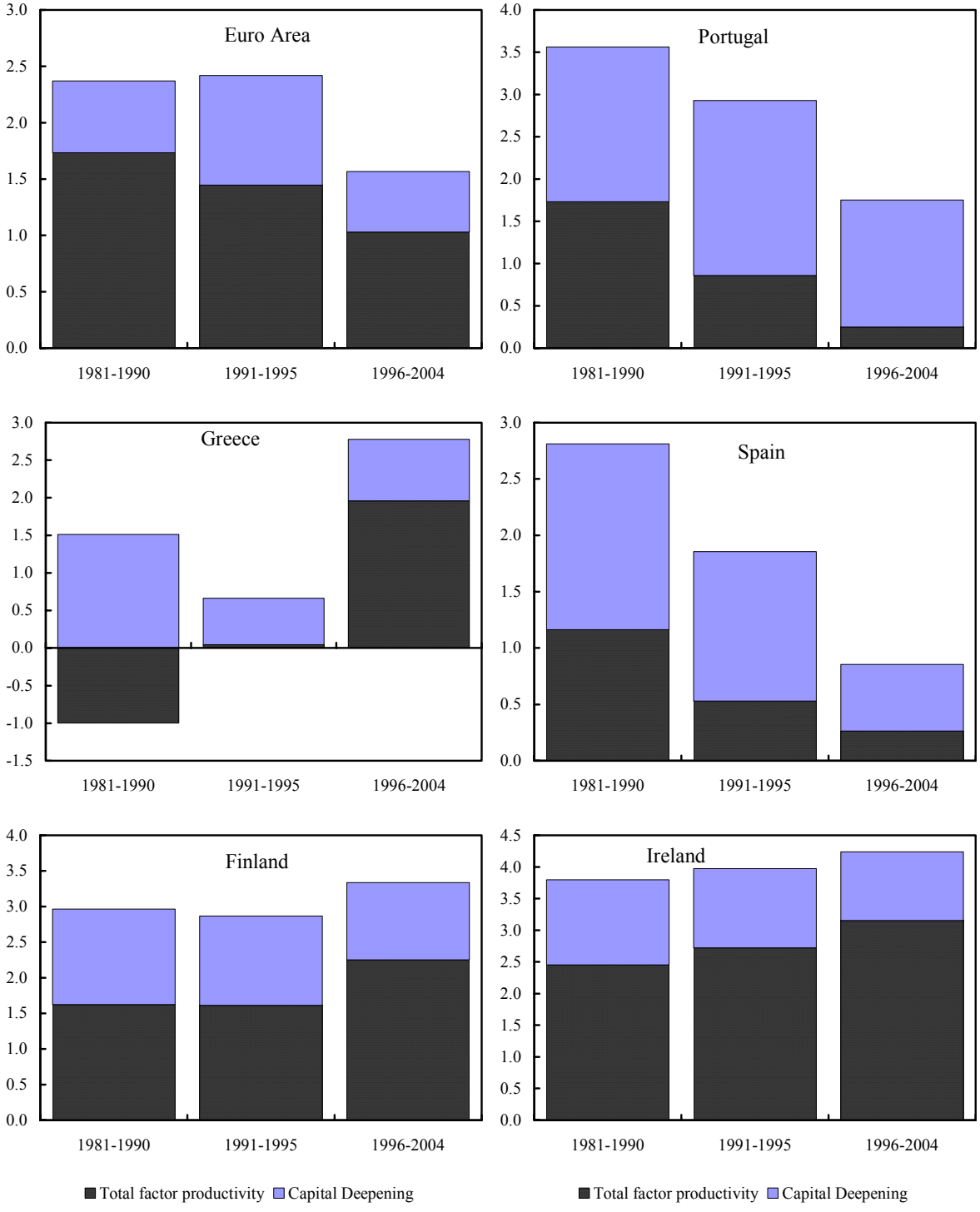
Figure 5. Portugal: Real Compensation





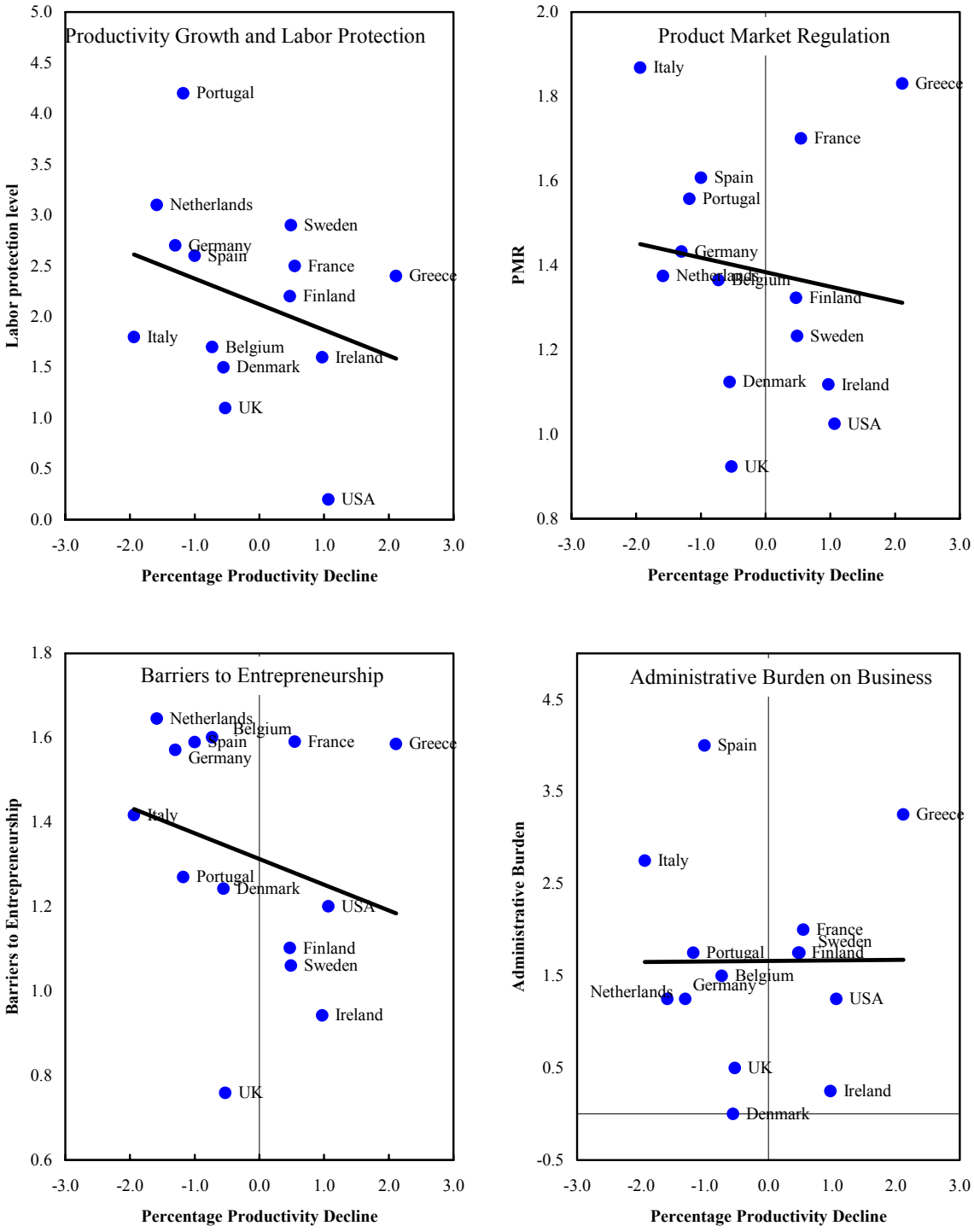
Source: AMECO Database; OECD; and staff calculations.

Figure 6. Portugal: Labor Productivity Growth, in percent



Source: AMECO database, Fund staff calculations.

Figure 7. Portugal: Market Regulation and Productivity Growth



Source: OECD PMR Database

ICT and Non-ICT Sectoral Classification

1) ***ICT Producing***. In Manufacturing: Office machinery (30); Insulated wire (313); Electronic valves and tubes (321); Telecommunication equipment (322); Radio and television receivers (323); Scientific instruments (331). In Services: Communications (64); Computer & related activities (72).

2) ***ICT Using***. In Manufacturing: Clothing (18); Printing & publishing (22); Mechanical engineering (29); Other electrical machinery & apparatus (31-313); Other instruments (33-331); Building and repairing of ships and boats (351); Aircraft and spacecraft (353); Railroad equipment and transport equipment (352+359); Furniture, miscellaneous manufacturing; recycling (36-37). In Services: Wholesale trade and commission trade, except of motor vehicles and motorcycles (51); Retail trade, except of motor vehicles and motorcycles; repair of personal and household goods (52); Financial intermediation, except insurance and pension funding (65); Insurance and pension funding, except compulsory social security (66); Activities auxiliary to financial intermediation (67); Renting of machinery & equipment (71); Research & development (73); Legal, technical & advertising (741-3).

3) ***Non-ICT***. In Manufacturing: Food, drink & tobacco (15-16); Textiles (17); Leather and footwear (19); Wood & products of wood and cork (20); Pulp, paper & paper products (21); Mineral oil refining, coke & nuclear fuel (23); Chemicals (24); Rubber & plastics (25); Non-metallic mineral products (26); Basic metals (27); Fabricated metal products (28); Motor vehicles (34). In Services: Sale, maintenance and repair of motor vehicles and motorcycles; retail sale of automotive fuel (50); Hotels & catering (55); Inland transport (60); Water transport (61); Air transport (62); Supporting and auxiliary transport activities; activities of travel agencies (63); Real estate activities (70); Other business activities (749); Public administration and defense; compulsory social security (75); Education (80); Health and social work (85); Other community, social and personal services (90-93); Private households with employed persons (95); Extra-territorial organizations and bodies (99).

4) Other: Agriculture (01); Forestry (02); Fishing (05); Mining and quarrying (10-14); Electricity, gas and water supply (40-41); Construction (45).

Source: O'Mahony and van Ark (2003).

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II. Fiscal Adjustment and Growth in Portugal[10]

A. Introduction

1. **The drive to EMU-membership generated a boom in economic activities in Portugal in the 1990s**. Government revenues benefited from the rapid growth of output, and the fiscal deficit fell from above 6 percent in 1994 to close to 3 percent in 1997. However, as the boom ran out of steam, the deficit breached the Stability and Growth Pact (SGP) ceiling in 2001, and the government managed to keep the deficits under the ceiling in subsequent years only through substantial one-off measures. In early 2005, an independent commission headed by the Governor of the Bank of Portugal estimated that the deficit for the year could approach 7 percent of GDP in the absence of consolidation measures. The prolonged problems with the fiscal accounts prompted the government to adopt a new fiscal adjustment program, which envisages cutting the fiscal deficit to 3 percent of GDP (without one-off measures) by 2008.

2. **This chapter aims to examine the possible short-run impact on output growth of the planned fiscal consolidation in Portugal**. As a starting point, we will update the estimates of the historical fiscal multipliers, which improves over previous efforts by employing a more rigorous identification scheme. However, to study the issue one needs to look beyond the historical fiscal multipliers, because fiscal consolidation could alter the economic agents' expectations and create expansionary effects (also referred to as non-Keynesian effects) on output under certain conditions (as the literature has found in some country cases). These outcomes are especially likely when initial confidence is poor, and there is high uncertainty about the future paths of the public accounts and output. This may well characterize the current environment in Portugal.[11]

3. **The rest of this chapter is organized as follows**. Section B presents new estimates of the historical fiscal multipliers for Portugal, based on quarterly fiscal data. In Section C, we summarize the findings of the literature on non-Keynesian effects. In Section D, we examine, given Portugal's current economic environment and the features of the government's adjustment program, whether non-Keynesian effects could occur, potentially offsetting some of the direct costs of adjustment. Section E concludes.

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[10] Prepared by Yuan Xiao.

[11] Whatever its short-run effects on growth, fiscal adjustment is critical for sustainable medium-term growth in Portugal. This paper thus takes as its starting point that adjustment is both inevitable and desirable. The paper seeks to shed light on the channels through which Portugal's fiscal consolidation could affect short-run output growth and highlight the characteristics needed in the fiscal adjustment program to minimize the output costs.

B. New Estimates of Historical Fiscal Multipliers

4. **A natural starting point in studying the output response to a fiscal contraction is to examine the historical fiscal multipliers**. Two methods are widely used in the literature: simulation through a structural macroeconomic model and a time-series approach. The former is sometimes criticized for assuming the answer rather than finding it from the data, and the latter could be affected by structural changes in the economy and limited by data availability. Recent studies that cover Portugal include European Commission (EC) (2001), which simulates the results from the EC's quarterly economic model QUEST; and IMF (2004), which applies the structural vector autoregression (SVAR) methodology to annual data from 1953 to 2001. A summary of these results is shown in Table 1. Both studies find sizable expenditure multipliers, but they differ in the magnitude of the revenue multiplier. For example, EC (2001) finds that an increase in expenditure of 1 percent of GDP will lead to 0.7 percent higher output. The IMF numbers would imply a slight preference for tax-based adjustment, although the difference in magnitude of the tax and spending multipliers is not significant.

Table 1. Portugal: Estimates of Fiscal Multipliers

	Methodology	Tax Multiplier *	Expenditure Multiplier *
EC (2001)	Simulation	0.0	0.7
IMF (2004)	SVAR	-0.5	0.83

* Change in real output after one year following a one-unit shock to revenues/expenditure.

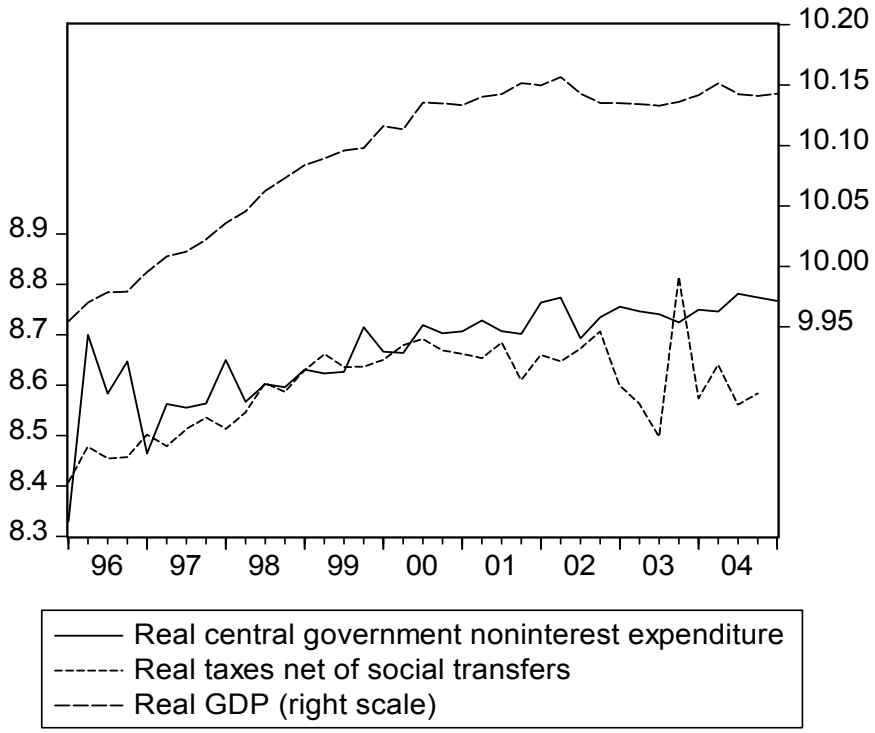
5. **In this section, we present new estimates of the fiscal multipliers, applying the SVAR methodology to quarterly fiscal accounts data**. As can be seen below, the use of quarterly data enables us to deal with the identification problem more satisfactorily than IMF (2004). Intuitively, with quarterly data one could make identification assumptions based on the timing of the fiscal decisions that are not plausible at an annual frequency. The trade-off is that the sample period of the quarterly data is very short.

6. **As in Blanchard and Perotti (2002), we estimate a three-variable vector autoregression (VAR) composed of real government spending (*G*), real net taxes (*T*), and real GDP (*Y*), covering the period 1995:Q3-2004:Q4**. The government spending series is derived from the monthly bulletins of budget execution published by the Ministry of Finance. It includes central government expenditure excluding interest payments on a cash basis.[12] Net taxes are defined as the government's tax receipts minus expenditure on social

[12] The series contains only expenditure by the state subsector; consumption by autonomous bodies is not captured. Expenditure data for the general government are published only on an annual basis. Preliminary quarterly expenditure data are being compiled back to 1999 by the authorities.

transfers, both of which were obtained from Eurostat. Both series are deflated by the GDP deflator. In addition, all variables are seasonally adjusted and in logarithms, and we include a quadratic trend in each equation. Four lags are used in the VAR. The data are shown in Figure 1.

Figure 1. Data Used in the Estimation



7. **We could write the structural model (the SVAR) that governs the evolution of the three variables considered as follows**:

$$Ay_t = \Gamma_1 y_{t-1} + \Gamma_2 y_{t-2} + ... + \Gamma_p y_{t-p} + Bv_t, \quad (1)$$

where $y = [T \;\; G \;\; Y]'$ and $v = [e^t \;\; e^g \;\; e^x]'$ is the vector of structural shocks (a tax shock, a government spending shock, and an output shock) that are mutually uncorrelated and standardized to have unit variances, such that $E[vv'] = I$. Our main goal is to study how the system responds to these structural shocks in v. The classical identification problem suggests that without additional restrictions we cannot estimate (1) successfully, and we can only estimate the reduced-form transformation:

$$y_t = \Psi_1 y_{t-1} + \Psi_2 y_{t-2} + ... + \Psi_p y_{t-p} + u_t, \quad (2)$$

where Au = Bv, such that the elements of the reduced-form error term u are linear combinations of the structural shocks. As can be demonstrated, three additional identification restrictions are needed to obtain estimates of the matrices A and B and the parameters in the structural model (1). Following Blanchard and Perotti (2002)'s notation, and letting $u = [t \;\; g \;\; x]'$, we can write Au = Bv as

$$\begin{aligned} t &= a_1 x + a_2 e^g + d_1 e^t, \\ g &= b_1 x + b_2 e^t + d_2 e^g, \\ x &= c_1 t + c_2 g + d_3 e^x. \end{aligned} \tag{3}$$

8. **Blanchard and Perotti (2002) argue that one can explore the institutional features of the fiscal decision-making process to obtain the required restrictions**. In particular, by using quarterly data, we can assume that, when spending decisions are made, output and tax receipts in the same quarter are not observable. As a result, we have $b_1 = 0$.[13] We obtain an estimate of a_1 from estimated tax elasticities with respect to income, and from the elasticity of social transfers with respect to output. Using such information for Portugal, we assume a_1 = -0.5, although it turns out that the final results are not sensitive to reasonable values of a_1. Finally, we impose the assumption that tax decisions within a quarter are not influenced by the spending shock in the same quarter and, hence, $a_2 = 0$.[14] With these restrictions, we calculate the coefficients in (3):

$$\begin{aligned} t &= -0.5x + 0 \cdot e^g + 0.052 e^t, \\ g &= 0 \cdot x - 0.002 e^t + 0.034 e^g, \\ x &= -0.004 t + 0.074 g + 0.006 e^x. \end{aligned} \tag{4}$$

9. **The coefficients in (3) have the expected signs**. The system's response to the structural shocks can then be constructed as the impulse response functions and accumulated impulse responses, which are shown in Figures 2 and 3. The first panel in the last row of Figure 2 shows how output responds to a shock to net taxes. An initial dip in output is quickly reversed, and the response dies down rapidly and is never statistically significant. The lack of any output response is also clear from the accumulated impulse response curve in Figure 3. By contrast, the second panel in the last row of Figure 2 shows that output jumps up following a government spending shock. The increase in output lasts for about six

[13] The ability to make such assumptions shows the advantage of using quarterly data. With annual data such an assumption is less plausible as the government could change spending in response to output shocks and unexpected changes in revenues—for example, to meet certain deficit targets.

[14] Alternatively, one could assume $b_2 = 0$ with very similar results.

quarters and is then reversed and tapers off in the following year. The accumulated response curve in Figure 3 suggests a positive and significant response of output in the short run.

10. **The evidence seems to support the existence of the Keynesian demand effect of a government spending shock, while shocks to net taxes produce no significant effects**. Barring any offsetting effects, a reduction in government spending on goods and services would dampen demand immediately.[15] We also compute the fiscal multipliers based on the impulse response functions (Table 2), which are defined as the changes in real output following a one-unit change in the fiscal variable, both expressed in euros. The estimated expenditure multipliers are significant, and overall they are close to previous estimates, if somewhat larger. The tax multipliers are not statistically different from zero, a result that is also similar to the simulation result from the EC's QUEST model, but contrary to IMF (2004). The estimates are also broadly similar to those of the other European Union (EU) members, as reported in EC (2001).

Table 2. Portugal: Estimated Fiscal Multipliers

	First Quarter	After First Year	After 20 Quarters
Tax Multipliers (insignificant)	-0.03	0.30	0.24
Expenditure Multipliers	0.29	1.32	1.07

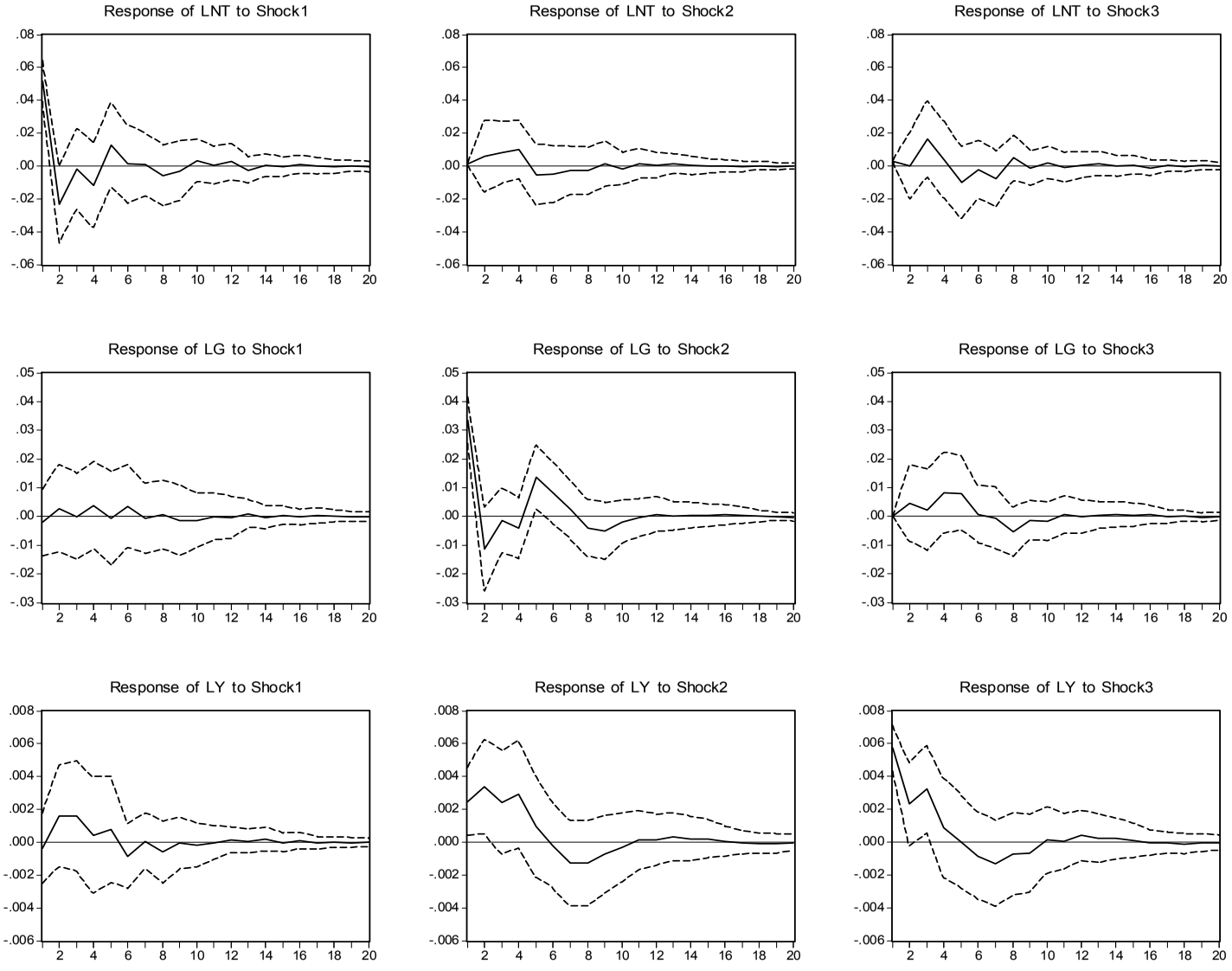
C. Expansionary Effects of Fiscal Contractions: What Have we Learned from the Literature?

11. **Recently, a growing literature has examined the possible expansionary effects of fiscal contractions**.[16] Starting with Giavazzi and Pagano (1990), studies have found that, contrary to the prediction of traditional theories, there are historical cases where, after a fiscal contraction, output rose instead of falling. Moreover, these episodes seem to share some common characteristics, that could account for the existence of non-Keynesian, expansionary effects of fiscal contractions, such as boosting confidence, reducing investment uncertainty, preventing risk premiums from rising, and improving competitiveness.

[15] One should not jump to the conclusion, based solely on this finding, that tax measures are then more desirable to achieve Portugal's deficit reduction, as the core of Portugal's fiscal problem lies in the steady rise in the current expenditure over the last decade. The literature generally agrees that expenditure-based adjustments are more successful (see below).

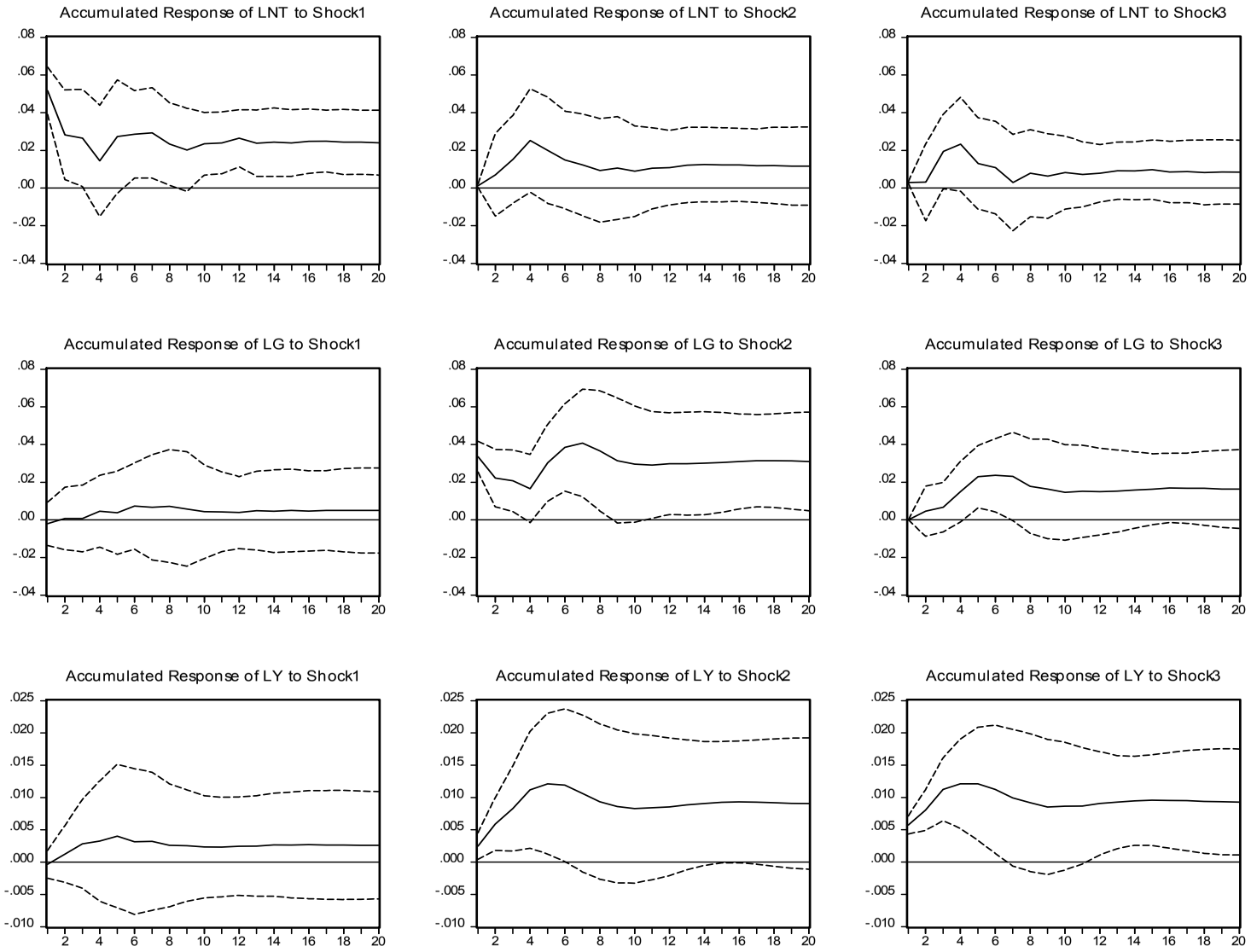
[16] See Hemming et al (2002) for a survey.

Figure 2. Impulse Response Functions of SVAR



Notes: LNT = net taxes; LG = government spending; LY = output. Shock1 = shock to net taxes; Shock2 = shock to governments pending; and Shock3 = shock to output.

Figure 3. Accumulated Response to Structural Innovations



Notes: LNT = net taxes; LG = government spending; LY = output. Shock1 = shock to net taxes; Shock2 = shock to government spending; and Shock3 = shock to output.

Examples of such expansionary contractions include Australia, 1987; Belgium, 1984–85; Canada, 1986–87; Demark, 1983–86; Greece, 1986–87; Ireland, 1987–89; Italy, 1983; Netherlands, 1991; and Sweden, 1986–87.[17]

12. **The experience of these countries suggests that predictions based on historical multipliers may need to be modified to take account of the characteristics of individual consolidation episodes**.[18] Historical multipliers obtained from data for the aforementioned countries usually display the standard Keynesian signs,[19] which can be interpreted as the output response following a "normal" change in the fiscal policy. Yet if the fiscal adjustment program is able to induce a "regime change" in the behavior of economic agents' expectations and behavior, the output response would also be different. In the aforementioned cases, non-Keynesian effects were so strong that they were able to completely offset the negative impacts on demand and reverse the sign of the multiplier.

Channels of non-Keynesian effects relevant to Portugal

13. **The main channels through which a fiscal contraction could stimulate activities in a country such as Portugal can be summarized as follows**:[20]

- On the demand side, when the existing paths for the fiscal deficit and public debt are viewed as nonsustainable and leading eventually to a crisis, poor **confidence** could hamper consumption and investment. A credible fiscal consolidation in such a case is likely to reverse the course of expectations. Meanwhile, consumers may feel that their permanent income is higher as their future income rises and future tax burden eases.[21]

- Problems with the fiscal accounts raise **uncertainty** about the future path of output, as the probability of a debt crisis rises. In an environment with highly uncertain future profits, firms tend to postpone investment decisions, and foreign firms will hold off

[17] See Alesina and Ardagna (1998).

[18] Ideally one should allow for the nonlinear effects in the estimation of fiscal multipliers. We are, however, unable to differentiate the fiscal policy changes in the short sample used in Section B.

[19] See, for example, EC (2001) for multipliers of EU member countries.

[20] Portugal is a small economy participating in a monetary union, therefore some channels typically discussed in the literature, such as the interest rate channel and the exchange rate channel are absent.

[21] Giavazzi and Pagano (1990) have found evidence of this channel in the case of Demark.

entry into the domestic market. Therefore, correcting the fiscal problem could boost investment by eliminating such uncertainty.

- Another consequence of large fiscal deficits and growing public debts is that the financial market may demand higher **risk premiums** on the country's debt instruments, that raise interest rates and make investment more costly.

- On the supply side, reducing wages in the public sector could have a spillover effect on the general wage level, which could strengthen the **competitiveness**. Cutting government employment, by limiting total labor demand, could also put downward pressure on the general wage level.[22]

What separates "expansionary contraction" episodes from the normal, Keynesian cases?

14. **As the empirical evidence suggests, all fiscal contractions are not the same**. Non-Keynesian effects depend on how consumers and businesses respond to the fiscal contraction. This, in turn, is affected by the initial environment in which the economic agents find themselves and how the consolidation is achieved:

- The initial conditions before the start of the fiscal consolidation matter for its macroeconomic impact. In particular, the countries that experienced expansionary contractions typically started with large initial fiscal deficits and public debt levels, and unfavorable economic conditions. In such environments, confidence is poor and uncertainty is large, and a correction of the fiscal course could reverse expectations and stimulate activities.

- The credibility of the fiscal adjustment program is crucial in changing economic agents' expectations. In this regard, front-loaded fiscal adjustments are more credible and more likely to induce a regime change in economic agents' behavior, while more gradual and lengthy adjustments are not as effective in altering agents' expectations. The cumulative output costs of the latter, therefore, could exceed those of the former approach.

- Large adjustments are typically associated with a positive output response. Many studies have found that the output responses of large adjustments and small adjustments possess different characteristics. For example, in Giavazzi et al (2000), the authors allow a dummy variable for cases where the fiscal adjustment is particularly large (defined as greater than 1.5 percent of GDP) in a regression of the output growth on the change in the structural deficit. They find that the dummy variable is statistically significant and the output impacts are, therefore, nonlinear:

[22] Alesina and Ardagna (1998) have emphasized this channel.

large fiscal adjustments display non-Keynesian effects while the small ones have only the traditional demand effects.

- The literature has found that expenditure-based consolidations tend to be more durable and growth friendly than revenue-based ones. Studies suggest expenditure measures tend to spread across multiple categories, although sizable cuts in wage bills are the most common. Cutting unproductive transfers and other inefficient spending is also growth-enhancing, as Alesina and Perotti found in several studies (e.g., 1998). These findings counter the results from the VAR in Section B, which finds a substantial expenditure multiplier; however, the VAR estimation did not distinguish between adjustments of different sizes or between productive and unproductive expenditures.

- The consolidation should be accompanied by other structural reforms, such as on budgeting, tax and tax administration, and subnational borrowing rules, where needed.

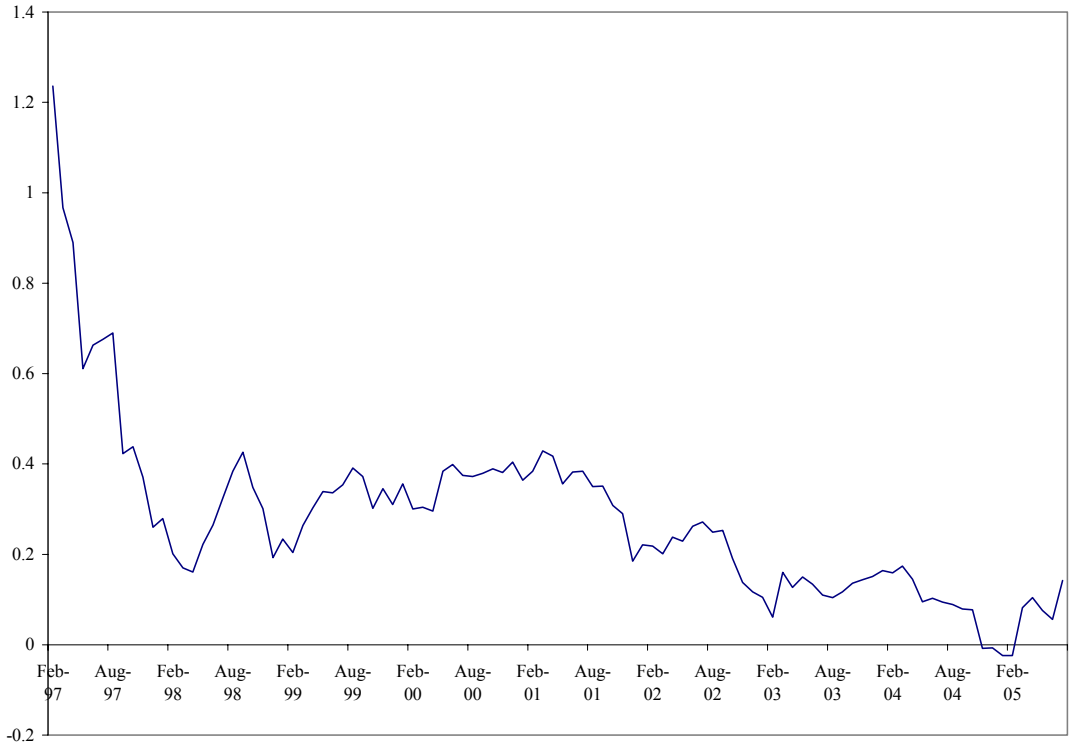
D. Implications for Portugal's Present Fiscal Consolidation

15. **Portugal's initial conditions are similar to those of many countries that experienced expansionary contractions**. The fiscal deficit will reach twice the size of the SGP ceiling and the public debt level will exceed the Maastricht criterion in 2005. This, together with a fragile recovery in output and slow investment growth, including foreign direct investment (FDI), suggests that a determined consolidation program could induce a regime change.

16. **Fiscal problems have worsened confidence and heightened uncertainty about Portugal's prospects**. While confidence is unobservable and affected by other factors, such as growth performance and unemployment, plenty of anecdotal evidence (e.g., in the press and during the recent government election) suggests substantial public awareness that the fiscal problem is a central economic issue facing the country. Standard & Poor downgraded Portugal's country rating in June, quoting explicitly the prolonged problems with the public accounts. The invoking of the Excessive Deficit Procedure by the EC in July further raised public concerns. Therefore, a credible fiscal adjustment program could improve confidence and reduce the uncertainty about the future paths of output and the public debt, and therefore revitalize investments, including FDI.

17. **A successful fiscal consolidation will help prevent a rise in the risk premium facing Portugal**. Figure 4 plots the interest rate differential between Portugal's ten-year government bond and that of Germany. Not surprisingly, the spread has been clearly trending downward in the past years. While there is no conclusive evidence that the overall trend is reversing, as the rising spread in the first half of 2005 may prove to be temporary and is in any case small, cautious investors could start to demand a higher risk premium if the fiscal problem continues to worsen in Portugal.

Figure 4. Spread of Ten-Year Government Bonds (Portugal vs. Germany), 1997–2005
(In percent)



18. **The authorities' Stability and Growth Program envisages an annual reduction of the fiscal deficit averaging 1 percent of GDP until 2008**. The question is, of course, whether this pace is enough to bring about the necessary regime change in agents' expectations. The definition for "large" adjustments varies across the studies where expansionary effects are found for large fiscal adjustment episodes. Table 3 brings together a sample of these definitions. At one end of the range, an internal study by the IMF's Fiscal Affairs Department in 2004 defines a large adjustment as a change in the fiscal deficit of more than 6.3 percent of GDP and over 21.8 percent of expenditure, based on the distribution of the sample studied. At the other end, a change of the fiscal deficit of greater than 1.5 percent of GDP in two years is studied by McDermott and Westcott (1996). It appears that Portugal's target meets the lower threshold, but there is no mechanical way to forecast its influence on expectations.

Table 3. Portugal: Definitions of Large Adjustments in the Literature

IMF	>6.3 percent of GDP and >21.8 percent of expenditure (top one-third of a sample of 260 cases)
OECD (1996)	>3 percent of GDP
McDermott and Westcott (1996)	>1.5 percent of GDP in two years
Giavazzi and Pagano (1996)	>5 percent of GDP cumulatively
Alesina and Ardagna (1998)	>2 percent of GDP in one year or >1.5 percent of GDP in two consecutive years

19. **In contrast to previous attempts, the authorities' new deficit-reduction strategy focuses on reining in the steady rise in current expenditure**. The main measures include reforming the pension system, curbing the wage growth for civil servants, and reducing the size of the public workforce.

- As discussed above, these expenditure measures, as found in the literature, are likely to be less damaging to growth than revenue-based measures. The current strategy is also perceived as tackling the root of the fiscal problems, and should thus have a favorable effect on credibility and expectations. The government is also aiming at raising the efficiency of public spending.

- The results in Section B suggests that social transfers are associated with a smaller multiplier. The reason could be that the impact of transfers on aggregate demand is affected by the consumption smoothing behavior of households, while reductions in government consumption and government investment will decrease directly aggregate demand. Therefore it is possible that the effect of the reduction in expenditure on pensions will be limited.

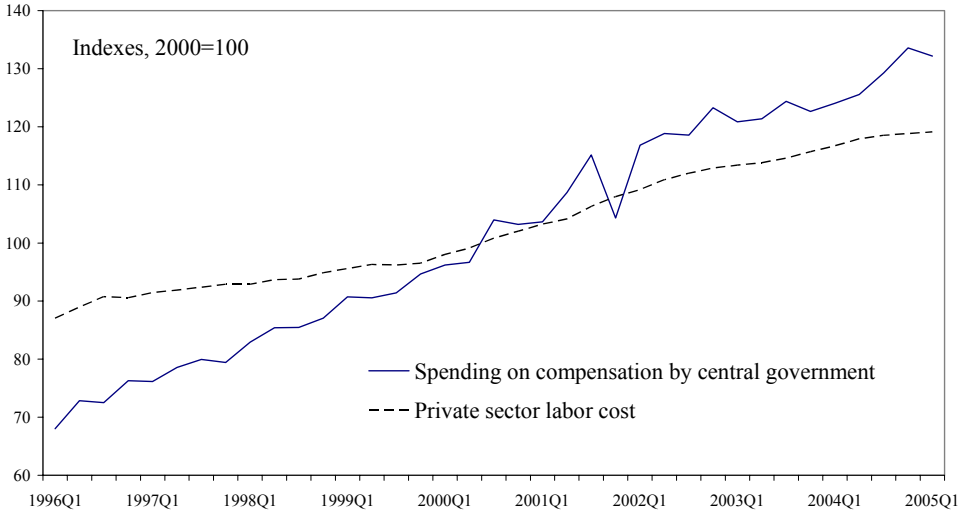
- Cutting the public wage bill could improve Portugal's competitiveness. In recent years, Portugal's competitive position has undergone continual erosion. As Figure 5 shows, there is a strong correlation between public and private wages in Portugal. A study by the Bank of Portugal[23] finds that Portugal has the largest wage differential between the public and private sectors among EU members. Judging by the "near non-existence of voluntary leaves of general government workers and by a very significant number of job applications whenever new vacancies are advertised in the general government,"[24] it is conceivable that this differential has created tensions in wages offered in the labor market. Therefore, curbing wage growth for civil servants is likely to also lower the growth of private sector wages, thereby making Portugal's

[23] Portugal and Centeno (2001).

[24] Portugal and Centeno (2001).

industries more competitive. In a similar vein, reducing the already very large size of the public workforce would decrease total labor demand and help rein in wage growth.

Figure 5. Portugal: Government Compensation and Private Sector Labor Cost
(1996-2005)



Sources: Portuguese authorities, and Eurostat.

20. **Of course, none of these factors suggest that fiscal consolidation will lead to an output expansion in Portugal**. While some positive effect on output might be expected due to them, it is impossible to predict the size of this effect or the extent to which it would offset the negative demand effects:

- The credibility effects depend on how the economic agents react to the consolidation, and it is difficult to predict the change in expectations. Many of the medium-term adjustment measures remain to be defined, which could affect the credibility of the program.

- The unfavorable external environment, with mounting competition from new EU members and emerging Asian countries, and the social impacts of certain reforms (such as pension reforms and reductions in public wages and employment) could limit the confidence boost.

- Better growth prospects may not induce households to consume more, as their indebtedness is already high and a consolidation is overdue.

- Several non-Keynesian channels discussed in the literature are absent from the Portugal case. Because Portugal is a member of a monetary union, changes in the fiscal policy cannot affect the nominal interest rates and the exchange rate.

E. Concluding Remarks

21. **This chapter estimates the historical fiscal multipliers for Portugal and discusses the possible expansionary effects of the current fiscal adjustment program**. The use of quarterly data enables us to identify the fiscal shocks under the SVAR setting. We find a large expenditure multiplier with the traditional sign, and an insignificant multiplier for net taxes. This seems to offer support for the authorities' strategy of reducing the deficit by limiting social transfers. However, because the lack of data and the short sample period prevented the construction of a richer VAR, the results should be interpreted with caution.

22. **We have also argued that, based on the recent literature examining the links between fiscal policy and output growth, and given the initial conditions and the features of the government's adjustment strategy, several non-Keynesian effects could partly offset the negative short-term demand effects**. It is worth repeating that the need for fiscal consolidation in Portugal stems from the unsustainable path of the public accounts rather than any non-Keynesian effects the consolidation may have on output. However, in order to reduce the short-term output costs of the needed consolidation, the government should aim to further enhance the credibility of the adjustment program.

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III. THE PORTUGUESE BANKING SECTOR[25]

A. Introduction

1. The Portuguese banking industry has undergone significant transformations following wide-ranging reforms associated with Portugal's accession to the European Union (EU) in mid-1980s and then to the European Monetary Union (EMU) in late 1990s.[26]

2. **The aim of this paper is to provide an overview of main developments in the Portuguese banking sector since euro adoption**. In particular, the paper investigates competitive conditions in the banking industry and the sector's recent financial performance.

3. **Competitive conditions seem to have strengthened in recent years**. Financial liberalization and deregulation, and the creation of the EMU, helped bolster consolidation in the banking industry in Portugal and in other European countries.[27] As a result, market concentration increased, as measured by the usual market-structure indicators. Yet, empirical evidence, based upon Panzar-and-Rosse's H-statistic, suggests that competitive conditions in the Portuguese banking sector were not affected. Actually, market contestability, which is particularly strong in the case of large banks, rose somewhat.

4. **Portuguese banks proved to be resilient to the difficult operating environment of the last few years, which was marked by the progressive slowdown of the economy and compressed interest margins**. To preserve profitability, banks strengthened alternative sources of income (essentially commissions), reduced their financing costs by tapping international capital markets, rationalized operating costs (notably for personnel), and enhanced credit procedures. As a result, capital adequacy ratios strengthened and the quality of loan portfolios improved. Banks also improved their liquidity position by tapping the long-term segment of international capital markets. However, potential vulnerabilities remain, mainly associated with the high level of household and corporate debt as well as the significant concentration of banks' exposure across sectors (especially real estate) and borrowers.

5. The paper is organized as follows: Section B discusses changes in the structure of the Portuguese banking industry and its implications for market competition; Section C presents an overview of the financial performance of the Portuguese banking sector in 1999–2004; and Section D concludes and highlight potential vulnerabilities.

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[25] Prepared by Alessandro Giustianni.

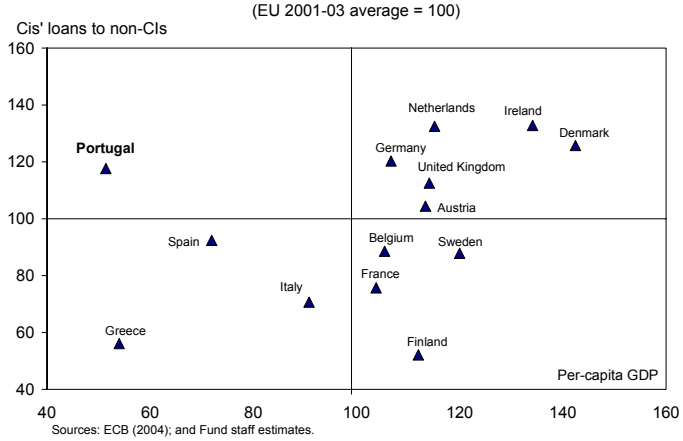
[26] For a detailed survey of the reforms of the Portuguese banking system, see Decressin (1999).

[27] See, European Central Bank (2004 and 2005).

B. Market Structure and Competition

6. **Credit institutions (CIs) dominate financial intermediation to a greater extent in Portugal than in other EU countries**.[28] In Portugal, CIs' loans to the non-CI sector averaged about 142 percent of GDP in 2001–03, slightly above the EU average. Compared with the level of development of the economy, as measured by the level of per-capita GDP, the breadth of the banking system in Portugal is greater than in other EU member countries (Figure 1).

Figure 1. Credit Institutions' Intermediation
(EU 2001-03 average = 100)



Sources: ECB (2004); and Fund staff estimates.

7. **Portuguese banks hold strategic stakes in other sectors of the economy**. The larger Portuguese banks are organized as financial conglomerates, with relevant stakes in other non-traditional banking business sectors, such as insurance companies, stock exchange brokers, and asset management. Albeit with mixed results, major banks have also formed strategic alliances with non-financial companies with the aim of exploiting profit opportunities in specific fields, such as telecommunication and e-economy.[29]

8. **In the past decade, Portugal experienced a consolidation in the banking industry, in common with other European markets**. Financial liberalization and deregulation, together with the creation of the EMU, fostered a more competitive environment that was conducive to bank consolidation. Between 1995 and 2004, the number of credit institutions in Portugal

[28] The European Central Bank (ECB) defines a "credit institution" as "(a) an undertaking whose business is to receive deposits or other repayable funds from the public and to grant credits for its own account; or (b) an electronic money institution within the meaning of Directive 2000/46/EC of the European Parliament and of the Council of 18 September 2000 on the taking up, pursuit and prudential supervision of the business of electronic money institutions." This is an aggregate broader than the one used Section C to analyze the financial performance of the Portuguese banking sector, which draws from Bank of Portugal statistics based on data at the consolidated group level.

[29] For instance, Banco Espirito Santo has an alliance with Portugal Telecom and Banco Comercial Português with Electricidade de Portugal (EDP), the Portuguese electricity company.

declined from 233 to 197, mainly due to mergers and acquisitions (M&As), part of which were cross-border (Table 1).[30]

Table 1. Portugal: Bank Consolidation in Selected Euro-Area Countries

Country	Number of CIs		Number of branches		Number of M&As 1/	
	1995	2004	1995	2003	1995–2004	o/w cross-border
Portugal	233	197	3,466	5,440	38	40.0
Spain	506	346	36,465	39,762	95	31.6
Greece	53	62	2,404	3,300	34	25.7
Italy	970	787	23,493	30,502	275	12.2
EMU12	9,507	6,406	162,074	167,644	901	23.2

Source: ECB (2005).
1/ The estimated number of M&As may exclude a number of smaller deals that were not reported. M&A data include both minority and majority acquisitions; cross-border M&As cover both acquirers from the euro area and third countries.

9. **As a result, market concentration in Portugal increased**. Market structure indicators such as the Herfindhal-Hirshman Index (HHI) and the share of total bank assets held by the five largest institutions suggest that the consolidation process was somewhat more intense in the case of Portugal than in other euro-area countries (Table 2).[31]

10. **Yet, more intense banking sector concentration seems not to have weakened competitive conditions in the Portuguese banking sector**.[32] Intuitively, it can be noted that

[30] The actual scope of M&A operations may be somewhat overestimated because data include both minority and majority acquisitions. In addition, data may reflect transactions within banking groups that represent only a reorganization of their sub-holding structure.

[31] The HHI is the sum of squares of the markets shares (s_i) of all firms in a sector ($HHI = \Sigma_i s_i^2$, $i = 1, ...,N$). When all banks (n) are of equal size, HHI is equal to $(100/n)^2$, which tends to be 0 when n tends to be very large. When HHI is between 1,000 and 1,800, the market structure is somewhat concentrated. When HHI assumes a value above 1,800, the market is highly concentrated.

[32] According to the structure-conduct-performance paradigm, which establishes a direct link between market structure and competitive conduct, a rise in market concentration would facilitate collusive behaviors among firms, and hence would lead to higher prices and profitability. To the contrary, Claessens and Laeven (2004) found some evidence that more concentrated banking systems are more competitive.

banks' return on equity remained fairly stable and the spread between loan and deposit rates even narrowed (see Section C).

Table 2. Portugal: Market Concentration Indicators in Selected Euro-Area Countries (1997–2003)

Countries	Herfindhal-Hirshman Index		Share of 5 largest credit institutions	
	1997	2003	1997	2003
Portugal 1/	577	1,044	46	63
Spain	285	521	32	44
Greece	885	1,130	56	67
Italy	201	240	25	27
EMU 12	383	581	45	53
EU 15	373	541	46	53

Source: ECB (2004).
1/ Based on data at consolidated bank group level, the HHI would be equal to 1,414 in 1997 and 1,423 in 2003; the share of the five largest institutions would be 62.9 percent in 1997 and 76.7 percent in 2003.

11. **To better assess the degree of competition in the banking industry, the Panzar and Rosse (1987) methodology was applied to a sample of 22 banks or bank holdings over the 1998–2003 period**. Based on a reduced-form equation of revenue at bank level, the Panzar and Rosse H-statistic measures market power by the extent to which changes in factor prices are reflected in banks' revenue.[33] In other words, the H-statistic is the sum of the elasticities of the reduced-form revenues with respect to factor prices, that in the present case are labor costs, costs of funding, and capital costs.[34] As summarized in Table 3, the value assumed by the H-statistic allows one to distinguish among different market structures.

12. **Although the sample period considered is relatively short—six years, from 1998 to 2003—it is reasonable to inquire whether competitive conditions may have changed over time due to institutional changes that are not captured by the simple reduced-form revenue equation**. To this end, it is assumed that the H-statistic is a function of time and this constraint is imposed on the reduced-form equation of bank revenue.[35] In addition, to capture potential

[33] Two definitions of bank revenues were used: gross interest income, under the assumption that banks' core activity is to produce loans and investment; and total revenue, reflecting the fact that banks have diversified their business activity by offering a host of services to their customers. Contrary to other study, bank revenues were not scaled by total assets because, as Vesala (1995) pointed out, this would be equivalent to estimate a price equation without assessing its relationship with equilibrium revenues.

[34] For details of the regression specifications, see Appendix.

[35] See, Bikker and Groeneveld (1998), De Bandt and Davis (2000), and Bikker (2004).

differences in competitive conditions for banks of different sizes, the sample was split between large and small banks.

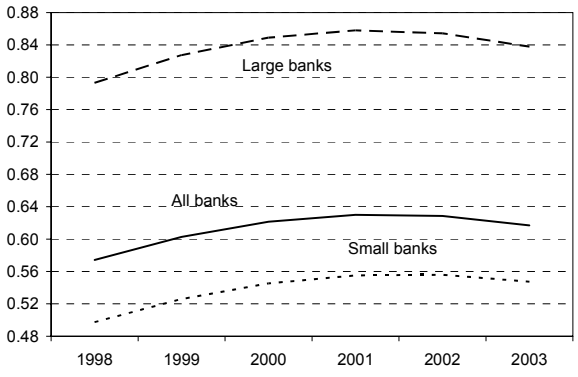
Table 3. Portugal: Discriminatory Power of the H-Statistic

Values of H	Competitive environment
$H \leq 0$	Monopoly equilibrium: each bank operates independently as under monopoly profit maximization conditions (H is a decreasing function of the perceived demand elasticity) or perfect cartel.
$0 < H < 1$	Monopolistic competition free entry equilibrium (H is an increasing function of the perceived demand elasticity).
$H = 1$	Perfect competition. Free entry equilibrium with full efficient capacity utilization.

Source: Bikker (2004).

13. **The results indicate that although conditions of monopolistic competition prevailed throughout the period under review, the degree of competition in the Portuguese banking industry increased over 1998–2003**. The estimated H-statistics are consistent with conditions of monopolistic competition in the Portuguese banking industry. Bank competition seems to have strengthened somewhat in the year immediately before and after euro adoption, and then subsided (Figure 2). For the sample of banks as a whole, the H-statistic is estimated to range between 0.57–0.62, which is somewhat lower than gauged by other studies (Table 4). However, when the sample is split according to bank asset size, competition seems to be more intense (higher H-statistic) for the group of large banks than for the sample of small banks.[36] This result is consistent with the view that local markets, where small banks predominantly operate, are less competitive than national and international markets, where large banks are mainly active.[37]

Figure 2. H-statistics; 1998-2003
(Computed on interest revenue equation)



[36] A Wald test on input cost elasticities indicates that the estimated H-statistic for large banks is significantly different from the one calculated for small banks. Instead, Bikker (2004) found that market competition did not vary much among large (H=0.91), medium (H=0.88), and small (H=0.84) banks.

[37] See De Bandt and Davis (2000) and Bikker (2004).

14. **Cross-country studies confirm that banking competition in Portugal is robust** (see Table 4). Although differences in sample periods and in estimation techniques make it difficult to compare the results of different studies, a number of cross-country analyses find that bank markets in Europe are usually characterized by monopolistic competition, The results of these studies also suggest that Portugal compares well with other European countries.

Table 4. Portugal: H-Statistic for the Banking Sector in Selected Euro-Area Countries

Period	Bikker (2004) 1991–1997	Corbó and others (2005) 1995–2001	Claessens and others (2004) 1994–2001	Fund Staff 1998–2003
Portugal	0.83	0.80	0.67	0.57–0.62
Spain	0.55–0.66	0.64	0.67	
Greece	0.76	0.75	0.76	
Italy	0.82	0.65	0.60	
Memorandum items:				
Sample average 1/	0.73	0.68	0.69	
Max-min	0.34–0.93	0.48–0.90	0.50–0.86	
Sample median 1/	0.76	0.68	0.68	

1/ Based on EU countries included in the sample.

C. Financial Performance

15. **Portuguese banks proved to be resilient to the difficult operating environment of the last few years, which was marked by the progressive slowdown of the economy, compressed interest margins, and growing competition**. They preserved a solid level of profitability, as measured by the rate of return on assets or equity, broadly in line with other European countries (Table 5).

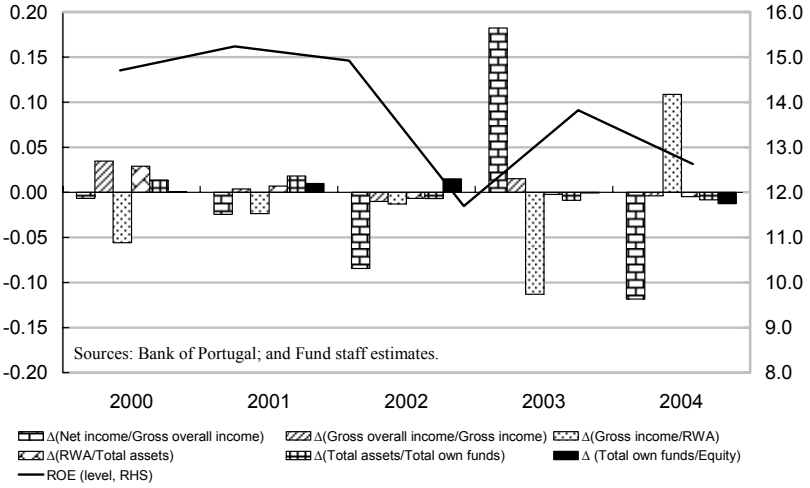
Table 5. Portugal: Indicators of Bank Profitability in Selected Euro-Area Countries, 1999–2004
(In percent)

	1999	2000	2001	2002	2003	2004
Return on Assets						
Portugal	0.9	0.9	0.9	0.7	0.8	0.8
Spain	...	1.0	0.9	0.9	0.9	1.0
Greece	2.4	1.4	1.0	0.5	0.6	0.5
Italy	0.6	0.8	0.6	0.5	0.5	0.7
Return on equities						
Portugal	14.7	15.1	14.9	11.7	13.9	12.8
Spain	...	15.3	13.5	12.1	13.2	14.2
Greece	28.6	15.4	12.4	6.8	8.9	7.3
Italy	8.7	11.2	8.6	7.1	7.4	9.4

Sources: National authorities; and Fund staff estimates.

16. **To better gauge the contribution of different factors in shaping Portuguese banks' profitability, the return on equity (ROE) of the banking sector as a whole was broken down into its fundamental components**. Changes in ROE can be viewed as the result of changes in the banking sector's financial strength, efficiency, competitiveness, risk exposure, and financial structure (Box 1). In 2000–04, although there was a marked volatility of individual factor contributions, some interesting results emerge (Figure 3).[38]

Figure 3. Breakdown of the Year-on-Year Change in the ROE
(In percentage points)



17. **The contribution of the financial strength indicator to profitability was always negative, except in 2003, reflecting banks' efforts to build up loan loss provisions**. Although nonperforming loans (NPLs) declined to low levels, owing to banks' enhanced credit procedures and significant loan write-offs, banks strengthened their efforts to build up loan loss provisions (Table 6). This was also promoted by more rigorous rules on loan classification and provisioning introduced by the Bank of Portugal in mid-2003, which forced banks to make provisions earlier than in the past. As a result, the coverage of NPLs reached 83.4 percent of the total in 2004, compared to 67.7 percent in 2000.[39]

[38] ROE changes are the sum of the changes in the logarithms of each component.

[39] If general provisions are added, the coverage ratio raised from 135.1 percent in 2000 to 144.5 percent in 2004.

Table 6. Portugal: Bank Loan Quality in Selected Euro-Area Countries, 1999–2004
(In percent)

	1999	2000	2001	2002	2003	2004
Nonperforming loans to total loans 1/						
Portugal	...	2.2	2.2	2.3	2.4	2.0
Spain	...	1.0	0.9	1.0	0.9	0.7
Greece	15.9	9.9	8.2	7.3	7.0	7.0
Italy	9.8	7.8	6.7	6.5	6.6	6.5

Sources: National authorities; and Fund staff estimates.
1/ The definition of nonperforming loans may vary across countries.

Box 1. Decomposition of Banks' Rate of Return

Banks' ROE can be decomposed as follows:1/

$$ROE = \frac{\text{Net income}}{\text{Gross overall income}} \times \frac{\text{Gross overall income}}{\text{Gross income}} \times \frac{\text{Gross income}}{\text{RWA}} \times \frac{\text{RWA}}{\text{Total assets}} \times \frac{\text{Total assets}}{\text{Total own funds}} \times \frac{\text{Total own funds}}{\text{Equity}}$$

The first ratio is an indicator of financial strength. An increase in this component indicate lower deductions from income to cover different risks and extraordinary losses. However, it may also be the result of a one-off increase in extraordinary profits and hence the improvement in ROE will prove to be temporary.

Changes in the second ratio capture changes in bank efficiency. In fact, it may be rewritten as follows:

$$\frac{\text{Gross overall income}}{\text{Gross income}} = 1 - \frac{\text{Administrative costs}}{\text{Gross income}} = 1 - \text{Efficiency ratio}$$

Therefore, a positive contribution of this factor points to progress in the way banks carry out their business activity.

The third ratio is a measure of asset productivity adjusted for risk. A raise in this ratio denotes that banks have improved the allocation of their investment portfolio and hence they can earn a higher return per unit of assets adjusted for the risk assumed.

While the fourth factor provides an indication of the risk profile of banks' balance sheet, the fifth ratio measures the bank's gearing ratio. A shift of banks' portfolio toward riskier activities or an increase in their leverage make banks more vulnerable to shocks, thus weakening their financial soundness.

The sixth and last ratio offers a measure of the quality of banks' capital structure. Since the numerator includes subordinated debt, a rise in this ratio implies that banks their indebtedness within their regulatory capital. This implies a worsening of their risk exposure and hence of their

1/ See Bank of Spain (2004) and Bank of Portugal (2004). The terminology used is consistent with the Bank of Portugal presentation of the income statement of the banking system on a consolidated basis.

18. **The negative contribution of risk-adjusted asset productivity was only partially offset by improvements in bank efficiency, which were somewhat uneven**. The EMU-related convergence of domestic interest rates resulted, in fact, in a significant compression of banks' interest margins (Table 7). This led Portuguese banks to strengthen other sources of income, mainly commissions, and to gradually improve the structure of their financing, issuing directly in capital markets and reducing their reliance on the interbank market.[40]

Table 7. Portugal: Indicators of Bank Financial Performance in Selected Euro-Area Countries, 1999–2004
(In percent)

	1999	2000	2001	2002	2003	2004
Interest margin to gross income						
Portugal	64.8	62.9	65.8	65.0	60.0	58.1
Spain	...	68.0	70.1	70.8	68.8	68.7
Greece	44.5	54.5	62.8	72.5	74.2	74.9
Italy	55.0	52.2	52.3	56.6	55.4	55.9
Trading and fee income to total income						
Portugal	28.6	29.5	25.5	26.1	27.7	29.1
Spain	...	32.0	29.9	29.2	31.3	31.3
Greece	49.9	35.5	28.0	22.7	21.6	20.3
Italy	25.8	26.0	21.8	21.8	21.1	20.5
Noninterest expenses to gross income						
Portugal	54.8	51.1	50.7	51.8	50.5	50.5
Spain	...	63.6	61.0	59.8	58.0	56.6
Greece	48.1	52.8	58.8	69.3	62.3	61.8
Italy	60.6	55.9	55.3	59.8	61.0	60.6
Personnel expenses to noninterest expenses						
Portugal	61.6	61.8	59.5	59.3	59.3	58.6
Spain	...	56.7	56.8	57.0	58.0	57.9
Greece	63.6	61.8	59.8	58.0	58.2	59.1
Italy	58.4	56.3	54.5	54.6	54.8	54.1

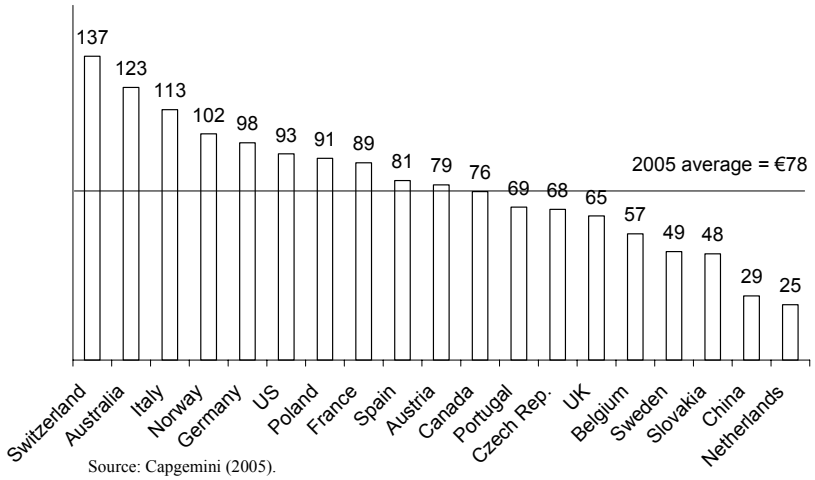
Sources: National authorities; and Fund staff estimates.

[40] Tapping international capital markets was helped by a gradual but steady narrowing of the spread paid by Portuguese banks, which however remained higher than other European countries (Bank of Portugal, 2005).

19. **Significant efforts were made to rationalize operating costs**. Notwithstanding the increase in the number of branches, employment was reduced by almost one-fifth since the mid-1990s. Also, the burden of other expenses was also contained. As a result, non-interest expenses absorbed a declining share of gross income. Improvements in Portuguese banks' efficiency compare favorably with those of banks in other EU countries (see Table 7).

20. **The efficiency of the Portuguese banks is reflected in their relatively low pricing of core banking products and services**. In a recent survey of retail banking in 19 countries, the average price of core banking products and services (i.e., account management, means of payments, cash utilization, and exceptional handling) is estimated to range between €137 in Switzerland and €25 in the Netherlands (Figure 4).[41] In the case of Portugal, the average price local customers pay is estimated to be €69, slightly below the sample average (€78).

Figure 4. Retail Banking Prices in Selected Countries; 2005
(Annual weighted averaged prices for the local profile, 2005, in euro)



Source: Capgemini (2005).

21. **While strengthening the level and quality of their capital bases, Portuguese banks shifted toward more prudent risk strategies**. In 2002, the ROE contributions of the ratio between risk-weighted and total assets as well as of the gearing ratio shifted into positive territory, thus pointing to some improvements in banks' financial stability. This result is corroborated by a recovery in bank capitalization, partially reflecting some increase in own funds. However, as of end 2004, capital adequacy ratios, though above the Basel minimum ratio, remain somewhat lower than in other European countries (Table 8).

[41] See Capgemini (2005). It is worth noting that only five banks were surveyed in Portugal, which was for the first time included in the country sample, and therefore no time series is available.

Table 8. Portugal: Indicators of Bank Capital Adequacy in Selected Euro-Area Countries
(In percent)

	1999	2000	2001	2002	2003	2004
Capital adequacy ratio						
Portugal	10.8	9.2	9.5	9.8	10.0	10.4
Spain	...	12.4	12.9	12.5	12.6	11.6
Greece	16.2	13.6	12.4	10.5	12.0	12.8
Italy	10.6	10.1	10.4	11.2	11.4	11.6
Tier I ratio						
Portugal	8.0	7.6	7.3	7.1	7.1	7.3
Spain	...	...	...	...	...	...
Greece	15.3	13.5	10.9	8.8	9.8	10.0
Italy	8.6	7.8	7.8	8.2	8.5	8.8

Sources: National authorities; and Fund staff estimates.

D. Challenges Ahead

22. **Corporate and household indebtedness have reached new heights**. Persistently favorable credit conditions, associated to the nominal convergence brought about by Portugal's participation in the euro area, fostered corporate borrowing and households' demand for financial services, especially mortgage loans. As of end 2004, corporate and household debt reached 98 and 79 percent of GDP, respectively, compared to 86 and 61 percent of GDP in 2000. Increasing interest rates and persistently weak economic conditions could lead corporate and household sectors to reconsider their expenditure plans. This, in turn, would depress domestic demand and economic activity, further affecting banks' loan portfolio quality and income outlook.

23. **Banks are heavily exposed to the real estate market**. The growing market for mortgages and the increased recourse to loan securitization facilitated the financing of real-estate related activities. Against this background, in 2004 banks' total exposure to the real estate sector reached 53 percent of total loans originally granted to the non-financial private sector, compared to 47 percent in 2000.[42] in addition, the average loan-to-value (LTV) ratio for new mortgages has increased substantially, reaching 80 percent in 2004 compared to less than 50 percent 10 years earlier.[43] Intensified competition in this market resulted in some easing of credit standards.

[42] The growth of mortgage lending seems not to have fueled a housing price bubble that, actually, have declined somewhat in real terms (i.e., deflated by the CPI).

[43] In terms of stock, the LTV ratio increased from 12 percent in 1994 to 39 percent in 2004 (Cardoso and Geraldes da Cunha, 2005)

Should banks exercise their security rights, the process of obtaining, and then disposing of, real estate collateral may be problematic and lengthy, as experience in other countries has shown.

24. **Bank lending to the corporate sector remains significantly concentrated in a few large borrowers**. In 2002–04, almost half of the total credit to non-financial enterprises was in the form of loans to a few large-sized industrial groups, mainly in the service sector, which accounted for 0.5 percent of total borrowers.[44] The sum of these large exposures were equivalent to almost twice the regulatory capital of the banking system as a whole. Empirical evidence of an inverse relationship between delinquency ratios and firm size and the fact that those industrial groups belong to the non-tradable sector, especially the services sector, may be considered mitigating factors.[45] However, in light of the uncertainties surrounding the economic outlook, continued surveillance of these exposure is called for.

25. **To maintain adequate levels of profitability in a very competitive environment, banks have to strike the right balance between risk and return on assets**. Portuguese banks seem to have improved their risk profile but asset productivity is low. Should the latter remain weak, further efforts in boosting bank efficiency, through stricter control on cost developments, will be called for in order to maintain an adequate level of profitability.

[44] The data refer to loans of amount equal to or greater than 10 millions of euro (Bank of Portugal, 2005).

[45] See Bank of Portugal, 2005.

Test on Market Structure

Theory

In the context of the Panzar and Rosse test on market structure (H-statistic), banks are assumed to be firms producing a single product. Based on a reduced-form equation of revenue at bank level, the H-statistic is the sum of the elasticities with respect to factor prices. It can be demonstrated that if the market is perfectly competitive and banks operate at their long-run equilibrium, an increase in factor prices would raise both marginal and average costs without affecting the optimal level of output of any individual firm.[46] As a result, banks should experience an equivalent increase in revenues and the H-statistic should assume a value equal to 1. On the other hand, if the market is monopolistic, an increase in input prices should raise marginal costs, reduce equilibrium output and hence revenues. In this case, the H-statistic should be either equal to zero or negative. In the "intermediate" case of monopolistic competition, under the assumption of free entry and hence of zero-profit in equilibrium (Chamberlinian model), the H-statistic assumes a positive value but lower than 1.

The following reduced-form equation for banks' revenue (R_{it}) was estimated:

$$\log R_{it} = \alpha + \sum_j \beta_j \log w^j_{it} + \sum_k \gamma_k \log X^k_{it} \qquad (1)$$

for t = 1, ..., T, where T is the number of periods observed, i = 1, ..., I, where I is the total number of banks, j = 1, ..., J where J is the total number of inputs, k = 1, ..., K, where K is the number of bank-specific variables that affect the bank's revenue or cost function. Hence, the H-statistic is equal to:

$$H = \sum_j \beta_j \qquad (2)$$

A critical feature of the Panzar and Rosse test is that banks should at their long-run equilibrium. An equilibrium test used in the literature is provided by equation (1) in which either the rate of return on assets (ROA) or the rate of return on equity (ROE) is included as dependent variable. The underlying assumption is that in competitive capital markets, risk-adjusted rates of return will be equalized across banks and will not be correlated with input prices.

To inquire whether competitive conditions may have changed over time due to institutional changes that are not captured by the simple reduced-form revenue equation, it was assumed that the H-statistic is a function of time and this constraint is imposed to equation (1).[47] In

[46] See Vasala (1995).

[47] See, Bikker and Groeneveld (1998), De Bandt and Davis (2000), and Bikker (2004).

particular, as in De Bandt and Davis (2000), the H-statistic was assumed to follow a quadratic time-trend, followed by the coefficients of factor costs as well, namely:

$$H = \sum_j \beta_j H_t = H_0 + h_1 t + h_2 t^2 \quad (3)$$

$$\beta_{jt} = \beta_{j0} + h_1 t + h_2 t^2 \quad \text{so as} \quad \beta_{jt} - \beta_{j0} = \beta_{it} - \beta_{i0} \quad (4)$$

Therefore, rearranging the terms, the following equation was estimated:

$$\log R_{it} = \alpha + \sum_j \beta_{j0} \log w^j_{it} + h_1 t \left(\sum_j \log w^j_{it}\right) + h_2 t^2 \left(\sum_j \log w^j_{it}\right) + \sum_k \gamma_k \log X^k_{it} \quad (5)$$

Data description

To implement the above methodology, balance sheet and income statement data from Bankscope were used over the 1998─2003 period. The sample comprised 22 banks or bank holdings for which all data were available over the period considered.[48] Tests were implemented for the whole sample as well as for the group of five largest banks and the remaining group of small banks.[49]

Two definitions of banks' revenues were used as dependent variable. The first one refers to banks' gross interest income, excluding capital gains.[50] This choice was consistent with the view that the core activity of banks is to produce loans and investment. Alternatively, banks' total revenue was considered as dependent variable, reflecting the view that banks started diversifying their business activity by offering a host of services to their customers.[51]

Three input variables were considered: labor cost, cost of funding, and capital cost. Given limited information on the number of staff employee, labor cost was approximated by the ratio between wage costs and the (average) sum of bank loans and deposits, which were assumed to be the most labor intensive activities in a bank. Costs of funding was equal to the ratio between interest expenses and the (average) sum of deposits and other interest-bearing

[48] Consolidated balance sheet and income statement data were used except in the case of one bank.

[49] Small banks were defined as those banks having a stock of total assets lower that one-third of the largest bank in the sample.

[50] Contrary to other studies, bank revenues were not scaled by total assets. As pointed out by Vesala (1995), this would be no longer a revenue equation but a price equation whose behavior with respect to equilibrium revenues would remain unexplored.

[51] In the case of banks included in the sample, the share of income fees and other operating income has slightly increased, albeit not steadily, from 21.5 percent to 25.6 percent of total revenue between 1998 and 2003.

liabilities. As proxy of capital costs, it was used the ratio between non-wage operating costs and (average) total assets.

Three "bank-specific" variables were included in the estimated equation: equity capital, loans to assets ratio, and the ratio between non-performing loans and gross loans. The variable "equity capital" was included as scale factor. The variable "loans to asset ratio" was supposed to capture the asset structure of banks. The variable "non performing loans to gross loans ratio" was introduced to take into account bank specific risk factors as well as banks' monitoring costs.

The basic statistics of the variables included in the exercise are reported in Table 9. In the regressions, all variables were expressed in logarithms.

Results

Equation (5) was estimated considering the whole sample of banks as well as for the groups of large and small banks separately. The estimation process corrected for individual (fixed) effects[52] as well as cross-section heteroskedasticity. Robust methods were used to compute the coefficient standard errors.

The results are reported in Table 10.[53]

- Cost of funding is the variable with by far the largest elasticity. Labor and capital elasticity are broadly similar.
- While the first cost variable assumes always a positive coefficient, the coefficients of the other two cost variables are always negative. Banks seems to be able to transfer to borrowers an increase in the cost of funding whereas they have to absorb, at least partially, a raise in labor and capital costs.
- Contrary to expectations, the "loan-to-asset ratio" variable assumes a negative coefficient, which is significantly different from zero in all specifications.
- The "nonperforming-to-gross loan ratio" variable assumes a negative and significant coefficient. A higher proportion of nonperforming loans not only depresses bank revenues, but it also increases its monitoring costs.
- The coefficients of the time trend are significantly different from zero.

[52] In the case of large banks, the F-test indicates that data can be pooled together, and the correction for fixed-effects is not necessary.

[53] In the Table, the coefficients h_1 and h_2 of equation (5) correspond to TIME and TIME^2.

The H-tests reject both the hypothesis of monopoly ($H \leq 0$) and perfect competition ($H = 1$). However, the H statistic assumes values significantly above zero thus implying a form of monopolistic competition.

Table 9. Portugal: Descriptive Statistics of the Pooled Sample, 1998–2003

	Interest revenues 1/	Total revenues 1/	Labor costs 2/	Costs of funding 3/	Capital costs 4/	Equity capital 1/	Loans to assets ratio 4/	NPLs to gross loans 5/
Total sample								
Average	637	776	153	497	133	599	5,175	2.8
Median	169	205	109	402	110	175	5,894	2.1
Standard deviation	987	1,195	168	571	119	929	2,418	3.6
Large banks								
Average	2,231	2,725	99	427	106	2,084	6,087	2.3
Median	1,835	2,256	100	443	104	1,877	6,195	2.1
Standard deviation	949	1,119	24	88	23	951	775	1.0
Small banks								
Average	168	203	169	517	141	162	4,906	2.9
Median	101	140	127	388	116	137	5,250	2.1
Standard deviation	166	181	187	647	134	113	2,662	4.1

Sources: Bankscope; and Fund staff estimates.
1/ In millions of euro.
2/ Per 10,000 euros of deposits and loans.
3/ Per 10,000 euros of deposits and other interest-bearing liabilities.
4/ Per 10,000 euros of total assets.
5/ In percent.

Table 10. Portugal: Estimates of the Panzar-Rosse Statistic, 1998–2003

	All banks			Large banks			Small banks		
	Interest revenue	Total revenue	ROAE	Interest revenue	Total revenue		Interest revenue	Total revenue	
Constant 1/	Fixed effects	Fixed effects	Fixed effects	0.76348	1.36101		Fixed effects	Fixed effects	
				0.57839	*1.41499*				
Labor costs	-0.12237	-0.29031	0.11589	0.42932	0.23013		-0.21359	-0.31445	
	-2.32408 *	*-4.21517* **	*2.20447* *	*3.70837* **	*2.41134* *		*-2.79946* **	*-4.30326* **	
Costs of funding	0.83948	0.62102	0.01963	0.67081	0.58820		0.80443	0.63187	
	12.88100 **	*10.83621* **	*0.49833*	*6.60615* **	*6.99476* **		*12.04738* **	*18.37700* **	
Capital costs	-0.14301	0.01650	-0.12850	-0.30719	0.05924		-0.09355	0.01340	
	-5.44101 **	*0.55956*	*-2.46690* *	*-2.67041* *	*0.32914*		*-3.45847* **	*0.40836*	
Loans to assets ratio	-0.31477	-0.39148	-0.10085	-0.71804	-0.72579		-0.37097	-0.40773	
	-5.06150 **	*-12.14326* **	*-3.07973* **	*-5.23362* **	*-13.31029* **		*-0.37097*	*-9.63502* **	
Equity capital	0.51345	0.39996	0.00496	1.08062	1.01142		0.47695	0.36822	
	10.33467 **	*6.58701* **	*0.07408*	*24.83745* **	*22.98413* **		*11.10427* **	*9.41245* **	
Non-performing to total loans	-2.42982	-3.20982	-1.25932	7.26913	3.07164		-3.14793	-3.22643	
	-7.56506 **	*-5.94378* **	*-2.42946* *	*3.18416* **	*3.35591* **		*-7.37425* **	*-26.14331* **	
Time	0.01124	0.01191		0.01358	0.01200		0.01108	0.01288	
	6.13709 **	*11.07916* **		*3.20252* **	*6.48602* **		*5.22306* **	*6.26862* **	
Time^2	-0.00168	-0.00163		-0.00212	-0.00172		-0.00155	-0.00170	
	-5.19112 **	*-11.25188* **		*-4.18857* **	*-5.94841* **		*-4.35854* **	*-8.25904* **	
Weighted statistics									
Adjusted R-squared	0.99942	0.99970	0.99740	0.99993	0.99959		0.99929	0.99982	
S.E. of regression	0.24161	0.20448	0.25914	0.12274	0.10257		0.25845	0.22212	
Durbin-Watson stat	2.14736	2.13030	2.04101	2.01128	2.09580		2.05734	2.07396	
H-statistic (1998)	0.57409	0.34721		0.79294	0.87757		0.49729	0.33082	
H-statistic (2003)	0.61708	0.40402		0.83787	0.92893		0.54736	0.39683	
Wald Test: F-statistic			0.02301						
(probability)			(0.8797)						
Chi-square			0.02301						
(probability)			(0.8794)						

Sources: Bankscope; and Fund staff estimates.
1/ In the case of the sample of large banks, the fixed effect hypothesis can be rejected.

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