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Ireland: Selected Issues and Statistical Appendix

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IRELAND

Selected Issues and Statistical Appendix

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Approved by European I Department

July 21, 1999

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I. Ireland and the Euro: Productivity Growth, Inflation, and the Real Exchange Rate[1]

A. Introduction

1. Ireland's growth performance for most of the decade has been exceptional. Annual GDP growth during 1991–97 has averaged over 6 percent, with the manufacturing sector growing in excess of 10 percent per year. Output growth in Ireland continues to exceed the European average by a wide margin.

2. If output continues to grow at anywhere near recent rates, some real appreciation of the exchange rate might be expected as higher productivity in the traded goods sector increases the demand for labor, pushing up wages and non-traded goods prices (the Balassa-Samuelson effect). In a currency union, this real appreciation would be reflected in higher inflation than elsewhere. Therefore, some wage and price inflation over and above the rest of the euro area might be justified as a market response to Ireland's rapid productivity growth.

3. If so, it would be useful to quantify the possible magnitude of this effect. With this in mind, this paper examines the recent productivity growth in Irish traded and non-traded goods, and provides some rough estimates of the sort of wage and inflation differentials which would be predicted by a Balassa-Samuelson framework under certain growth assumptions for the future. Of course factors other than the Balassa-Samuelson effect will influence wages and the prices, particularly in the short run.[2] For this reason, the intent of the paper is not to predict wages and prices, but rather to provide a framework for judging what sort of wage growth and inflation could be sustained over the medium term without leading to a loss of competitiveness.

4. In assessing the recent growth performance, the paper makes the important argument that measured productivity growth in Irish manufacturing in recent years is likely to overstate the actual productivity gains embodied in Irish factors of production. Most of the measured productivity growth is accounted for by sharply rising returns in a handful of sectors dominated by large foreign-owned export-oriented firms. Since these returns are mainly attributed to the intangible assets of multinationals rather than factors of production located in

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[1]Prepared by Brian Aitken.

[2] Given Ireland's position in the business cycle relative to the rest of the euro area, cyclical factors might be particularly important in explaining short run real exchange rate movements; if growth in Ireland slows and European growth picks up, some pressure toward real depreciation might at least partially offset any long-run Balassa-Samuelson effect. On the other hand, the Irish pound is widely regarded as having locked into the euro at a somewhat undervalued exchange rate, which would lead to pressure for a one-time real appreciation.

Ireland, they need not lead directly to wage pressures. Once these returns are taken into account, the scope for wage and inflation differentials appears to be fairly modest.

Inflation differentials in a currency union

5. There is some precedent for inflation differentials to persist in a currency union. In U.S. states, where casual observation suggests that both labor and capital is more mobile than within Europe, regional price differences can be fairly large and surprisingly persistent. Using a panel of price indexes in 15 U.S. cities from 1918 to 1995, Cecchetti, et al (1998) find that prices converge rather slowly—the half-life of convergence is estimated at approximately 9 years. Moreover, there is no evidence that the rate of convergence has increased recently. Consistent with this, annual inflation rates in the U.S. cities measured over 10 year intervals were found to differ by as much as 1½ percent.

6. Possible reasons for regional inflation differentials in the United States, in addition to the Balassa-Samuelson effect on non-traded goods prices, include segmented markets, sticky nominal price adjustment, and transportation costs between regions. Disentangling these effects is difficult. In their paper, Cecchetti, et al (1998) found that for each of four major cities the relative price of non-tradeables rose sharply over time, and that real exchange rates between cities fluctuated substantially, even though price divergence between cities for non-tradeable goods did not appear to be any more persistent than for tradeables. In contrast, Parsley and Wei (1995) found that for 51 specific products in 48 cities between 1975 and 1992 differences in non-traded prices were more persistent than for traded goods, with the half-life of price convergence of services nearly four years compared to one year for tradeables. On the whole, there is evidence that meaningful inflation differentials can arise even with a common currency and relatively high factor mobility, and that the Balassa-Samuelson effect may play a role in creating these differentials.

B. Productivity Growth, Inflation, and the Real Exchange Rate in a Balassa-Samuelson Framework

7. The Balassa-Samuelson framework has become the benchmark model for long-run real exchange rate determination.[3] In this model, productivity growth in the traded goods sector raises the demand for labor, pushing up wages in all sectors. Slower productivity growth for non-traded goods requires an increase in their relative price to maintain equilibrium in the

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[3]See Froot and Rogoff (1995) for a discussion of the Balassa-Samuelson effect, as well as the empirical success of the long run relationship between productivity differentials and the real exchange rate. For a more recent empirical treatment, see Canzoneri et al (1999). With regard to inflation, Alberola-Ila and Tyrväinen (1998) study the relationship between productivity differentials and the real exchange rate for 8 of 11 EMU countries, and infer the potential for inflation differentials in EMU. They argue that for several EMU countries inflation differentials of around one percent could be expected.

labor market. Real appreciation, then, will occur if productivity growth in the traded goods sector is faster than for non-traded goods.

8. How much the real exchange rate appreciates depends on how capital-labor ratios respond to productivity gains (Appendix I). If, as is useful for illustration, perfect capital mobility is assumed the real appreciation is given by:

$$\hat{p}^N = \frac{\theta^N}{\theta^T}\,\hat{a}^T - \hat{a}^N \qquad (1)$$

where $\hat{p}^N$ is the percent change in non-traded goods prices relative to traded goods (real appreciation), $\hat{a}^T$ and $\hat{a}^N$ are productivity growth rates for traded and non-traded goods, and θ^T and θ^N are the labor intensities of traded and non-traded goods production.[4] Consistent with this, wage growth in the economy will also reflect productivity growth:

$$\hat{w} = \frac{\hat{a}^T}{\theta^T} = \frac{\hat{p}^N + \hat{a}^N}{\theta^N} \qquad (2)$$

where $\hat{w}$ is the wage growth measured in traded goods.

9. It is a small step from real appreciation to deriving inflation differentials. Absent a nominal exchange rate instrument, as in a currency union, any real appreciation will take place through higher inflation. Therefore, the inflation differential will depend on a country's productivity growth in traded goods relative to non-traded goods compared with the same relative growth in the rest of the currency area. Provided the euro area is not so large as to significantly affect world traded goods prices, and again, assuming perfect capital mobility, the inflation differential will be given by:

$$\begin{aligned}\pi - \pi^* &= \gamma(\hat{p}^N - \hat{p}^{N*}) \\ &= \gamma\left(\frac{\theta^N}{\theta^T}\,\hat{a}^T - \hat{a}^N - \frac{\theta^{N*}}{\theta^{T*}}\,\hat{a}^{T*} + \hat{a}^{N*}\right) \qquad (3)\end{aligned}$$

where γ is the share of non-traded goods in the CPI, and the symbol * denotes the rest of the euro area.

10. It is important to highlight that in the Balassa-Samuelson framework, productivity growth brings about a real appreciation through its impact on the *marginal*, not the *average*,

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[4]If capital is perfectly mobile, real appreciation is determined entirely by supply side conditions. If capital is not perfectly mobile, as is likely to be the case in the short run, demand side conditions are often modeled. These are discussed in Froot and Rogoff (1995). Since the focus of this paper is on real exchange rate and inflation developments abstracting from the business cycle, demand side conditions are not highlighted. Nonetheless, in estimating plausible Balassa-Samuelson effects, the paper considers the case in which capital cannot be transferred instantly across sectors.

product of labor in the traded goods sector. Productivity growth which raises the average product but leaves the marginal product unchanged will not increase labor demand, and will not push up wages and non-traded goods prices. As will be made clear in the rest of the paper, this is particularly important for Ireland.

11. To illustrate this, consider a stylized example of measured productivity growth where output in the traded sector is determined by the following production function:

$$Y = aL$$

In this case measured productivity, equal to output per worker, will be the same as the marginal product of labor. Any increase in output per worker reflects an increase in marginal product and will, by raising the demand for labor, push up wages and non-traded goods prices.

12. Now suppose that a foreign-owned firm begins producing in Ireland with the production function:

$$Y = bL$$

where $b>a$. Total output will now be determined by:

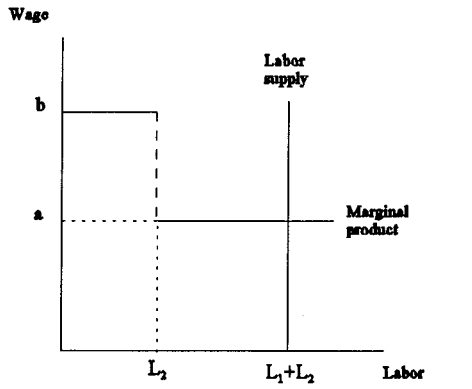
$$Y = aL_1 + bL_2$$

Measured productivity will be a weighted average of productivity in the two sectors:

$$\frac{Y}{L} = \alpha\, a + (1-\alpha)\, b$$

where α is the share of labor in Irish-owned firms. It is clear that the entry of the foreign firm has increased measured productivity, but the marginal productivity of the Irish worker remains unchanged at a (Figure 1). In this case the higher measured productivity in the traded goods sector following foreign entry will have no impact on wages and non-traded goods prices, and there will be no Balassa-Samuelson effect. Although this is clearly an extreme example, it nonetheless illustrates that in certain circumstances measured productivity growth can overstate the potential for real exchange rate appreciation.

Figure 1. Labor Market Equilibrium



C. Traded and Non-traded Productivity in Ireland

Understanding the recent performance of Irish manufacturing

13. A quick look at the performance of the Irish manufacturing sector shows why this might be a concern. The manufacturing sector has been the engine of Irish GDP growth throughout the 1990's. According to data from the Census of Industrial Production, net output per worker in manufacturing grew by an average annual rate of 9.3 percent in real terms during 1991–96 (Figure 2).[5] However, the growth in manufacturing has been overwhelmingly concentrated in just a few sectors. Over 80 percent of the growth in output per worker during 1991–96 is accounted for by five sectors which combined employed only 8 percent of the manufacturing labor force in 1991 (Table 1).[6] For all other manufacturing sectors, output per worker grew by an average of 4 percent.

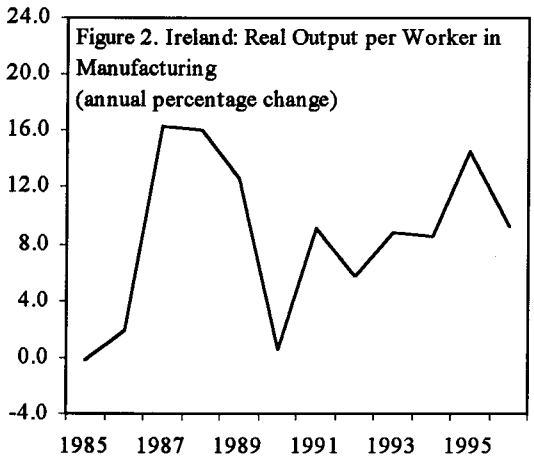


Figure 2. Ireland: Real Output per Worker in Manufacturing
(annual percentage change)

[5]Output figures discussed in this section are taken from the Census of Industrial Local Units, and represent net output, or value-added, which is defined as gross output less materials, industrial services, and fuel and power. Mining, which represents a small fraction of industrial output, is included in order to make the data comparable to OECD data for euro area countries analyzed later in the paper. The nominal output figures are deflated using the value-added deflator for manufacturing provided by the Economic and Social Research Institute (ESRI), since sectoral deflators were not available for the new industrial classification.

[6] These sectors are "homogenized food preparations" and "other food products" (1588, 1589) including cola concentrates, "reproduction of recorded media" (223) including software, "other organic basic chemicals" (2414) representing mainly pharmaceutical inputs, "pharmaceutical preparations" (2442), and "office machinery and computers" (30). See Conroy, et al (1998).

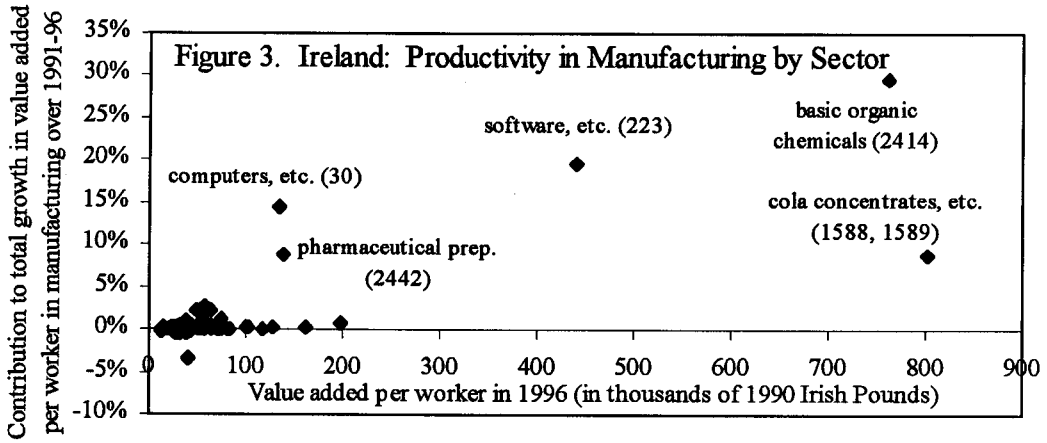
Table 1. Productivity and Wage Growth in Manufacturing

	Output per worker 1/	Real wages 1/	Share of labor in 1991
Actual growth between 1991 and 1996:			
Percent change for all industries 2/	9.3	3	...
Key sectors	8.2	1	...
Excluding key sectors	4.1	3	...
Contribution to growth by sector:			
All sectors	100	100	100
Key sectors	81	47	8
Other basic organic chemicals (2414)	30	7	1
Software, etc. (223)	20	11	1
Computers, etc. (30)	14	19	4
Cola concentrates, etc. (1588, 1589)	9	2	1
Pharmaceutical preparations (2442)	9	9	1
Other sectors	19	53	92

Sources: Census of Industrial Production, Economic and Social Research Institute, and staff estimates
1/ Deflated by the value-added deflator for manufacturing.

2/ Growth in output per worker in all sectors is greater than for the key and non-key sectors due to shifts in output from low-growth to high-growth sectors.

14. Not only do the key sectors account for most of the growth, but all show very high levels of output per worker which set them off from the rest of the manufacturing industry. For example, output per worker for the subsector of food production which includes cola concentrates was almost IRE £800,000 in 1996 (Figure 3).



15. Importantly, only a small fraction of this output goes to pay wages; wages as a share of net output for the key sectors averaged only 8 percent, compared to 35 percent for all other manufacturing sectors. Indeed, even with very strong growth in output per worker, real wages in the key sectors grew by only 1 percent per year during 1991–96, compared with about 3 percent in all other manufacturing sectors.

16. The unusually high returns in the key sectors are not surprising if understood in the context of the global operations of large multinationals which dominate these sectors. Typically, the multinational would have invested a large amount of resources globally in research, product development, and advertising, and would choose the location of its producing subsidiaries based on a number of considerations including, importantly, the tax regime in the host country. If the parent company's global development expenses are large, high output per worker in its subsidiaries would be required to generate a return to investment on its intangible assets.

17. Something like this explains the output performance in the key sectors in Ireland. The degree of foreign ownership in these sectors is very high: in 1996, 95 percent of the value-added produced in the key sectors was produced by foreign-owned enterprises, compared with 54 percent for all other manufacturing sectors. A large majority of these enterprises' output is exported. The cola industry, for example, is dominated in Ireland by Coca Cola and Pepsi. The global R&D and advertising expenditures of these companies would be large, and the profitability of the subsidiary operations in Ireland would need to be high to generate a return on investments at headquarters. Understood in this context, it is no surprise that the measured output per worker in the cola concentrates industry is unusually high, and that only a small portion of this output is passed on in the form of wage payments.

18. The important implication is that the very high measured output per worker in Ireland's key sectors is likely to overstate the marginal productivity embodied in capital and labor physically located in Ireland. Rather than reflecting the inherent productivity of Irish labor, the high output per worker in the key sectors at least partly reflects the intangible assets of multinationals. While there is some evidence that over time foreign investment has permanently raised the productivity of Irish workers as knowhow is accumulated and ideas and practices spill over into Irish industry (O'Malley, 1998), the measured productivity of workers in the key sectors would almost certainly return to more typical levels if these foreign companies located elsewhere. If this is the case, then Ireland's recent productivity growth is unlikely to result in wage pressures in the same magnitude, and will overstate the scope for Balassa-Samuelson effects.

Estimating productivity growth in Irish manufacturing

19. To get a better measure of the sort of productivity growth that would lead to a Balassa-Samuelson effect, it would be necessary to strip out that part of measured output which represents a return to intangible assets of multinationals, with the remaining output

attributed to its factors of production–capital and labor–and productivity. Measured in this way, productivity would be more likely to reflect changes in the marginal product of Irish labor. By comparing this adjusted productivity growth for traded and non-traded goods with growth rates in euro area economies, a rough estimate of the possible Balassa-Samuelson effects can be derived.

20. Unfortunately, there is no direct way to isolate returns to the intangible assets of multinationals. In principle, data on repatriated earnings, royalties, and other payments of subsidiaries to parent companies could be used, but these are only available in aggregate based on balance of payments data.[7] One way to overcome this data shortcoming is to recognize that the key sectors are exceptional with respect to output per worker, and to subtract that portion of net output after payment of wages and salaries (hereafter referred to as "returns") which is above a certain chosen threshold. The choice of the threshold would be guided by some observed "norm" for the manufacturing industry. This is in essence the approach taken by Conroy et al (1998), who conclude that for many of the key sectors returns were unusually large both with respect to the estimated capital stock and in comparison with similar sectors in EU countries; these excess returns, they argue, reflect the use of technological, scientific or market knowledge, brands, and other elements contributing to market power. While choosing a threshold based on a norm is somewhat arbitrary, the approach is nevertheless sensible once it is recognized that the key sectors in Ireland are indeed outliers because of their access to intangible assets.

21. By all accounts, measured returns in the key sectors have greatly exceeded average returns for all other sectors; during 1991–96, returns as a share of value-added in the key sectors have averaged over 85 percent, compared with 54 percent for all other sectors (Figure 4).[8] Returns in have been particularly high for cola concentrates (95 percent), software (92 percent), and basic organic chemicals (89 percent). The distribution of returns across sectors is somewhat skewed: in 1991, over 75 percent of all sectors had returns which fell below a threshold of 53 percent.

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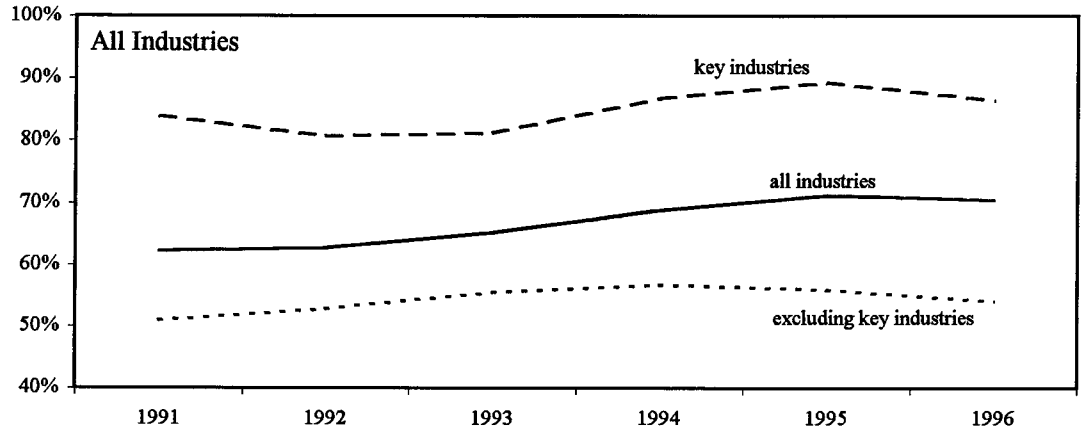
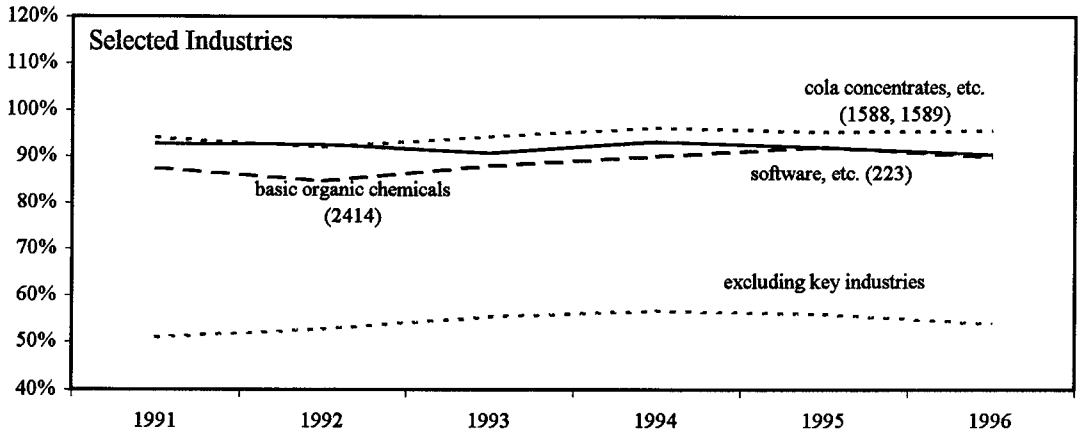
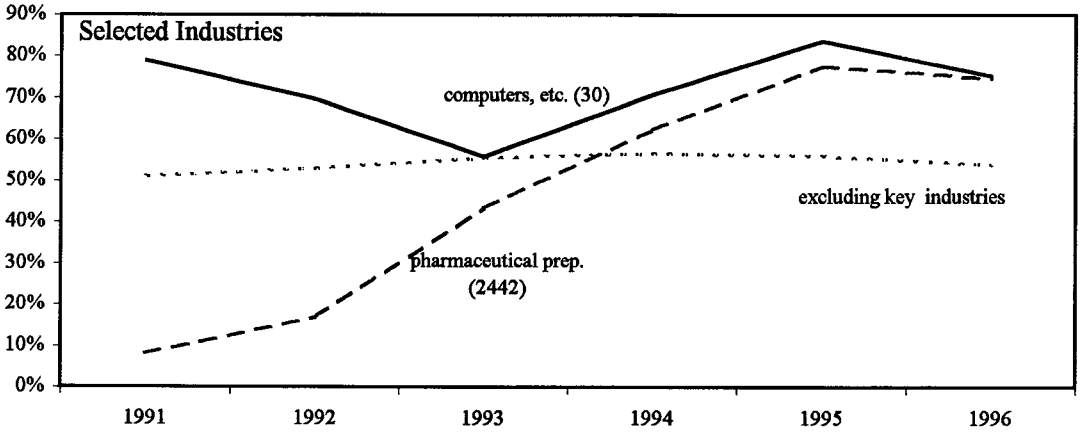
[7] In the balance of payments, factor payments associated with the activities of multinationals are large, and account for much of the substantial difference between GDP and GNP levels as well as growth rates. See Chapter II, *Potential Output Growth in Ireland.*

[8] Here, "returns" are defined as value-added less wages and salaries less investment in physical capital. The investment component is intended to proxy for outlays necessary to offset depreciation of existing capital. Since this component is generally small, it makes little difference if it is excluded. As an alternative to returns as a share of value-added, returns could be measured as a share of the capital stock. Although these two measures turn out to be strongly correlated, the capital stock is a constructed series (discussed in more detail below) rather than a reported value. As such, it is much less reliable at the sectoral level than value-added. For this reason, the norm is determined with respect to returns as a share of value-added.

Figure 4. Ireland: Total Returns as a Share of Value Added 1/







Source: Census of Industrial Production; and Economic and Social Research Institute.

1/ Total returns are defined as value-added less wages and salaries less investment in physical capital.

22. Since little of the growth in output per worker in the key sectors was paid out as wages, it is no surprise that removing excess returns from total output has a profound affect on estimates of total factor productivity growth in manufacturing (see Appendix II for a full description of the estimation approach). On an unadjusted basis, measured productivity is estimated to have grown at an average annual rate of 6.8 percent during 1991–96 compared with 9.5 percent in the key sectors and 2.8 percent in all other sectors (Figure 5 and Table 2). However, when returns above the threshold of 53 percent of value-added are removed the adjusted productivity growth is estimated at only 3.9 percent.[9] Although the adjusted growth rate is sensitive to the threshold chosen, for all reasonable thresholds productivity growth is sharply lower when the unusually high returns in the key sectors are taken into account.

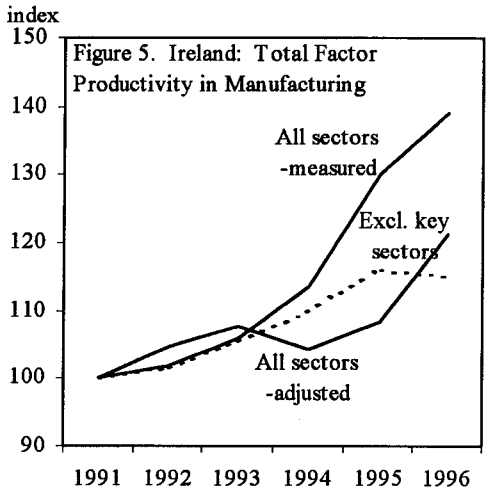


Table 2. Estimated Total Factor Productivity in Manufacturing.
(average annual percentage change, 1991–96)

All sectors	6.8
Key sectors	9.5
Non-key sectors	2.8
All sectors–adjusted 1/	
Threshold = 47 percent	3.7
Threshold = 53 percent	3.9
Threshold = 69 percent	4.8

Sources: Census of Industrial Production, ESRI, and staff estimates.
1/ Value-added is adjusted by subtracting excess returns above the specified threshold. See Appendix II.

Traded and non-traded productivity in Ireland and the euro area

23. As the largest traded industry, lower estimated productivity growth in manufacturing should reduce measures of productivity growth for traded goods as a whole, and thus the

[9]Adjusted Total factor productivity was measured using three different threshold levels: (i) 47 percent below which half of all sectors had returns as a share of value-added in 1991; (ii) 53 percent below which three quarters of all sectors had returns; and (iii) 69 percent below which 90 percent of all sectors had returns.

magnitude of the expected Balassa-Samuelson effect. Supplementing the productivity growth in manufacturing (estimated using the 53 percent threshold) with national accounts data for other sectors of the economy, productivity in the traded goods sector during 1991–96 grew by an estimated 3.5 percent compared with a measured growth rate of 6.1 percent (Table 3 and Figure 6).[10] This compares with annual productivity growth of 0.9 percent for non-traded goods. Since the productivity growth rates are determined over a period when output was both cyclically high (1994–96) and low (1991–93), they are more likely to reflect trends abstracting from the business cycle.

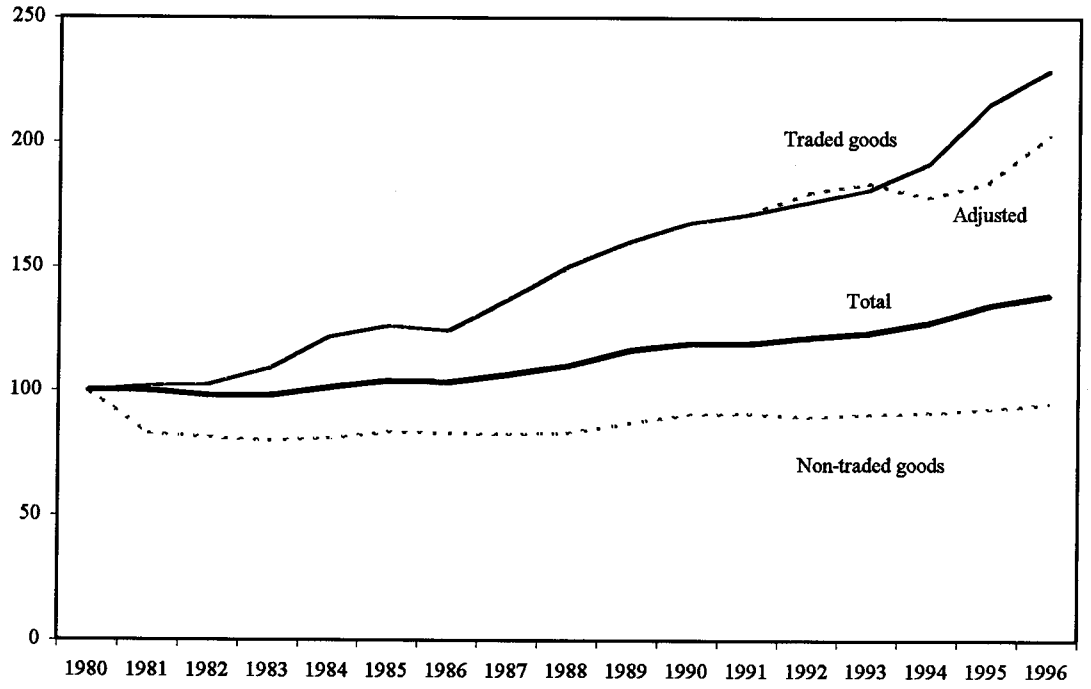
Table 3. Ireland: Total Factor Productivity by Sector
(Annual growth rate in percent)

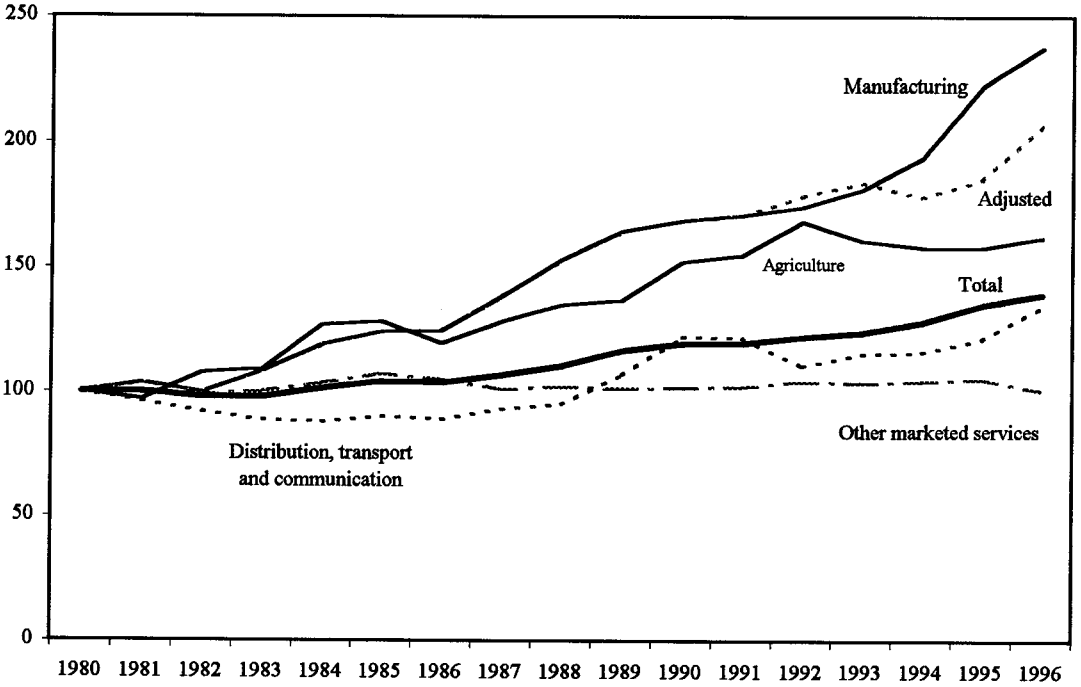
	Share in GDP 1980-96	Total factor productivity growth		
		1980-96	1991-96	
			Measured	Adjusted
Total	100	2.1	3.1	2.0
Traded goods	32	5.3	6.1	3.5
Agriculture, forestry and fishing	8	3.1	0.9	0.9
Manufacturing (incl. Mining)	24	5.5	6.8	3.9
Non-traded goods	68	-0.3	0.9	0.9
Utilities	2	2.3	4.1	4.1
Building and construction	5	3.2	5.1	5.1
Distribution, transport and communication	16	1.9	2.0	2.0
Other marketed services	23	0.0	-0.4	-0.4
Non-marketed services 1/	22	-0.2	-0.6	-0.6

Source: Economic and Social Research Institute, Census of Industrial Production, and staff estimates.
1/ Includes adjustments for financial services, and taxes on expenditure minus subsidies.

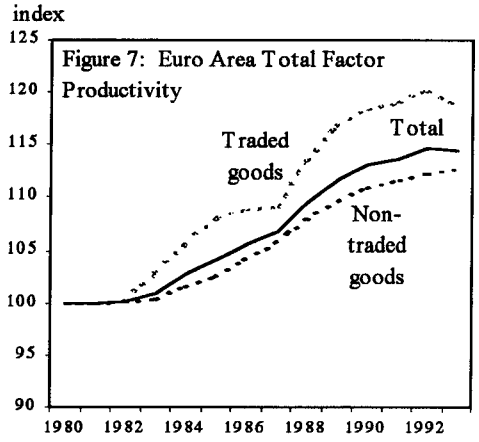
[10]Total factor productivity growth for each sector (other than for manufacturing) was estimated using the residual of an accounting decomposition of output growth based on changes in inputs, (the Solow residual) where the labor intensity for each sector was assumed to equal the average over the period considered of wages and salaries as a share of total output. National accounts data in constant prices and estimates of capital stock by sector are provided by ESRI. Traded goods are defined as manufacturing, mining, agriculture, forestry, and fishing, representing about one third of total output (Table 3). While part of distribution, transport and communications might also be included in the definition of traded goods (see De Gregorio and Wolf, 1994), data restrictions did not allow this sector to be split into traded and non-traded components in the case of Ireland. Given the relatively small size of this sector, this is unlikely to affect the results meaningfully.

Figure 6. Ireland: Total Factor Productivity by Sector, 1980-96
(Index 1980=100)





Source: Economic and Social Research Institute; Census of Industrial Production; and staff estimates.



24. The inflation differential will depend on how these growth rates compare with those in the euro area. Even adjusting for returns to intangible assets abroad, productivity growth for traded goods in Ireland appears to have been significantly above euro area rates in the 1980s and early 1990s. Although data for all euro area countries are not available, comparisons can be made for a subset of euro area countries (including Germany, France, Italy, Belgium, and Finland) during the period 1980–93. Based on a weighted average of OECD country estimates of total factor productivity by sector, annual growth in the traded goods sector for the whole period averaged only 1.3 percent for the euro area countries considered, or 2.0 percent for the faster growth period 1987–92 (Table 4, and Figure 7).[11] By comparison, non-traded growth averaged 0.9 percent for the period 1980–93, and 1.2 percent during 1987–92.

Table 4. Euro Area: Total Factor Productivity by Sector 1/
(Annual growth rate in percent)

	Share in GDP 1980-93	Total Factor Productivity Growth	
		1980-93	1987-92
Total	100	1.0	1.4
Traded goods	28	1.3	2.0
Agriculture	3	3.2	4.7
Mining	0	-1.1	2.2
Manufacturing	25	1.2	1.6
Non-traded goods	72	0.9	1.2
Electricity, gas, and water	3	-0.6	0.9
Construction	6	0.3	1.2
Wholesale and retail trade	6	0.0	0.7
Transport, storage, and communication	14	2.1	3.5
Finance, insurance, RE, and business services	13	0.4	-0.8
Community, social, and personal services	13	0.0	0.4
Government services and other	18	0.0	0.0

Source: OECD and staff estimates.
1/ Includes data for Germany, France, Italy, Belgium, and Finland.

[11]Data are from the OECD International Sectoral Database. Euro area-wide estimates of productivity growth are constructed by aggregating for each sector OECD total factor productivity estimates for all countries, weighted by each country's PPP-based U.S. dollar output for the sector.

D. Estimating inflation differentials in a Balassa-Samuelson framework

25. What do these growth rates, were they to continue, suggest about Irish wage growth and inflation which could be expected in a common currency area? It is worthwhile first to consider the inflation differential assuming perfect capital mobility, and then later to examine the effects if, as is more plausible in the near term, capital adjusts gradually.

26. Table 5 shows four variables for Ireland predicted by the Balassa-Samuelson framework—the inflation differential, the inflation rate, nominal wage growth, and real appreciation of the exchange rate—under various scenarios based on the framework derived in Appendix I.[12] As expected, once excess returns in Irish manufacturing are accounted for the inflation differential predicted by the Balassa-Samuelson framework falls substantially; adjusted growth in Irish tradeables gives rise to an inflation differential of 1¼ percent, compared to a differential of almost 3 percent if actual measured growth is used. Predicted nominal wage growth is much higher; even after adjusting for excess returns, wage growth of some 8 percent would be predicted if capital is assumed to adjust fully and instantaneously. However, this assumption is clearly inappropriate, as it implies an annual growth rate in the capital-labor ratio for traded goods (7½ percent) which is implausibly high, and well in excess of the actual rate of 1¾ percent during 1991–96.

27. Since immediate and full adjustment of the capital stock is not particularly likely in the near term, it is worth considering the predictions of Balassa-Samuelson under alternative assumptions about capital and labor growth. This is particularly important for wage growth, since rapid capital accumulation would imply a higher marginal product of labor, whereas gradual adjustment of the capital stock would dampen the growth in wages.

28. Besides perfect capital mobility, two scenarios for capital-labor ratio growth in Ireland are considered. In both scenarios, growth in the capital stock is assumed to continue at the same relatively rapid rate as during the period 1993–96, about 2½ percent per year. In the first scenario, labor supply is assumed to grow at the relatively rapid rate of about 2½ per year. In the second case, more moderate labor supply growth of about 1½ percent is assumed.[13] In both scenarios, euro area capital-labor ratio growth is assumed to continue at its historical rate.

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[12]The calculations for nominal wage growth and inflation are based on a euro area inflation rate of 1 percent. As discussed in Appendix I, the precise inflation differential which would be predicted depends on the extent to which traded goods productivity growth in the euro area affects world prices for tradeables. The calculations in Table 5 take as a baseline the case that the euro area growth does not significantly affect world prices. Relaxing this assumption is not likely to fundamentally alter the results.

[13]These two scenarios are consistent with the "baseline" and the "less optimistic" growth scenarios considered in Chapter II–*Potential Output Growth in Ireland.*

29. It is clear from Table 5 that different assumptions on capital and labor growth do not have much effect on the inflation differential; in all cases, inflation is predicted at just over 1 percent higher than in the euro area. Assuming a euro area inflation rate of about 1 percent, this suggests that Ireland could sustain price inflation rates of about 2 percent over the medium term. Predicted wage growth, however, is substantially lower than in the case of perfect capital mobility. Under more plausible assumptions on the capital-labor ratio, wage growth of some 5 to 5¼ percent per year could be sustained over the medium term.

30. Finally, it is worth noting that the wage and inflation growth predicted by the Balassa-Samuelson framework is relatively insensitive to different assumptions about euro area growth. Although these results are not shown, if euro area productivity growth were to continue at about 1 percent per year rather than 1½ percent assumed in Table 5, both the predicted inflation differential and predicted wage growth would rise by about 0.1 percent per year for each of the scenarios considered.

Table 5. Ireland: Inflation, Wage Growth, and Real Exchange Rate Forecasts in a Balassa-Samuelson Framework

(Annual percentage change)

	Perfect capital mobility		Imperfect capital mobility 1/	
	Measured productivity growth	Adjusted productivity growth	Rapid labor supply growth 2/	Slower labor supply growth 3/
Inflation differential	2.9	1.4	1.1	1.1
Inflation rate 4/	3.9	2.4	2.1	2.1
Nominal wage growth 4/	13.9	8.4	5.1	5.3
Real appreciation	7.0	3.7	4.1	3.9
Parameters				
Total factor productivity growth:				
Ireland				
traded goods	6.1	3.5	3.5	3.5
non-traded goods	0.9	0.9	0.9	0.9
Euro area				
traded goods	2.0	2.0	2.0	2.0
non-traded goods	1.2	1.2	1.2	1.2
Labor intensity:				
Ireland				
traded goods	46.4	46.4	46.4	46.4
non-traded goods	61.0	61.0	61.0	61.0
Euro area				
traded goods	60.2	60.2	60.2	60.2
non-traded goods	49.5	49.5	49.5	49.5
Growth in capital labor ratio:				
Ireland				
traded goods	13.1 6/	7.6 6/	2.2	2.7
non-traded goods	1.5 6/	1.5 6/	-0.8	0.4
Euro area				
traded goods	3.3 6/	3.3 6/	3.7	3.7
non-traded goods	2.5 6/	2.5 6/	1.6	1.6
Share of tradables in CPI	57.0	57.0	57.0	57.0
Memorandum items:				
Implied traded goods inflation	0.8	0.8	0.4	0.4
Euro area inflation target	1.0	1.0	1.0	1.0
Euro area real appreciation 5/	0.4	0.4	1.4	1.4

Source: ESRI, Census of Industrial Production, Central Statistical Office, and Staff estimates.

1/ Assumes the aggregate capital stock grows at the rate of 2 1/2 percent per year.

2/ Assumes total labor supply grows at the rate of 2 1/2 percent per year.

3/ Assumes total labor supply grows at the rate of 1 1/2 percent per year.

4/ Based on an assumed euro area inflation rate of 1 percent per year.

5/ Defined as the percentage change in the price of non-traded goods relative to traded goods

6/ In the case of perfect capital mobility, the capital labor ratio is endogenously determined.

A Balassa-Samuelson Framework for Determining Inflation Differentials

31. This section derives the Balassa-Samuelson relationship between productivity and the real exchange rate, and extends this relationship to determine inflation differentials.

The real exchange rate and wages

32. Start with a small open economy producing traded and non-traded goods according to:

$$Y^T = A^T(L^T)^{\theta^T}(K^T)^{1-\theta^T} \qquad (8)$$

$$Y^N = A^N(L^N)^{\theta^N}(K^N)^{1-\theta^N} \qquad (9)$$

where output (Y) in each sector is a function of labor (L), capital (K), and productivity (A).[14]

33. For a given distribution of capital, equilibrium in the labor market will be reached when the wage rate equals the value of the marginal product of labor in each sector:

$$W = \theta^T A^T(K^T/L^T)^{1-\theta^T} \qquad (10)$$

$$W = P^N\,\theta^N A^N(K^N/L^N)^{1-\theta^N} \qquad (11)$$

where W is the wage measured in traded goods and P^N is the relative price of non-traded goods. Equations 10 and 11 jointly determine the relative price of non-tradeables (the real exchange rate) as a function of the capital labor ratio. Log-differentiating both equations and solving for the percentage change in the relative price of non-tradeables gives:

$$\hat{p}^N = \hat{a}^T - \hat{a}^N + (1-\theta^T)\hat{k}^T - (1-\theta^N)\hat{k}^N \qquad (12)$$

That is, the real exchange rate will appreciate with higher productivity growth in tradeables relative to non-tradeables, and with faster capital-labor accumulation in the tradeable sector (accounting for relative labor intensities). The wage growth consistent with equations 10 and 11 is given by:

$$\begin{aligned}\hat{w} &= \hat{a}^T + (1-\theta^T)\hat{k}^T \\ &= + \hat{p}^N + \hat{a}^N + (1-\theta^N)\hat{k}^N\end{aligned} \qquad (13)$$

34. The relationship between the real exchange rate and productivity growth can be simplified by endogenizing the capital-labor ratios. This is done by assuming that with perfect capital mobility the capital-labor ratios are those which equate the marginal product of capital to a world rate of return (R).

---

[14] The model in this section is based on Froot and Rogoff (1995).

$$R = (1-\theta^T)A^T(K^T/L^T)^{-\theta^T} \qquad (14)$$

$$R = P^N(1-\theta^N)A^N(K^N/L^N)^{-\theta^N} \qquad (15)$$

From equations 14 and 15, growth in the capital labor ratios will depend on productivity growth:

$$\hat{k}^T = \frac{\hat{a}^T}{\theta^T}, \qquad \hat{k}^N = \frac{\hat{p}^N + \hat{a}^N}{\theta^N} \qquad (16)$$

Substituting equation 16 into equations 12 and 13 gives:

$$\hat{p}^N = \frac{\theta^N}{\theta^T}\hat{a}^T - \hat{a}^N \qquad (17)$$

$$\hat{w} = \frac{\hat{a}^T}{\theta^T} = \frac{\hat{p}^N + \hat{a}^N}{\theta^N} \qquad (18)$$

The inflation differential

35. The price level in Ireland will reflect both traded and non-traded goods prices:

$$P = (P^N)^\gamma P^T \qquad (19)$$

where P is the price level in euros, P^T is the traded goods price in euros, and γ is the share of non-traded goods prices in the CPI. As before, P^N is the relative price of non-traded goods. From equation 19 inflation will be:

$$\pi = \gamma\hat{p}^N - \hat{p}^T \qquad (20)$$

Similarly, inflation in the rest of the euro area will be:

$$\pi^* = \gamma^*\hat{p}^{N*} - \hat{p}^{T*} \qquad (21)$$

Assuming equal shares of non-traded goods in consumption, and assuming weak purchasing power parity for traded goods ($\hat{p}^T = \hat{p}^{T*}$), the inflation differential will be a function of the relative real appreciation of the exchange rate:

$$\pi - \pi^* = \gamma(\hat{p}^N - \hat{p}^{N*}) \qquad (22)$$

In the case of perfect capital mobility, and assuming that the euro area is not so large as to significantly affect the world price of tradeables, this differential will reflect productivity differences as follows:

$$\pi - \pi^* = \gamma\left(\frac{\theta^N}{\theta^T}\hat{a}^T - \hat{a}^N - \frac{\theta^{N*}}{\theta^{T*}}\hat{a}^{T*} + \hat{a}^{N*}\right) \qquad (23)$$

Estimating Total Factor Productivity in Irish Manufacturing

The framework

36. This section describes the approach taken in estimating total factor productivity growth for Irish manufacturing industries during 1991–96.

37. A rough production function is estimated using data from 130 manufacturing sub-sectors (including mining) taken from the Census of Industrial Production for the years 1991–96. The production function takes the following form:

$$Y_{it} = A_{it} L_{it}^{\alpha} K_{it}^{\beta} \qquad (24)$$

where Y_{it} is the net output (value-added) of sector i at time t, L_{it} is total number of workers engaged, K_{it} is the capital stock, and A_{it} is total factor productivity. In terms of logs, this becomes:

$$y_{it} = a_{it} + \alpha l_{it} + \beta k_{it} \qquad (25)$$

38. The coefficients on capital and labor are estimated using OLS. To better estimate the effect of changes in capital and labor on output across sectors and over time, time- and sector-dependent dummy variables are introduced. The estimated production function is therefore:

$$y_{it} = C_{it} + \alpha l_{it} + \beta k_{it} + \delta_1 TIME_t + \delta_2 SECTOR_i + \epsilon_{it} \qquad (26)$$

where the sector dummy variables are defined at the 3-digit level using the NACE Rev 1 industrial classification system. Estimated total factor productivity is defined as:

$$\hat{a}_{it} \equiv y_{it} - \hat{\alpha} l_{it} - \hat{\beta} k_{it} \qquad (27)$$

The data

39. Output for each sector is taken to be the nominal net output from the Survey of Industrial Local Units (part of the Census of Industrial Production) deflated by the value-added deflator for manufacturing (provided by ESRI). Although ideally each sector would have its own value-added deflator, sectoral deflators at this level of disaggregation and corresponding to the NACE Rev 1 industrial classification were not available. When productivity is estimated on an "adjusted" basis, output corresponds to total output less returns above a chosen threshold level. Labor is defined as the total number of workers engaged by industrial units, including employees, proprietors, and unpaid family workers.

40. Since capital stock are not reported in the Census, the series used in the estimation was constructed from Census data on investment. Ideally, investment data from previous censuses would be used to calculate a capital stock variable at an assumed depreciation rate.

However, the system of industrial classification was changed in 1991, and no direct correspondence between pre- and post-1991 classification can be made using data aggregated to the 4-digit level.[15] To overcome this, a proxy for the capital stock in 1990 was constructed using data on the total capital stock in that year for all manufacturing sectors, distributed among sectors in proportion to the sum of each sector's investment during 1991–96. While the distribution of the capital stock in 1990 is surely correlated with subsequent investment, using a proxy instead of the actual series will introduce noise into the estimation. Part of this noise will be corrected by including the sector-specific dummy variables, but the remaining noise could lead to an underestimation of total factor productivity in a sector if unusually large capital outlays were made in that sector prior to 1991. The capital stock for the years 1991 was constructed by adding investment (net additions to capital assets), deflated by an investment deflator for manufacturing provided by ESRI, and assuming a depreciation rate of seven percent.

Estimated total factor productivity

41. Results for estimated equation 26 are shown in Table A1. The fit is good, with the combined coefficients on capital and labor implying slightly higher than constant returns to scale. Total factor productivity estimates for each sector are weighted by the sector's inputs and summed to calculate total factor productivity for manufacturing as a whole. Based on this, average annual total factor productivity growth is also shown in Table A1.

42. When using measured output, total factor productivity grew at an average annual rate of 6.8 percent compared with 9.5 percent for the key sectors and 2.8 percent for all other sectors. Adjusted total factor productivity is estimated by subtracting from value-added the portion of returns as a share of value-added above a chosen threshold, where returns are defined as value-added less wages and salaries less investment in physical capital. Three different threshold levels were considered: (i) 47 percent below which half of all sectors had returns as a share of value-added in 1991; (ii) 53 percent below which three quarters of all sectors had returns; and (iii) 69 percent below which 90 percent of all sectors had returns. When the threshold of 53 percent is applied, the estimated productivity growth falls to 3.9 percent. As is clear in Table A1, this growth rate is sensitive to the threshold chosen.

[15]A correspondence between the two classification systems exists, but mapping the two systems directly requires much more desegregated data than are reported in the Census.

Table A1. Ireland: Estimated Total Factor Productivity in Manufacturing, 1991-96

	Total factor productivity growth (annual percentage change, 1991-96)	Production function estimates:				
		Constant	Coefficient on labor	Coefficient on capital	R-sq.	Number of obs.
Key sectors	9.5	0.21	0.72	0.51	0.94	30
		(0.0)	(2.8)	(0.6)		
Non-key sectors	2.8	2.10	0.79	0.28	0.96	749
		(11.4)	(22.2)	(9.4)		
All sectors	6.8	0.72	0.54	0.57	0.95	779
		(3.1)	(12.0)	(15.8)		
All sectors--adjusted						
Threshold = 47 percent	3.7	2.10	0.81	0.27	0.98	779
		(12.3)	(33.7)	(13.8)		
Threshold = 53 percent	3.9	2.00	0.80	0.29	0.98	779
		(15.2)	(30.8)	(13.9)		
Threshold = 69 percent	4.8	1.69	0.73	0.36	0.97	779
		(10.1)	(32.0)	(13.8)		

Source: Census of Industrial Production, ESRI, and Staff estimates.

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II. POTENTIAL OUTPUT GROWTH IN IRELAND[16]

A. Introduction

1. Since the beginning of the 1990s Ireland's GDP has grown by a cumulative 62½ percent in real terms; the increase in GNP was about 55 percent over the same period. This growth has been achieved by sizable foreign direct investment flows (FDI), and a rapidly growing labor force, and has been supported by strong productivity growth. The unpredictable nature of foreign direct investment and the highly elastic labor supply make it extremely difficult to estimate, with a reasonable degree of accuracy, the potential output level in Ireland. Potential output can be thought of as "the maximum production without inflationary pressure—or more precisely—the point of balance between more output and greater stability" (Okun, 1970, pp.132–33).

2. Given that monetary policy is decided at the euro-area level and the size, or the sign for that matter, of the Irish output gap will make little difference in the decision of the ECB to relax or tighten monetary policy it could be argued that information about the output gap may be irrelevant. However, there are at least two basic reasons why it may be important to obtain accurate estimates of potential output for the Irish economy. First, reliable information about potential output growth makes it possible to obtain better forecasts about the growth prospects in the medium term. Second, it allows policymakers to gauge the stance of fiscal policy.

3. The main focus of this paper is, therefore, to estimate the potential output for Ireland. A number of different measures of the output gap are compared but the preferred method is the production function approach that decomposes the potential into changes in the capital stock, labor, and productivity. A second objective is to evaluate the prospects for the medium term. The discussion is motivated by reference to the neoclassical growth model, which predicts that economies with lower capital per person tend to grow faster in per capita terms. In other words, it suggests that there will be convergence across economies. A corollary of this hypothesis is that growth will slow down in the medium term and that the potential of the Irish economy to carry on growing rapidly without significant wage and price inflation may diminish.

B. Comparing Different Estimates of Potential Output

4. A number of recent papers have reviewed extensively the different methods for estimating potential output, for example, Adams and Coe (1990), Bayoumi (1999), Canova

[16] Prepared by Zenon Kontolemis.

(1998), European Commission (1999), Kenny (1996), Magnier (1996), and references therein. Most of these approaches are based on purely statistical techniques, while few others rely mostly on economic theory; consequently, the results from these different methods vary considerably although most yield identical sign for the output gap.

5. Three methods are used in this study; the HP filter, the production function approach and finally an unobserved component model. The estimation of the output gap using the latter two approaches are discussed in Section C and D. The most commonly used statistical method, the HP filter, optimally extracts a smooth, stochastic trend from the data that is uncorrelated with the cyclical component. The parameter λ determines how smooth the trend component is relative to the actual series. The essence of the production function approach is an explicit modeling of output in terms of underlying factor inputs. Thus it involves the modeling of a production function that links output to factor inputs and the determination of the levels of inputs. Finally, the unobserved component model uses observed times series, such as GDP and inflation, to draw conclusions about the unobserved potential output (Kuttner, 1994).

6. A number of different estimates of the output gap for Ireland are shown in Table 1. The output gaps (as a percent of potential) for three episodes during the 1990s are shown in Table 1: the peak of 1990, the following trough in 1993, and the most recent boom in 1998 (which is not yet considered a turning point).

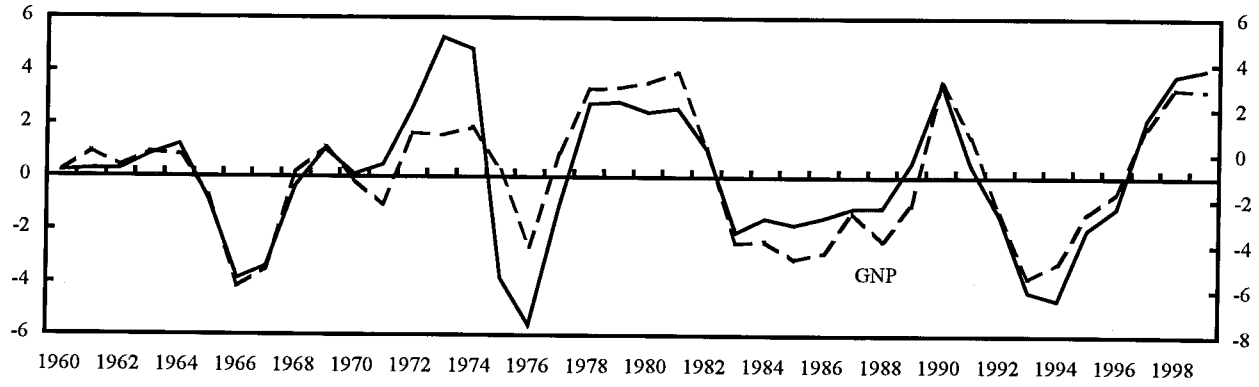
7. The top two rows show the growth rates of GDP and GNP. Given the large difference between GDP and GNP in Ireland, we provide estimates of potential output based on both series; the top panel of Figure 1 compares the two output gap estimates. The substantial factor payments associated with the activities of the multinationals create a sizeable difference between GDP and GNP. For the reasons discussed in Chapter I, GNP may provide a better measure of value added accruing to Irish factors of production than GDP which includes large recorded returns of multinationals. As seen in Figure 1, the differences are considerable and are usually more pronounced during the peaks and troughs of each cycle.

8. The estimates obtained with the HP filter are based on a value of the parameter λ equal to 100. The table finally illustrates a range of estimates produced by the European Commission (1999). These reveal how the different methods produce considerably different results. In particular, the estimates obtained by the HP filter imply larger output gaps compared with the production function approach and the unobserved component model.

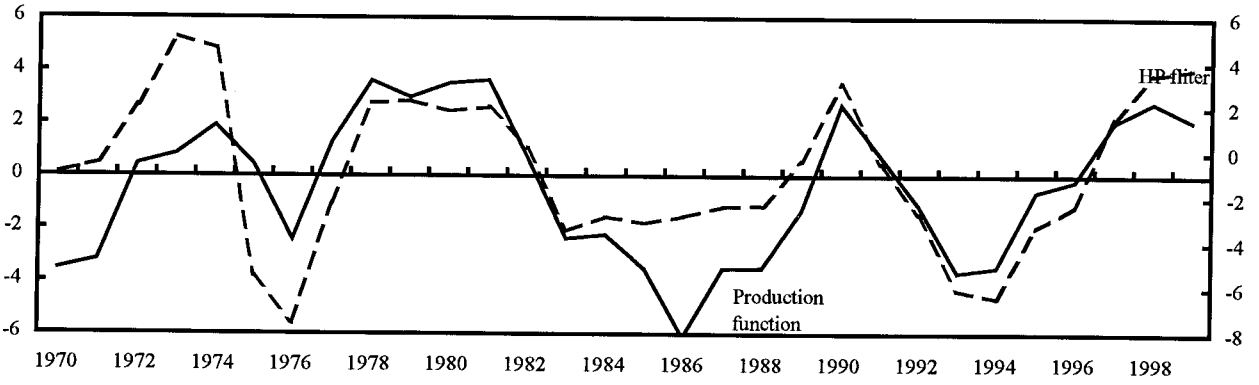
9. The middle panel of Figure 1 compares the output gaps obtained by the HP filter and the production function approach. As a result of the rapid growth in labor supply and investment in recent years (especially in 1998), the production function approach traces better the growth in potential and is not affected, to the same extent as the HP filter, by the most recent observation. The production function approach tells us what we expect to find out: given that many more workers entered the labor market recently, the economy's potential must have increased considerably. That simply means that the economy can sustain

Figure 1. Ireland: Output Gaps

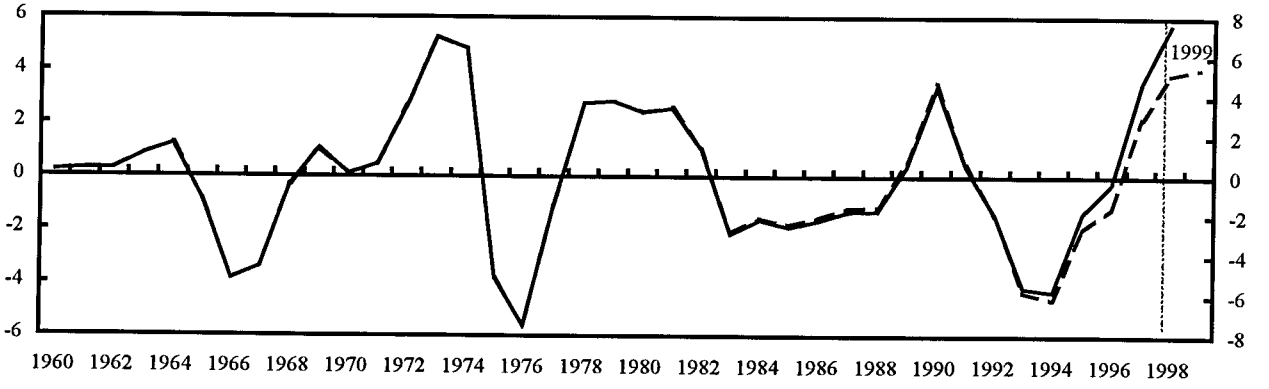
GDP and GNP compared (HP filter, lamda=100)



Comparing the HP filter with Production Function (GDP)



The End-Sample Problem



Source: Staff Estimates

a higher growth rate without the cost of extra inflation. The results from the production function approach are discussed in the next section.

Table 1. Ireland: Output Gap Estimates
(Percent of potential)

	1990 (peak)	1993 (trough)	1998 (current)
GDP growth (%)	+7.7	+2.6	+8.9
GNP growth (%)	+9.0	+2.6	+8.0
HP filter – GDP	+3.5	-4.3	+3.8
HP filter – GNP	+3.5	-3.8	+3.3
Prod. function- GDP	+2.7	-3.7	+2.8
Prod. function- GNP	+4.4	-3.5	+1.0
Unobserved co.	+3.3	-2.9	+2.7
Commission's comparison	+1.6/+4.2	-5.1/-5.9	+2.0/+4.0

10. One serious shortcoming of the HP filter is the sensitivity of the derived trend to the end-point. This is illustrated in the bottom panel of Figure 1. In view of the fact that output growth is projected to slow down considerably in 1999, using that year as an end-point results in a positive output gap of 3.8 percent of potential for 1998. This is compared with an output gap of 5.7 percent obtained by the HP filter with 1998 as the end-year. This of course illustrates the dilemma that the policymakers have to confront when making policy decisions in real time based on uncertain estimates of the output gap and potential output growth.

11. In these circumstances it is worthwhile to examine closely the sources of the variation in potential output using the production function approach. In contrast to the statistical smoothing methods, the production function approach provides estimates of potential output using a standard structural production-based approach which allows prior knowledge or expectations about the future evolution of the factors of production to be utilized: it also permits assessment of the respective contributions of the different factors of production and other influences to potential growth.

C. Supply-Side Estimates—Production Function Approach

12. The database used in Magnier (1996) and Samiei and Magnier (1998) was extended with recent data from the IMF and OECD. The total capital stock of the economy was estimated over the period 1970–98 from data on the volume of total gross fixed capital formation over the years 1960–98, assuming a capital-output ratio equal to 2 in 1960 and a

constant rate of real depreciation equal to 8 percent afterwards.[17] In the absence of an obvious, reliable candidate to represent capacity utilization, it was assumed that it is a function of the deviation of output from a "normal" level. A proxy for this variable is the deviation of actual output from its trend as measured earlier by the HP filter. More details about the estimation are available in Appendix I. Essentially potential output is computed as:

$$y_t^* = c + (1-\alpha)\, l_t^* + \alpha\, k_t + \beta\, ut^* + tfp$$

where k_t and l_t denote capital and labor respectively, ut* stands for the supposed "normal" degree of capital utilization and l* is calculated as:

$$l^* = (n\, l_{par}^*)(1 - U^*)h^*$$

with l^*_{par} and h* being estimates of the trend participation rate and of the average working hours, and U^* an estimate of the standard nonaccelerating wage rate of unemployment (NAIRU).

13. In order to estimate the total trend labor input l*, the participation rate and the number of hours worked have also been smoothed with the HP filter ($\lambda = 100$), and an estimate of U* has been obtained following the simple approach presented by Giorno et al (1995). This method essentially assumes that changes in wage inflation are proportional to the gaps between actual unemployment and the NAIRU:

$$\Delta^2 w = -a\,(U - U^*)$$

where w is an index of nominal wages. With the additional assumption that the NAIRU does not significantly change from one year to another, the NAIRU can thus be simply approximated by:

$$U^* = U - (\Delta U / \Delta^3 w)\, \Delta^2 w$$

and the resulting series are then smoothed with the HP filter to eliminate erratic movements.

14. We present two different scenarios based on different assumptions about labor force growth, investment, wage growth, and unemployment. The assumptions behind the estimation of potential GDP and GNP for Ireland are shown in Table 2 and in Table 5. The

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[17] Trend changes in the resulting series thus appear similar to those of the business capital stock estimated by the OECD (Economic Outlook data base). The conclusions are not sensitive to any of these assumptions.

baseline scenario is based on a more optimistic set of assumptions about labor input, wage inflation, and unemployment. Under the alternative, less optimistic scenario, it assumed that wage growth accelerates somewhat in 2000–01 and unemployment grows slightly after 1999 following the recent decline. At the same time labor is still expected to grow, albeit at a slower rate compared with 1998.

Table 2. Baseline Scenario Assumptions
(Percent growth)

	1998	1999	2000	2001	2002	2003
GDP(GNP) 1/	8.9(8.1)	7.5(6.9)	7.0(6.5)	6.1(5.6)	5.9(5.5)	5.7(5.5)
Investment	11.0	10.7	8.3	7.3	7.3	7.3
Labor force	5.4	3.7	3.3	2.5	2.0	2.0
Population	2.1	2.0	1.5	1.5	1.5	1.5
Unemployment	7.7	6.4	5.9	5.5	5.5	5.5
Wage	5.5	5.5	5.0	5.0	5.0	5.0

1/ Numbers in parentheses are the GNP growth rates.

Baseline scenario

15. Table 3 and Table 4 show the contribution to the growth of potential GDP and GNP (Pot) from labor, capital, and total factor productivity, according to the baseline scenario. It is assumed that female participation rates will to rise further while inward migration flows will continue in the next few years, ensuing a rapid growth in labor (see also OECD, 1999). Notice that changes in labor are the result of changes in unemployment (Emp), growth in the labor force and participation rates (Lab) and hours worked.

16. The estimates show that the growth of potential has accelerated from about 5½ percent in 1993 to nearly 8 percent by 1998. This performance can be explained by the rapid growth in labor input, the strong productivity performance, and, to a lesser extent, high investment flows. A striking result is that most of the pickup in trend growth in the 1990s is accounted for by increases in the labor force rather than total factor productivity. The growth of labor input accounted for about 40 percent of the growth in potential in 1998. Since 1993 the contribution of labor seems to have increased considerably from 1½ percent annually to about 3 percent in 1998, with most of that increase coming from an increase in the labor force rather than hours worked. To a lesser extent, the contribution of total capital has also increased from ½ percent in 1993 to 1½ percent in 1998, reflecting high investment flows.

Total factor productivity growth has remained strong but stable throughout the 1990s, after the rapid acceleration posted in the 1980s.

Table 3. Contributions to Potential GDP Growth—Baseline Scenario

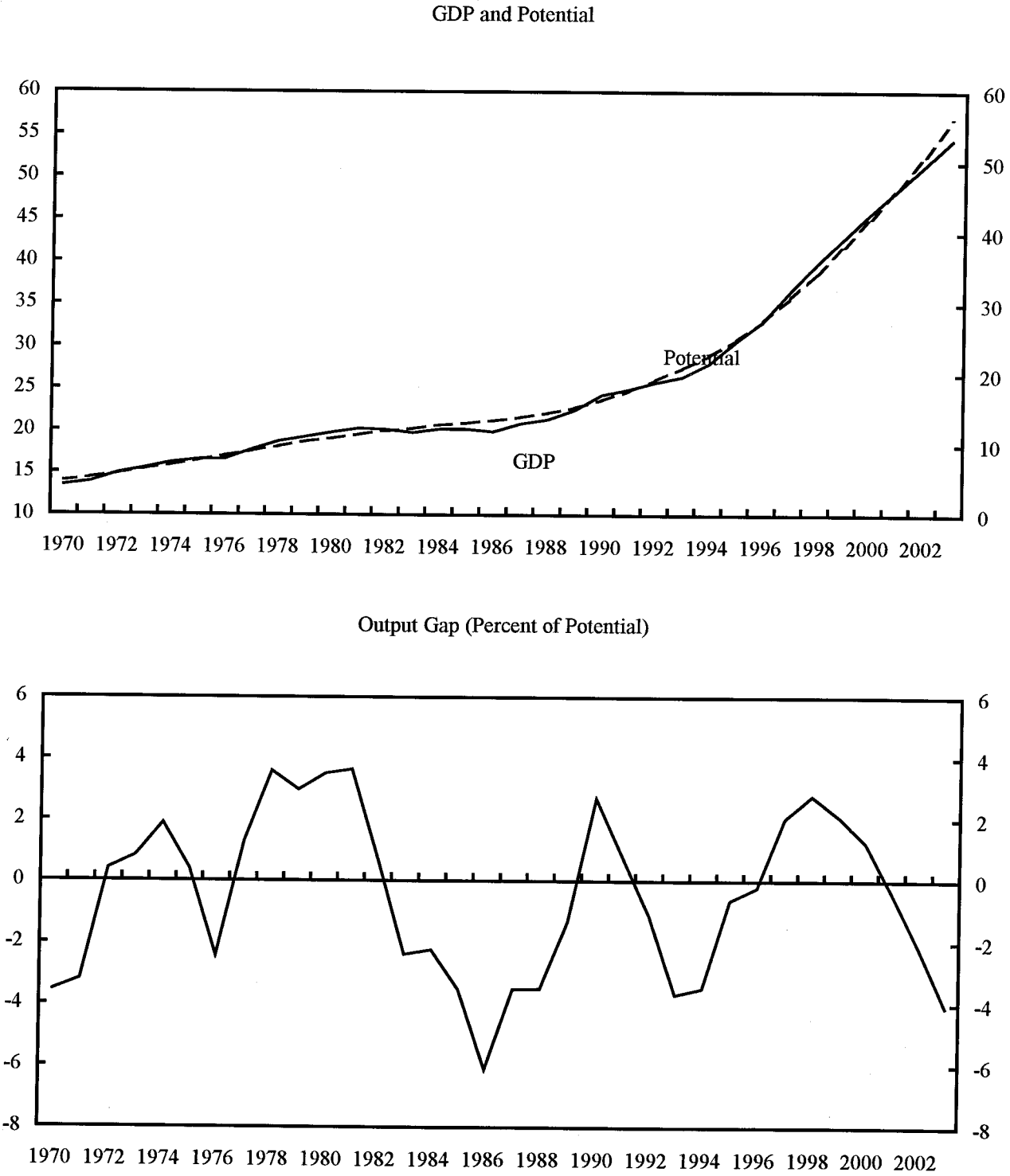
Year	GDP	Pot	Labor, of which				Capital	TFP	Output gap breakdown			
			Total	Emp	Lab	hours			Gap	Lab	Cap	Other
1993	2.64	5.23	1.57	0.44	1.23	-0.10	0.58	3.08	-3.68	-2.31	-2.11	0.66
1994	5.76	5.39	1.57	0.53	1.06	-0.03	0.61	3.22	-3.49	-0.93	-2.53	-0.09
1995	9.50	6.16	2.11	0.62	1.48	0.02	0.73	3.32	-0.63	-0.15	-0.87	0.40
1996	7.73	7.02	2.60	0.67	1.88	0.05	1.04	3.38	-0.20	-0.63	-0.77	1.19
1997	10.70	7.94	3.31	0.71	2.53	0.07	1.22	3.41	2.04	-0.02	1.11	0.93
1998	8.93	7.83	3.11	0.72	2.31	0.07	1.30	3.42	2.79	1.86	1.79	-0.90
1999	7.50	7.90	3.05	0.72	2.27	0.06	1.44	3.41	2.10	2.14	1.60	-1.66
2000	7.00	7.60	2.66	0.69	1.91	0.05	1.54	3.40	1.26	1.98	1.24	-1.97
2001	6.10	7.56	2.56	0.66	1.86	0.04	1.60	3.40	-0.38	1.33	0.44	-2.15
2002	5.90	7.53	2.48	0.64	1.81	0.04	1.66	3.39	-2.16	0.15	-0.39	-1.95
2003	5.70	7.54	2.43	0.62	1.78	0.03	1.72	3.39	-4.09	-0.98	-1.30	-1.90

Table 4. Contributions to Potential GNP Growth—Baseline Scenario

Year	GNP	Pot	Labor, of which				Capital	TFP	Output gap breakdown			
			Total	Emp	Lab	hours			Gap	Labor	Cap	Other
1993	2.63	5.05	1.56	0.43	1.23	-0.10	0.58	2.91	-3.50	-2.32	-2.11	0.87
1994	6.26	5.12	1.56	0.53	1.06	-0.03	0.61	2.95	-2.58	-0.97	-1.82	0.18
1995	7.97	5.81	2.11	0.61	1.48	0.02	0.73	2.97	-0.75	-0.18	-0.80	0.23
1996	7.17	6.63	2.60	0.67	1.88	0.05	1.04	2.99	-0.45	-0.62	-0.57	0.74
1997	9.05	7.52	3.31	0.71	2.53	0.07	1.22	2.99	0.70	-0.01	0.68	0.03
1998	8.07	7.40	3.11	0.72	2.31	0.07	1.30	3.00	1.06	1.87	1.28	-2.10
1999	6.90	7.49	3.05	0.72	2.27	0.06	1.44	3.00	0.23	2.14	1.20	-3.12
2000	6.50	7.19	2.66	0.69	1.91	0.05	1.54	3.00	-0.66	1.98	0.99	-3.64
2001	5.60	7.16	2.56	0.66	1.86	0.04	1.60	3.00	-2.35	1.33	0.33	-4.04
2002	5.50	7.14	2.48	0.64	1.81	0.04	1.66	3.00	-4.08	0.15	-0.31	-4.01
2003	5.50	7.15	2.44	0.62	1.78	0.03	1.72	3.00	-5.80	-0.97	-0.91	-4.08

17. Figure 2 shows the actual, potential GDP and the output gap obtained by the production function approach. Based on these estimates the GDP was estimated to be about 2.8 percent above potential in 1998. With these assumptions and an additional hypothesis about TFP growth in 1999–2003, it is estimated that this gap will narrow only slightly to

Figure 2. Ireland: Actual, Potential GDP and the Output Gap (Production Function Method)



Source: Staff Estimates

about 2.1 percent above potential in 1999.[18] As GDP growth slows down to about 5½–6 percent, the gap is estimated to turn negative, owing mainly to strong growth in potential output.

18. When GNP is used to estimate potential, total factor productivity appears to be somewhat lower (3¼ percent), and as a result the growth of potential output is also lower. In this case the estimates suggest that the GNP was 1 percent above potential in 1998 and will be close to potential in 1999. The gap will turn negative after 2000.

A less optimistic scenario

19. Given the uncertainties in predicting inward migration flows and female participation rates, in the second less optimistic scenario the labor force growth and the rate of growth of working age population are assumed to slow down significantly (see Table 5 for the underlying assumptions). As explained above, under this scenario wage inflation is set to accelerate somewhat while unemployment will rise somewhat after 1999. Table 6 and Table 7 present the contribution of labor, capital and total factor productivity to the growth of potential GDP and GNP respectively.

Table 5. A Less Optimistic Set of Assumptions
(Percent growth)

	1998	1999	2000	2001	2002	2003
GDP(GNP) 1/	8.9(8.1)	7.5(6.9)	7.0(6.5)	6.1(5.6)	5.9(5.5)	5.7(5.5)
Investment	11.0	10.7	8.3	7.3	7.3	7.0
Labor force	5.4	1.5	1.5	1.5	1.5	1.5
Population	2.1	1.0	0.5	0.5	0.5	0.5
Unemployment	7.7	6.4	6.5	6.6	6.7	7.0
Wage	5.5	5.5	6.0	6.0	5.5	5.0

1/ Numbers in the parentheses are GNP growth rates.

[18] For the years 1999-2003 it was assumed that the TFP growth will continue to be strong. This is equal to the average growth rate of TPF between 1993 and 1998.

Table 6. Contributions to Potential GDP Growth—A Less Optimistic Scenario

Year	GDP	Pot	Labor, of which				Capital	TFP	Output gap breakdown			
			Total	Emp	Lab	Hours			Gap	Labor	Cap	Other
1993	2.64	5.43	1.53	0.42	1.21	-0.10	0.58	3.31	-4.12	-2.37	-2.36	0.52
1994	5.76	5.46	1.51	0.51	1.03	-0.03	0.61	3.34	-3.99	-0.96	-2.68	-0.43
1995	9.50	6.11	2.02	0.58	1.42	0.02	0.73	3.37	-1.10	-0.08	-1.02	0.00
1996	7.73	6.88	2.47	0.62	1.79	0.05	1.04	3.38	-0.53	-0.38	-0.86	0.71
1997	10.70	7.71	3.12	0.64	2.41	0.07	1.22	3.37	1.94	0.41	1.00	0.51
1998	8.93	7.53	2.88	0.64	2.16	0.07	1.30	3.36	2.99	2.53	1.68	-1.26
1999	7.50	6.92	2.13	0.61	1.45	0.06	1.44	3.34	3.31	2.30	1.53	-0.57
2000	7.00	6.60	1.74	0.57	1.11	0.05	1.54	3.33	3.49	1.48	1.20	0.75
2001	6.10	6.58	1.67	0.54	1.09	0.04	1.60	3.32	2.80	0.72	0.44	1.60
2002	5.90	6.59	1.62	0.51	1.07	0.04	1.66	3.31	1.93	0.02	-0.35	2.24
2003	5.70	6.61	1.59	0.49	1.06	0.03	1.71	3.31	0.85	-0.80	-1.21	2.86

Table 7. Contributions to Potential GNP Growth—A Less Optimistic Scenario

Year	GNP	Pot	Labor, of which				Capital	TFP	Output gap breakdown			
			Total	Emp	Lab	Hours			Gap	Lab	Cap	Other
1993	2.63	5.02	1.53	0.42	1.21	-0.10	0.58	2.91	-3.54	-2.37	-2.11	0.87
1994	6.26	5.06	1.51	0.51	1.03	-0.03	0.61	2.95	-2.57	-0.96	-1.82	0.18
1995	7.97	5.72	2.02	0.58	1.42	0.02	0.73	2.97	-0.65	-0.08	-0.80	0.23
1996	7.17	6.49	2.47	0.62	1.79	0.05	1.04	2.99	-0.21	-0.38	-0.57	0.74
1997	9.05	7.33	3.12	0.64	2.41	0.07	1.22	2.99	1.12	0.41	0.68	0.03
1998	8.07	7.17	2.88	0.64	2.16	0.07	1.30	3.00	1.72	2.53	1.28	-2.10
1999	6.90	6.57	2.13	0.61	1.45	0.06	1.44	3.00	1.82	2.30	1.20	-1.70
2000	6.50	6.27	1.74	0.57	1.11	0.05	1.54	3.00	1.85	1.48	0.99	-0.64
2001	5.60	6.27	1.67	0.54	1.09	0.04	1.60	3.00	1.01	0.72	0.33	-0.04
2002	5.50	6.28	1.62	0.51	1.07	0.04	1.66	3.00	0.08	0.02	-0.31	0.38
2003	5.50	6.30	1.59	0.49	1.06	0.03	1.71	3.00	-0.86	-0.80	-0.91	0.85

20. Despite a considerable slowdown in the growth of labor after 1998, potential GDP growth continues to be strong, owing mainly to strong TFP improvement. Nevertheless, for a given GDP growth, the growth of potential is about 1 percent lower than in the baseline case. Under these circumstances the output gap in 1998 is estimated to be 3 percent and it is expected to widen further to 3¼ percent of potential in 1999 and 3½ percent in 2000.

Alternative TFP estimates

21. Chapter I provides an alternative estimate for TFP growth based on sectoral industry data from the manufacturing sector which exclude large repatriated earnings by multinationals. This suggests a 2 percent growth in TFP over 1991–96, which is significantly lower than the Solow residual-based estimate derived in this chapter. Using these TFP growth numbers, Table 8 shows alternative estimates for potential output growth over 1999-2000, which avoids some of the measurement problems in aggregate output and income data.

Table 8. Potential Output Growth With Alternative TFP Estimates

	Potential	Labor	Capital	TFP 1/
1999	6.49	3.05	1.44	2
2000	6.19	2.66	1.54	2
2001	6.16	2.56	1.60	2
2002	6.14	2.48	1.66	2
2003	6.15	2.43	1.72	2
Average	**6.23**			

1/ TFP growth based on estimates provided in Chapter I.

22. The estimated growth of potential is about 6¼ percent over 1999–2003. A less optimistic set of assumptions (Table 5) results in a growth rate for potential output of about 5½ percent.

Explaining the growth in total factor productivity

23. Why has TFP growth been so strong in the last few years? And furthermore is this growth likely to persist into the future? It is clear that TFP growth in Ireland, even accounting for measurement problems, has been higher than that in trading partners, especially within EMU. We focus on two possible explanations: first, improved education which affects the overall quality of human capital and, second, the shift from low productivity agriculture to high productivity manufacturing production.

Education

24. Two forces have contributed to a marked improvement in the qualification of new entrants in the labor force. The first stems from the recent demographic trends in Ireland: a late baby boom that got underway in the 1970s peaked in 1980, resulting in a hump-shaped distribution of the population with a peak in the 15–19 age group (see OECD, 1999, for example). This development took place much later compared with other European countries. In absolute numbers more educated young workers have therefore entered the labor market recently and will continue to do so in the next few years.

25. Second, the composition of the Irish labor force has experienced a substantial changeover in the recent years, as the proportion of recent cohorts entering the work force with no qualification has markedly declined. In fact, given that the younger workers entering the labor market tend to be more educated (or have better training), the overall level of education of the labor force has risen considerably.

26. Table 9 shows that 66 percent of those in the age group 25–34 had completed secondary education in 1996 compared with 30 percent in the age group 55–64. A similar gap exists for those with university education, as seen in Table 9. These differences are evident for the OECD area as a whole, albeit not as marked as in the case of Ireland, and highlight the transformation that is underway in the labor market.

Table 9. Educational Attainment
(Percent of population)

	At least upper secondary		At least university degree	
	Ireland	OECD average	Ireland	OECD Average
25-34	66	72	14	15
35-44	54	65	11	14
45-54	38	55	9	12
55-64	30	42	6	8
25-64	**50**	**60**	**11**	**13**

Source: OECD (1999).

Migration

27. Migration affects the education distribution of the population directly. Unlike newly born persons, migrants come with accumulated human capital and thus influence directly the educational distribution of the labor market. Migrants tend to save more and thus contribute

growth via higher investment in addition to raising the educational profile of the labor force (see also Barro and Sala-I-Martin, 1995, for example and references therein). Finally, the majority of recent immigrants are of Irish origin and have thus integrated easily with the local workers.

Shift to more productive production

28. The gradual shift of human and capital resources toward the highly productive modern sector associated with foreign direct investment has played an important role in enhancing TFP growth in Ireland. Embedded in the pioneering work of Balassa and Samuelson is the idea that the shift from agricultural to manufacturing production leads to an increase in the measured TFP growth. This is basically due to the fact that TFP growth in manufacturing is higher than in the agricultural sector and therefore the aggregate TFP growth will remain high so long as the economy shifts resources away from the agricultural sector.

D. Output—Inflation

29. Although potential output is defined as that level of output which, if attained, does not set off inflationary pressures, information on price inflation is usually omitted from the estimation[19]. In this section information on price inflation is used to estimate potential output[20]. Figure 3 shows the estimated output gap for Ireland based on a model that uses information on the change in CPI to estimate potential. Essentially (the growth of) potential output is modeled as a latent stochastic trend and deviations from trend are linked to inflation through a simple Phillips curve. Thus output and inflation form a bivariate unobserved-components model estimated by maximum likelihood (see Kuttner, 1994, for example). The advantages of using this method are that (i) it allows information on inflation to be used in the estimation of potential output, and (ii) it allows the estimation of uncertainty inherent in the estimation of potential output.

30. Inflation in Ireland has remained subdued in recent years, although output growth has been accelerating. It would appear therefore that the potential of the Irish economy has increased. Again, contrary to the output gap derived by the HP filter, this method reveals that the output gap has closed somewhat between 1996 and 1998. Figure 3 makes it clear that the

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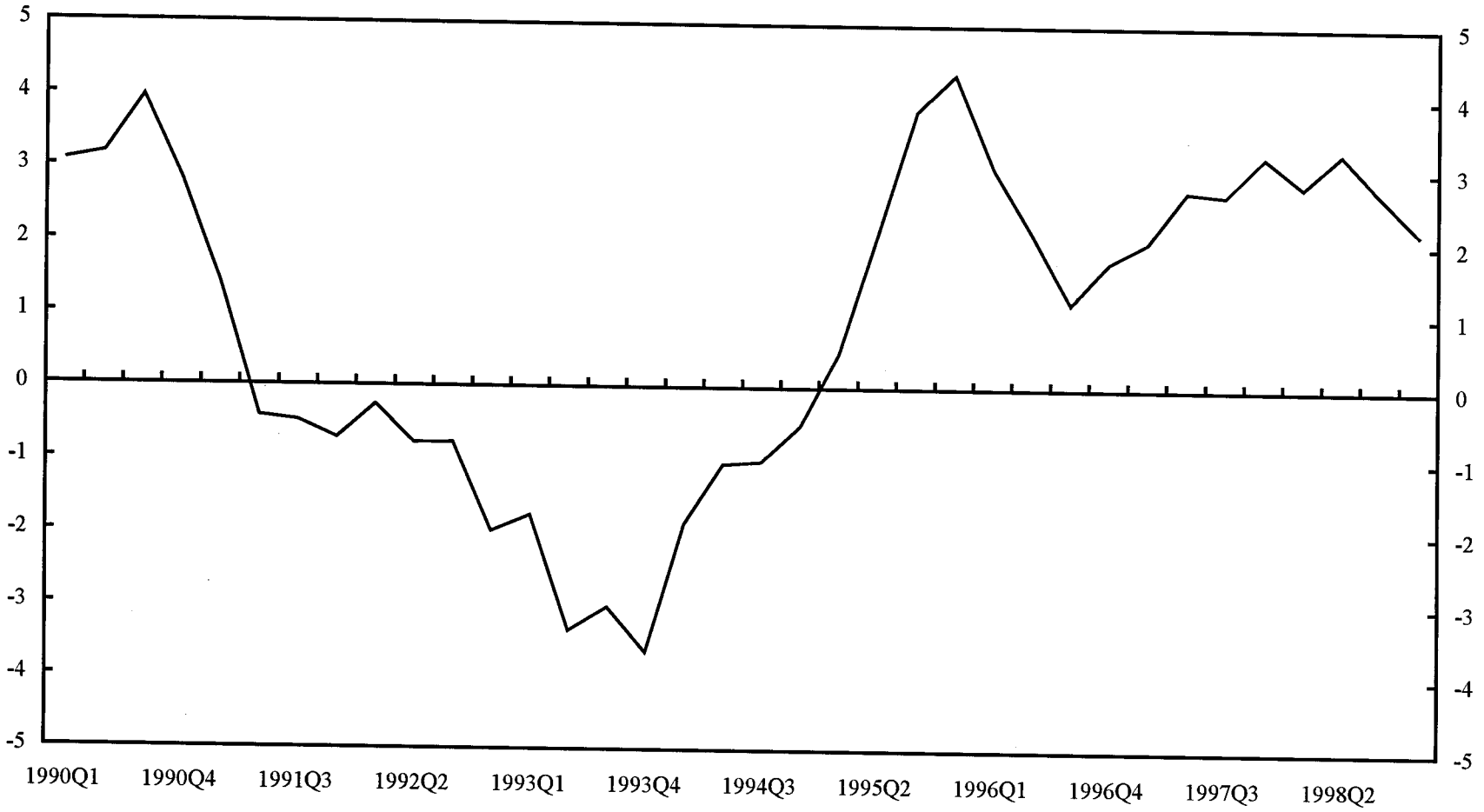
[19] An exception is the methodology of Adams and Coe (1990).

[20] The data used in this estimation is quarterly (from the OECD database) and consequently differs slightly from the annual data used elsewhere in the study.

Figure 3. Ireland: Output Gap Estimated Using Information about Inflation



Source: Staff Estimates.

output gap has not widened, as suggested by the HP filter. The results obtained by this method are closer to the production function estimates. Both use relevant information (about factor inputs, CPI), that the HP filter omits, thereby producing a somewhat smaller output gap.

E. Convergence in the Solow-Swan Model: The Catch-up Hypothesis

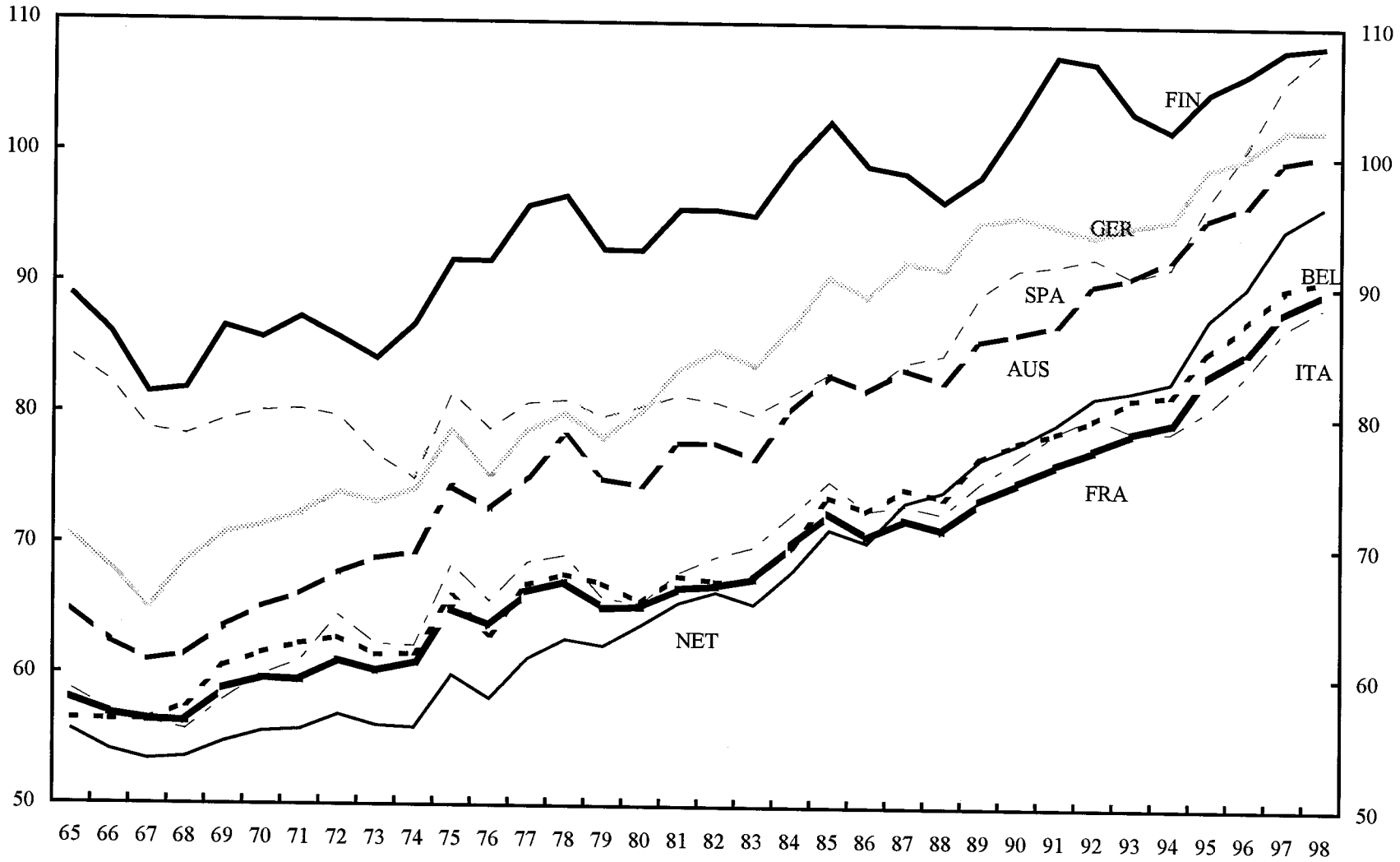
31. The neoclassical growth model provides a useful benchmark for motivating the discussion for the medium term growth prospects for Ireland (more details can be found in the Appendix II). The model has interesting implications for Ireland since it predicts that economies with lower capital per person tend to grow faster in per capita terms. In other words it suggests that there will be convergence across economies. This hypothesis, that less rich economies tend to grow faster per capita than rich ones—without conditioning on other country specific characteristics—is referred to as absolute convergence. Indeed there is evidence in favor of convergence especially when similar or homogeneous economies are compared (see Barro and Sala-i-Martin, 1995). Given that Ireland has grown faster than other European countries, Figure 4 shows that the Irish GDP per worker has been converging rapidly to the European levels. A corollary of this hypothesis is that growth will slow down in the medium term and the potential of the Irish economy to carry on growing rapidly without significant wage and price inflation could diminish.

32. The Solow-Swan model implies gradual convergence to a steady state. For given shares of capital and labor it is possible to make some quantitative estimates for this convergence rate which is essentially a function of the distance between output and the steady state (details in Appendix II).

33. Table 10 shows the growth rates based on two different levels of output relative to steady state (y/y^*)[21]. In the upper panel of the table it is assumed that this ratio is 50 percent while in the lower panel this is set equal to 70 percent. The growth of labor, assumed to be equal to 3.1 percent, is the average growth rate over 1997–2003 and is based on the assumptions from the baseline scenario (Table 2); we also use an alternative estimate of 4 percent growth for comparison. The TFP growth is set equal to 3.5 percent, as estimated by the Solow decomposition, and 2 percent consistent with the alternative estimates provided in Chapter I.

[21] These are the average growth rates over the period.

Figure 4. Ireland: GDP per Worker Relative to Selected Countries 1/
(In Percent)



Source: Staff Estimates

1/ Ireland's GDP in PPP dollars per worker, relative to country i.

Table 10. Growth Rates Implied by the Solow-Swan Model

Initial y relative to y* is 50 percent			
		TFP Growth	
		2.0	**3.5**
Labor (%)	**3.1**	4.6	4.7
	4.0	5.6	5.7
Initial y relative to y* is 70 percent			
		TFP Growth	
		2.0	**3.5**
Labor (%)	**3.1**	3.9	4.0
	4.0	4.8	4.9

34. The Solow-Swan model implies growth rates in the range of 4–5 percent, which are slightly lower from previous estimates. However, these are not directly comparable with growth rates estimated in the previous section and furthermore, these growth rates are averages of diminishing growth rates as predicted by the Solow-Swan model. Nevertheless, according to this model convergence to steady state is quick. For example, when we assume a rate of technological progress of about 2 percent and a growth of labor of 3.1 percent, the convergence coefficient (defined in Appendix II as β^*) implies that 8.5 percent of the gap between y and y* vanishes every year and it takes about nine years to close half of the distance between y and y*.[22]

F. Concluding Remarks

35. The main focus of this paper was to estimate the potential output for Ireland and evaluate the growth prospects for the medium term. The preferred method for estimating potential output is the production function approach that decomposes the potential into changes in the capital stock, labor, and productivity. The results show that potential output increased considerably in recent years in line with an expanding labor force and strong investment growth and supported by strong productivity growth. Labor supply growth has been the most important factor explaining the pickup in trend growth since the early 1990s and may explain the relatively modest wage growth in Ireland for much of the 1990s.

[22] These estimates are based on the implicit assumption that the saving rate (and therefore investment) is constant. Allowing for a higher rate of investment (financed through foreign direct investment flows) would affect the steady state of the economy and therefore the growth rates.

36. An alternative method, that uses information about CPI growth directly, supports the finding that potential output has increased in recent years. The results obtained by this method are closer to the production function estimates. Both use relevant information (about factor inputs, CPI), that the HP filter omits, thereby producing a somewhat smaller output gap.

37. These estimates of potential output growth suggest that the increase in potential output will slow down eventually as labor force growth levels off, the demographic transformation — which affects the educational characteristics of the population and thus total factor productivity growth —is completed, and investment flows moderate. In addition, accounting for some of the measurement problems in the aggregate output and income data, is shown to reduce significantly the estimated potential growth over the medium term.

The Production Function Approach

38. This follows closely Magnier (1996) and is based on Giorno et al (1985). The methodology for estimating potential output is based on the standard Cobb-Douglas production function:

$$y_t = c + (1-\alpha)\, l_t + \alpha\, k_t + b\, ut + tfp + e \qquad (1)$$

where lower case letters denote that the variables are in (natural) logs and l_t is the labor input, k_t the capital stock, tfp_t is the trend total factor productivity (log index), and ut_t is a proxy for the intensity of use of capital and employed labor (log index). Therefore $(1-\alpha)$ is the elasticity of output with respect to labor and b is the elasticity of output with respect to capacity utilization, c is a constant, and e is a random shock.

39. Total labor input is obtained as:

$$L = (n\, l_{par})(1-U)\, h \qquad (2)$$

where n denotes the working age population, l_{par} is the participation rate, U the unemployment rate, and h the average working hours.

40. The total factor productivity (TFP) and parameter b (the elasticity of output with respect to capacity utilization) are jointly estimated by an iterative procedure. Assuming that parameter α is well approximated by labor's share in GDP, the respective contributions of labor and capital to output are computed and subtracted from the observed (log) GDP, the residual being denoted $resd_0$. A first estimate of parameter b is then obtained by regressing this residual variable on a constant, a linear time trend, and the capacity utilization variable:

$$resd_0 = r + v\, t + b_0\, util + e_0 \qquad (3)$$

41. The component of $resd_0$, that is not explained by changes in capacity utilization, provides the first approximation of the log index of total factor productivity:

$$tfp_0 = resd_0 - b_0\, util \qquad (4)$$

This approximation is then smoothed with the HP filter and substituted for the constant and linear time trend component $r + v\, t$ in equation (3). This model is then re-estimated, yielding a new estimate of b, and therefore a new estimate of trend total factor productivity tfp, which

is again smoothed, and so on. Final estimates for parameter b and for the trend total factor productivity are thus obtained when the procedure finally converges. When implemented over the period 1970–98, with an assumed constant labor share of income $(1-\alpha) = 0.65$[23], the sequential procedure quickly converges to a fixed value for parameter b equal to 0.73.

Potential output is therefore computed as:

$$y_t^* = c + (1-\alpha) l_t^* + \alpha k_t + \beta ut^* + tfp \qquad (5)$$

where ut* stands for the supposed "normal" degree of capital utilization and l* is calculated as:

$$l^* = (n l_{par}^*)(1 - U^*)h^* \qquad (6)$$

with l^*_{par} and h* being estimates of the trend participation rate and of the average working hours, and U^* an estimate of the standard nonaccelerating wage rate of unemployment (NAIRU).

[23] National accounts estimates indicate large changes in the labor share in income since the 1960s. Total labor income measured as the remuneration of employees represented 62 percent of net domestic product at factor cost on average over 1990-94, and 70 percent including income from self-employment and other trading income.

The Neoclassical Growth Model

42. This section describes the main elements of the Solow-Swan growth model. For more details the reader can refer to Barro and Sala-i-Martin (1995) and references therein. The production function of the Solow-Swan model, $Y_t = f(K,L,A) = AK_t^{\alpha}L_t^{1-\alpha}$, is neoclassical and has the usual properties: (i) constant returns to scale; and (ii) positive but diminishing returns to capital and labor. In this economy income is consumed and saved and s is the saving rate. For a given depreciation rate, δ, the capital stock evolves over time according to $\dot{K}_t = sY_t - \delta K_t$ where $\dot{K}$ is the growth rate.

43. The steady-state growth rates in this model are exogenously determined and hence the recommendations for long-run growth that one can make are limited. However, the model has very interesting implications for the transitional dynamics. Given that a steady-state capital/labor ratio exists and is unique (and greater than zero), when the capital-labor ratio increases the growth rate of output declines and approaches zero asymptotically. The model explains why growth is higher for low levels of capital stock. Saving a constant share of income s every period results in new investment, which in turn leads to higher output. Subsequently, each addition to capital raises output by smaller amounts, owing to the diminishing returns to capital. An increase in the saving rate will result, however, in a higher steady-state capital stock, and a temporarily higher (per capita) output growth rate, but permanently higher levels of per capita capital and output.

44. With exogenous technological progress the production function, $Y_t=F(K, L, A(t))$, implies an exogenously increasing, at a rate x, average product of capital. In this case the average product of capital is increasing with time and so is the growth rate of the capital stock. This rate of technological progress is equivalent to total factor productivity (TFP) growth.

45. In summary, the neoclassical model predicts that growth will be higher when the capital stock is relatively low and will decline along with new additions to capital until it reaches the steady state. With the Cobb-Douglas production function, the Solow-Swan model provides us with a quantitative measure of the speed of convergence of the capital/labor ratio to its steady state value; it is straightforward to calculate this speed of convergence (β^*) as follows[24]:

$$\beta^* = (1-\alpha)(x+\delta+\dot{n})$$

[24] See Barro and Sala-i-Martin(1995).

This coefficient gives information about the speed with which output per person approaches its steady state, y^*.[25] [26] The growth rate of output is a function of the distance between output and the steady state and is given by: $\gamma_y \cong -(1-\alpha)(x+\dot{n}+\delta)[\log(y/y^*)]$, as derived in Barro and Sala-i-Martin (1995),where x is the TFP growth, $\dot{n}$ is the labor input growth rate, δ is the depreciation rate, y and y* are the levels of actual output and steady output respectively.[27]

[25] This convergence rate does not depend on either the saving rate *s* for the case of a Cobb-Douglas production function.

[26] This is a particular property of Cobb-Douglas technology and is due to two opposite and equal effects (see p.37 in Barro and Sala-i-Martin, 1995, for more details).

[27] See Barro and Sala-i-Martin (1995), pp.36-37. This is based on a log-linear approximation of the growth rate around the steady state and it can be used in a recursive procedure to estimate the growth rates during convergence. For the given set of parameters, estimate the speed of convergence (β*) and use the expression for γ_y to calculate the growth rate of the economy. This is repeated until convergence to steady state.

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III. General Government Fiscal Position and Future Pension Liabilities [28]

A. Introduction

1. Both of Ireland's publicly financed pension systems—the social welfare and the public service— are entirely *pay-as-you-go* based, and no provisions have been made to meet future pension liabilities.[29] Several options are possible with regard to financing these liabilities: (i) reduce the general government debt, and hence the future interest burden leaving room to support higher pension costs in the future; (ii) fund pension liabilities through a notional fund within general government; and (iii) fund pension liabilities through an independently managed fund with a fixed charge to the budget.[30] The Irish authorities have indicated interest in taking advantage of their current substantial fiscal surpluses to fund future pension liabilities.

2. This note provides a rough evaluation of the government's fiscal position adjusted for future pension expenditures. The assessment is based on two types of calculations: (i) the net present value of the profile of net pension expenditure over 1998–2047, indicating the stock of future pension liabilities; (ii) the additional resources needed annually to fund (or cover) future pension liabilities.

3. The estimations in this paper, based mainly on two government pension studies, suggest that accounting for future pension liabilities would have a significant impact on the reported fiscal position. The reported government fiscal surplus would be significantly lower, or disappear altogether, while the government debt ratio would rise by over 120 percent of GDP.[31] These calculations are intended to assess the extent to which the pension systems are self-sufficient, and what could be done today in order to avoid an excessive burden of pension expenditures in the future.

4. The next section of this paper provides an overview of Ireland's pension system; the third section gives a summary of the long-term demographic projections; the fourth section

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[28] Prepared by Natasha Koliadina.

[29] *Pay-as-you-go* pensions are paid out of current tax revenues, rather than out of an accumulated fund.

[30] Under ESA 95, notional funds within the control of the government do not affect the fiscal balance. However, payments made to an independently managed pension fund outside government could be considered current expenditures, thereby reducing the fiscal balance.

[31] Based on revised (ESA95 basis) GDP. This corresponds to 130 percent of GDP under the orginal GDP estimates.

describes the estimation of net future pension liabilities and demonstrates the implications for the fiscal position in terms of both the government debt ratio and the adjusted general government balance. Conclusions are provided in the last section.

B. Pension System in Ireland

5. The old-age pension system in Ireland is a two-pillar system—the social welfare pensions constitute the first pillar, and voluntary supplementary (mostly occupational) pensions are included in the second pillar. The unfunded, *pay-as-you-go* **social welfare pension scheme** provides contributory and noncontributory benefits. Contributory pensions are paid to those who qualify on the basis of pay-related social insurance (PRSI) contributions, while noncontributory pensions are means-tested benefits for those who do not qualify for PRSI contributions. Although there is no formal indexation commitment, social welfare pensions are adjusted annually to reflect, at a minimum, price inflation. However, reflecting the government's commitment to raise pensions to IR£100 per week by 2002—slightly in excess of the estimated subsistence threshold—social welfare pensions in recent years have been growing broadly in line with average industrial earnings, or even slightly above. Average replacement rate in Ireland is somewhat lower than in other major industrial countries, but above that in the United Kingdom.[32]

Table 1. Pension Replacement Rates 1/
(In percent)

Ireland	29.6
Major industrial countries	37.5
United States	38.5
Germany	52.0
United Kingdom	17.5
Canada	29.2
Sweden	39.0

Source; Chand and Jaeger. P. 12, and staff estimates for Ireland;
1/ The replacement rate for Ireland is a 1999 estimate; replacement rates for other countries are projections for 1995.

6. Currently, almost 90 percent of individuals over 66 years of age receive social welfare pensions, 58 percent of whom draw contributory benefits. It is expected that the share of those entitled to contributory benefits will increase to 86 percent in 2016, owing primarily to the increased female participation in the labor force.

[32] The replacement rate is defined as an average pension benefit in percent of gross average industrial earnings.

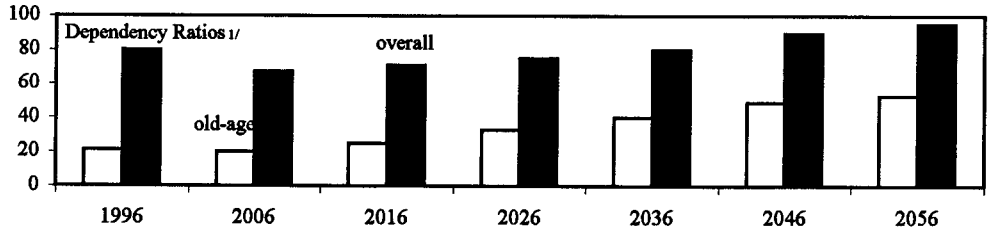
7. **Occupational pension schemes** can be grouped into unfunded public service schemes, privately funded occupational schemes, and individual personal pensions, usually arranged by self-employed individuals. Occupational schemes are voluntary, and employers are not legally responsible for their provision. Occupational schemes cover only 46 percent of the total number of people at work, and this number has been gradually declining, owing to the surge in the number of people working part-time or on a temporary basis.

8. The coverage by occupational pensions is significantly higher in the public sector than in the rest of the economy, owing primarily to the mandatory nature of the public sector pension schemes. The public sector pension scheme is a defined benefit scheme, providing about three-fourths of the final pensionable pay.

9. Social welfare pensions are financed out of the PRSI contributions, government contributions toward means-tested benefits, and a budget transfer covering the deficit on contributory pensions. Public sector pensions are a part of the public service pay bill, with the costs met from current revenue and employee contributions. Civil servants who were appointed prior to April 1995 do not make contributions to either pension scheme, but those who were appointed after this date are subjected to full PRSI contributions, since their pensions are coordinated with the social welfare system.

C. Long-term Demographic Changes

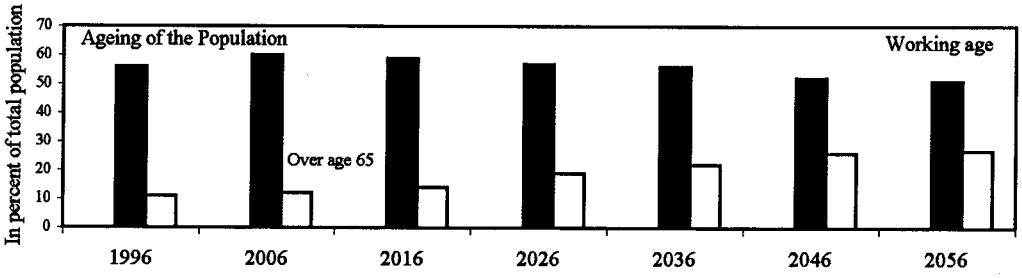
10. Currently Ireland's pension costs are significantly lower than those in other OECD countries, owing primarily to its favorable demographic profile and relatively modest level of benefits. However, the demographic profile of the population is projected to change significantly after 2020, which would translate into an increase in dependency ratios.



Source: Actuarial Review of Social Welfare Pensions.
1/ The old-age dependency ratio is the percentage share of people over age 65 to the working age group. The overall dependency ratio is the share of all dependents, including children of 0-19 years of age and people over age 65, to the working age population.

11. Over the next decade, the financing of pension expenditures would not overburden public finances: the share of the working age people in the total population is projected to

rise, while the share of those over 65 would slightly decline. Financing of pension benefits will become costlier after 2015 for public service pensions and after 2020 for social welfare pensions—when the decline in the share of working age population will be combined with an increase in the share of people over 65 years of age.



Source: Actuarial Review of Social Welfare Pensions.

12. By the middle of the next century the old-age dependency ratio is projected to increase sharply, and is likely to come close to those of other developed economies. These projections, however, are subject to a significant margin of error, owing to an uncertainty about net migration flows.

D. Estimation of Fiscal Implications

13. The analysis and estimates in this note are based on the *Actuarial Review of Social Welfare Pensions* (1997) and the *Interim Report of the Commission on Public Service Pensions to the Minister for Finance* (1997). These studies were not a response to a crisis, but a timely consideration of policy options to ensure that in the longer-term Ireland will not face difficulties similar to those being experienced elsewhere. For this reason estimates of net future pension liabilities are comprehensive in the sense that they do not account for government transfers and consider liabilities with respect to noncontributory pensions as a part of social security, rather than social welfare expenditure. The results of both studies suggest that the contribution rates would have to be increased significantly in the future, unless funding of future pension costs is started today.

14. The estimates are very sensitive to the position of the pension system at a staring point. This note reports the results of the estimates based on two assessments of the consolidated pension deficit in 1999: (i) the projection of the pension deficits produced by the *Actuarial Review* and the *Interim Report*, which amounted to1.8 percent of the ESA95 GDP, and (ii) the pension deficit—estimated from the 1999 budgetary projections of the

social insurance fund and public service pensions—which is expected to be 1 percent of GDP.[33]

15. The *Actuarial Review* and the *Interim Report* expected the social welfare pension deficit to be larger than that of the public service scheme—1 percent and 0.8 percent of GDP, respectively. Pension contributions of the social welfare and public service pension systems of 2.2 percent of GDP and 0.3 percent of GDP, respectively, were insufficient to finance pension costs of 3.2 percent of GDP in the case of social welfare system, and 1.1 percent of GDP in the case of public service scheme.[34]

16. However, according to the calculation of the pension deficit from budgetary projections (1 percent of GDP), public service pension deficit (0.6 percent of GDP) is expected to exceed that of the social welfare system (0.4 percent of GDP). The public sector pension deficit, however, is likely to be underestimated for two reasons: (i) it is based on the central government statistics, and thus does not include pension expenditure of the local authorities, and (ii) available data do not allow pension contributions to be separated from the European Social Fund receipts, both of which had been reported in the budget statistics under the same heading. The combined contributions and European Social Fund receipts amount to 0.3 percent of GDP, while the cost of the public service pension system is expected to be close to 1 percent of GDP. The deficit of the social welfare system was estimated as a difference between total pension outlays (2.4 percent of GDP), including noncontributory benefits and administrative costs, and residual contributions applied to pensions (2.0 percent of GDP), estimated as a difference between total PRSI contributions net of nonpension expenditure. It is also important to note that the economy has been operating above potential, and contributions that are currently inflated by the cycle would weaken in a long run.

Assumptions

17. The calculation of future pension net cash outflows in this note incorporates the assumptions and the methodology of the *Actuarial review*, and those of the *Interim Report*. (See table below.) Growth in average earnings was assumed to be independent of GNP growth and had been kept constant throughout the period in both studies.

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[33] The consolidated pension deficit is the sum of deficits of the social welfare and public service pension systems. Calculations in both studies are based on GNP. In this note all ratios are shown as a share of ESA95 GDP.

[34] The Actuarial Review of Social Welfare Pensions assumed that only 62.5 percent of total pay-related social insurance contributions would go toward the cost of pension benefits.

Table 2. Summary of Underlying Assumptions
Constant terms (1996 prices)

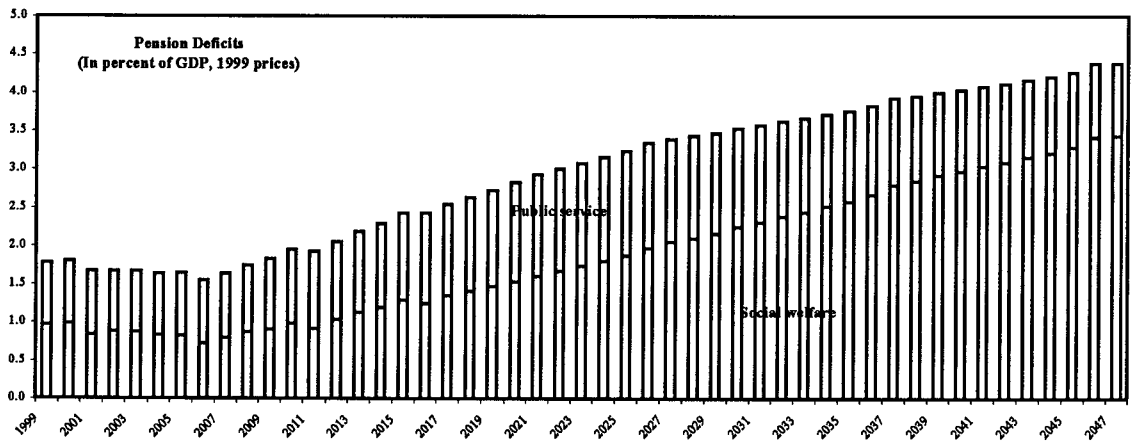
	Public Service	Social Welfare
Growth in real GNP		
2001–2006	5 percent	5 percent
2007–2016	3 percent	3 percent
2017–2047	2 percent	2 percent
Growth in average earnings	1.5 percent 1/	2 percent
Growth in pension benefits	1.5 percent	2 percent

Sources: *Actuarial Review* and *Interim Report.*

1/ Growth in public service average earnings does not reflect career progresssion increases of 0.5-2.5 percent per annum.

Profile of net pension expenditures

18. The profile of net pension expenditures is derived by applying the assumptions to the starting pension balances. The figure below illustrates this profile as estimated by the *Actuarial Review* and the *Interim Report* (corresponding to a starting balance of 1.8 percent of GDP).



19. As indicated by the figure above, net pension expenditure growth is expected to accelerate after 2015, which initially would be caused by the retirement of the major cohort of public servants, and after 2020–25 by the increase in the old-age dependency ratio. Although the net present value of pension liabilities can be estimated from this profile, the *Actuarial Review* and the *Interim Report* did not estimate them explicitly.

20. However, two consultants for the government, Peter Bacon and Associates and Brian Duncan of Mercers have estimated accrued net pension liabilities at 107 percent of GDP. Of this some 74 percent of GDP is estimated to be due to the social welfare system and the residual 33 percent of GDP due to the public service pension system.[35]

Alternative estimates of government debt

21. The table below presents four estimations of the general government debt, taking into account the net present value of pension liabilaities under different assumptions about the initial period balances and discount rates. The discount rate level and the first period pension balance are the only two factors that differ in these estimations. The first period pension deficit in Estimations 1 and 2 is the projection of the *Actuarial Review* and of the *Interim Report*, while in Estimations 3 and 4 it was derived from the 1999 budgetary projections. Gross debt is defined as the actual general government debt to GDP ratio at end-1998. Net debt including social security assets is estimated as a gross debt net of external reserves of the central bank (the social security system does not have any assets). Net future liabilities of the pension system is the stock of pension debt as of end-1998. These liabilities are calculated as the net present estimated value of the profile of net pension costs and include both accrued and future pension liabilities of the government.

Table 3. General Government Debt in 1998

(In percent of GDP)

	Estimation 1	Estimation 2	Estimation 3	Estimation 4
Initial parameters:				
Real discount rate (In percent)	4.0	2.5	4.0	2.5
First period pension balance (1999)	-1.8	-1.8	-1.0	-1.0
Gross debt	52.6	52.6	52.6	52.6
Net debt including social security assets 1/	42.9	42.9	42.9	42.9
Net future pension liabilities, *of which*	117.8	174.0	80.0	119.6
Social welfare	71.8	109.2	45.1	70.3
Public sector	46.0	64.8	34.9	49.3
Net debt including net future pension liabilities 2/	160.7	216.9	122.9	162.5

1/ Net debt is estimated as gross general government debt net of external reserves of the central bank.
2/ Net debt including net future pension liabilities is the sum of the net debt including social security assets and net future pension liabilities of the government.

[35] Accrued pension liabilities are pension costs to which the government has already commited itself. They reflect accumulated liabilities of the government with respect to those who are already enrolled in the system. This estimate neither includes any pension liabilities, which the government can incur in the future, nor contributions.

Alternative estimates of the government balance

22. In order to obtain an estimate of the additional fiscal resources needed annually to fund pension liabilities, this section considers two hypothetical options facing the government (see table below). The first is the full coverage of future pension liabilities which requires the net pension debt to be driven to zero by the end of the estimation period (2047). The cost under this option is the amount of resources needed annually to fully amortize the debt. The second option is partial coverage, which assumes that the pension debt is kept constant in real (1999) terms throughout the period. The cost under this option is the amount of resources needed annually to cover interest cost and to prevent the build-up of additional pension debt. Additional resource needs are computed as the difference between the cost of either option and the current pension balance, which is already reflected in the government's fiscal position. In other words, it is the amount of *additional* resource transfers required annually under each option to cover the cost of future pension liabilities. And finally, the adjusted general government balance represents the actual general government balance net of the annual resource need. As the table indicates, the financing requirement under either option depends strongly on the current pension balance and the level of the discount rate.

Table 4. Cost of Future Pension Liabilities

(In percent of 1999 GDP)

	Estimation 1	Estimation 2	Estimation 3	Estimation 4
Real discount rate	4 percent	2.5 percent	4 percent	2.5 percent
Full coverage of pensions				
Cost 1/	5.3	6.0	3.6	4.2
Current pension balance	-1.8	-1.8	-1.0	-1.0
Additional resource need 2/	3.5	4.2	2.6	3.2
Adjusted general government balance 3/	-0.8	-1.5	0.1	-0.5
Partial coverage of pensions				
Cost 4/	4.7	4.3	3.2	3.0
Current pension balance	-1.8	-1.8	-1.0	-1.0
Additional resource need 2/	2.9	2.5	2.2	2.0
Adjusted general government balance 3/	-0.2	0.2	0.5	0.7
Memorandum items:				
Actual general government balance expected in 1999	2.7	2.7	2.7	2.7
Net present value of future pension liabilities	117.8	174.0	80.0	119.6

1/ Reflects resources required to drive net pension liabilities to zero by the end of the period (2047).
2/ Additional resource need is the cost of full coverage adjusted for the pension deficit already recorded in the general government balance.
3/ The general government balance adjusted for the cost of covering pension liabilities.
4/ Reflects resources required to keep pension debt constant in real terms.

Conclusion

23. Pension costs in Ireland are expected to increase significantly in the long run. The current favorable position in terms of pension costs is projected to fade away over the next two decades, when the country will start to undergo the effects of the aging of its population.

24. The lack of consideration of accrued and future pension liabilities as a complement to current government finance accounts understates the stock of the government debt and could create an illusion of greater wealth, raising current consumption in excess of its long-term equilibrium level. The burden of higher pension costs in the future can be eased by their advanced funding, and the current strong fiscal position provides an opportunity for the government to smooth the burden of pension costs overtime. Estimates in this paper indicate that covering of pension liabilities will require 2½–3½ percent of GDP in additional fiscal resources—essentially wiping out the current fiscal surplus.

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IV. Work Incentives and Recent Labor Market Policies[36]

A. Introduction

1. At a time when jobs are abundant and labor shortages are intensifying, long-term unemployment, although gradually diminishing, remains high. With the long-term unemployed comprising almost half of all individuals out of work, the major challenge of labor market policies has shifted from job creation to improving labor skills and work incentives.

2. This note examines changes in incentives to work in 1997–99, and looks into potential implications of the introduction of the national minimum wage (NMW) for employment. In the last two budgets the government made significant efforts to improve incentives to work for low wage earners and the unemployed by reducing the burden of personal income taxation, extending the eligibility for certain social welfare benefits for the first three years of their employment, and by raising the level of personal tax allowances above the tax exemption limit. In September 1998, the government introduced interviews for young benefit claimants—under 25 years of age—which led to a significant reduction in the number of benefit recipients. In the first six months of interviews, 61 percent of those contacted left the Live Register, with a substantial portion of the leavers never turning up for the interviews. This, however, is not the first-best solution, since only about half of those leaving long-term unemployment are progressing to work, education, or training, while the rest leave the labor force.

3. The current government considers the introduction of the minimum wage as a priority step in addressing the issue of social exclusion, marginalization, and poverty. The National Minimum Wage Commission, appointed in July 1997, recommended that a minimum wage be set at the rate of two-thirds of the median wage for full-time workers, which at that time was equivalent to IR£ 4.40 per hour. The Commission also recommended setting a lower rate of 70 percent of the full rate for young workers under 18 years of age, and also a separate training rate for job entrants without experience, regardless of age. This reduced rate was proposed to apply on the basis of a sliding scale—at 75 percent of the full rate in the first year of work, increasing to 80 percent and 90 percent of the full rate in the second and third years, respectively.

4. The next section of the paper gives a brief summary of the composition of unemployment in Ireland, and the third part examines the effects of changes in social welfare and tax systems on incentives to work, faced by unemployed and low-income workers. The fourth section of the paper studies the potential demand and supply effects of the introduction of the NMW, and the last section is the conclusion.

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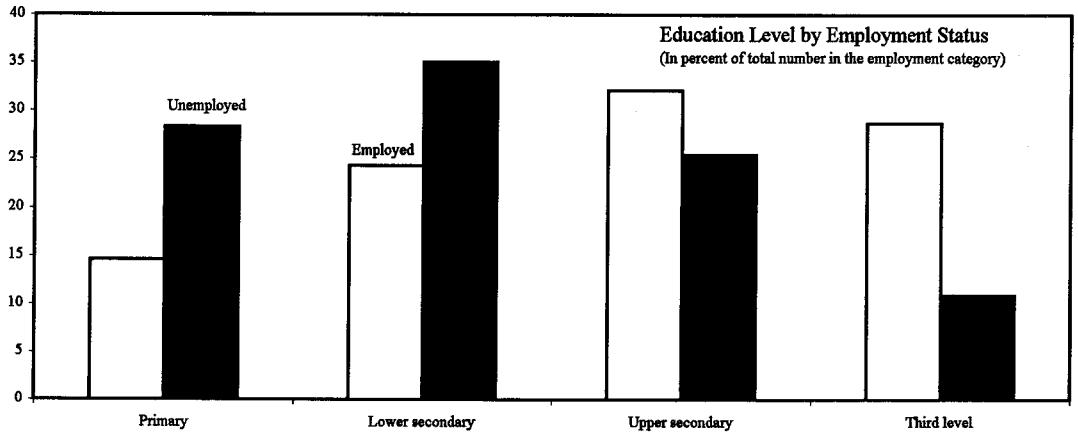
[36] Prepared by Natasha Koliadina.

B. Composition of Unemployment

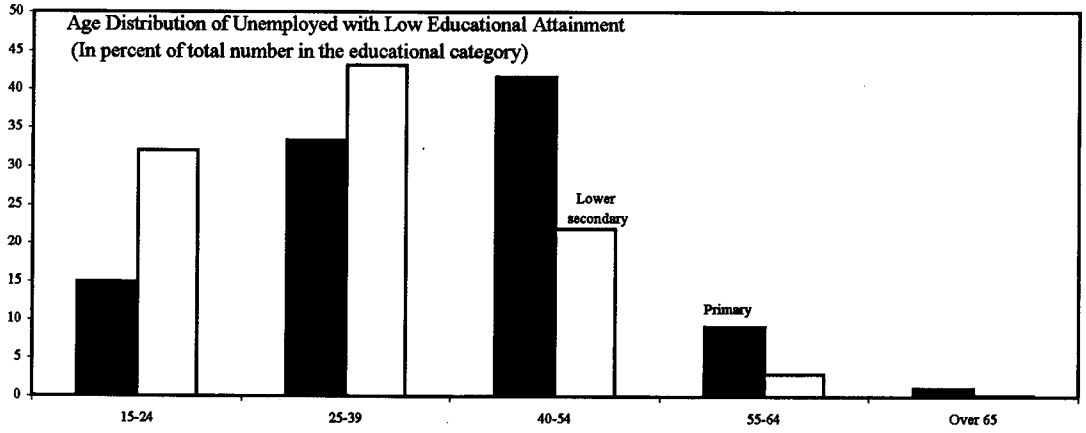
5. Changes in Ireland's economic structure—rapid expansion of high technology sectors and modernization and restructuring of indigenous industries—have shifted labor demand in favor of skilled labor, and reduced employment opportunities for unskilled workers.

6. The figure below indicates that the incidence of low educational attainment is much higher among unemployed, than those at work—almost two-thirds of unemployed have only a primary or a low secondary level of education, in contrast with 39 percent among employed.



Source: OECD.

7. Almost half of the group of people whose educational attainment is limited to a primary education are young—from 15 to 39 years of age—and unemployed. The share of the young and unemployed increases to 75 percent for the group whose educational attainment is limited to a lower secondary education.



Source: OECD.

8. The high proportion of young poorly educated unemployed people is a particular problem, since their chances of finding a job without additional training will diminish over time. The 1997 Annual School Leavers' Survey found that economic status of young people one year after leaving school was strongly related to the level of educational attainment, and that frequency of unemployment increased with low level of education.

9. Apart from work incentives, the economic status of working age people depends on market demand for certain types of labor, which determines an individual's employability in general, and the wage rate the person can command, in particular. As market demand shifts toward more skilled labor, the incidence of unemployment among unskilled workers would tend to increase and the differential between the wages of skilled and unskilled workers would tend to widen.

C. Changes in the Tax and Social Welfare Systems and Incentives to Work

10. The supply side of the labor market is affected by tax and benefit systems through their effects on incentives to work. Incentives to work are usually measured by replacement ratios, which are defined as the ratio of income when unemployed, to the net income from work—after taxes and transfers. Replacement ratios indicate the opportunity cost of staying out of work, compared with that of being employed. Both high levels of social welfare benefits and low levels of net earnings raise the opportunity cost of working and translates into high replacement ratios.

11. Individuals at low levels of income in Ireland face high replacement ratios, especially when the values of non-cash benefits are included. Replacement ratios in Ireland have been declining during the 1990s, and currently stand at an average rate of 51 percent, broadly in line with the European Union (EU) average. For low-income households, however, the average replacement ratio in Ireland is the second highest in the EU after Denmark.[37] As in other EU countries, people with low education in Ireland tend to have higher replacement ratios (76 percent) than those with high level of education (32 percent).[38] The proportion of unemployed persons among low-income households with replacement ratios in excess of 100 percent is strikingly high in Ireland—23 percent, compared with the EU average of 16 percent.

12. The designs of the tax and social welfare systems are important determinants of incentives to work. As suggested by the *Report of the Expert Working Group on the Integration of the Tax and Social Welfare Systems*, tax and social welfare policies had not been well coordinated in the 1980s and early 1990s, and multiple policy objectives of the

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[37] Salomäki and Munzi, p. 38.

[38] *Ibid.*, p. 40. A low level of education means that an unemployed person has a primary education and perhaps vocational training at work, but no institutional vocational training; a high level of education means college, or university.

government had also contributed to high replacement ratios. For example, significant increases in social welfare benefits and personal income taxation were responsible for high replacement ratios in the 1980s. By introducing a system of marginal tax relief and tax exemption limits in mid-1980s, as well as a family income supplement for low-paid workers, the government tried to offset the detrimental effect of high replacement ratios on work incentives.[39] This attempt, however, was not entirely successful since the combination of tax exemption limits, marginal tax relief and child additions resulted in a poverty trap—a situation, when individuals are worse off at higher, rather than lower gross income levels, because as gross incomes rise incomes net of taxes may fall. In addition, the policy of wage moderation tended to be supportive of high replacement ratios, since social welfare benefits increased in line with earnings.

13. Government measures directed at strengthening work incentives introduced in the last three budgets (1997–99) can be assembled in two broad categories: (1) changes in personal income taxation and social security contributions; and (2) changes in eligibility and levels of social welfare benefits. In the 1997 and 1998 budgets, tax measures included narrowing the gap between general tax exemption limits and personal tax allowances, widening the standard income tax band, and reducing the standard rate of personal income tax and that of the pay-related social insurance contributions. The income threshold to qualify for a Family Income Supplement was raised, and calculation of entitlement to the benefit was switched from gross to a net basis.

14. The replacement ratios, calculated by the Department of Finance, are broadly based. They take into account cash and non-cash payments received by the unemployed, including the value of the medical card and that of other secondary benefits. Net income from work is calculated, including the family income supplement and excluding any amount for travel costs.

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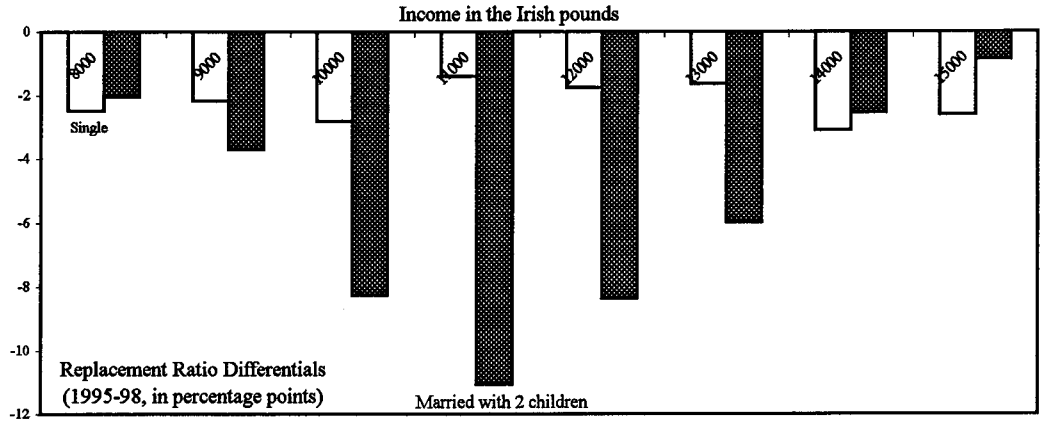
[39] Exemption limits are income thresholds below which the taxpayer pays no income tax, and child additions increase this limit for every dependent child. Marginal relief is designed to avert a sharp increase in tax liability (if computed by applying the standard rate to income net of allowances) as income passes the exemption limits. The system of marginal relief ensures that only income in excess of the relevant exemption limit is taxed at a maximum rate of 40 percent.



Source: The Department of Finance, OECD, and staff estimates.

15. As suggested by the figure above work incentives increased most for households with two children on incomes in the range of IR£10,000–13,000, while work incentives for single people did not improve significantly.[40] Changes in replacement ratios in 1995–98 were broadly in line with changes in average marginal rates of taxation (for all groups of taxpayers), but a larger decline in replacement ratios of married people with two children was the most likely to reflect changes in the calculation of entitlements to the family income supplement. [41]

16. In the 1999 budget, personal tax allowances were raised to the level in excess of general exemption limits for people under 65 years of age, and it was announced that these measures would allow the government to remove more than 80,000 taxpayers from the tax net. The personal income tax measures are expected to reduce the average rate of taxation of a single person by about 3 percent, and that of a married individual with two children by 1.5 percent. The figure below illustrates effects of the tax package of the 1999 budget across different income groups.

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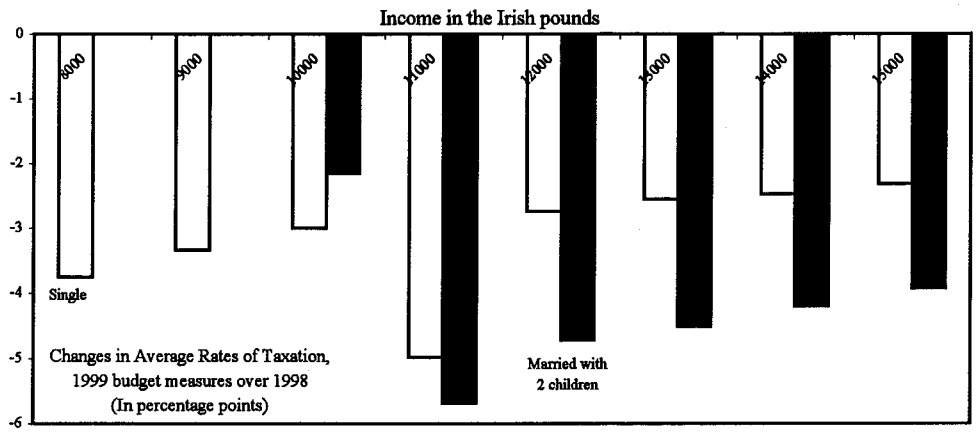
[40] Replacement ratios estimated by the Department of Finance do not take into account all special schemes designed to improve work incentives of the long-term unemployed. For example, a new program *Job Assist,* which is a special tax allowance for the long-term unemployed, was introduced in 1998, and is not reflected in the estimation of replacement ratios. Under this program an employee receives a tax break of IR£ 3000 and additional IR£ 1000 for each additional dependent child. This tax break tapers off over a three-year period.

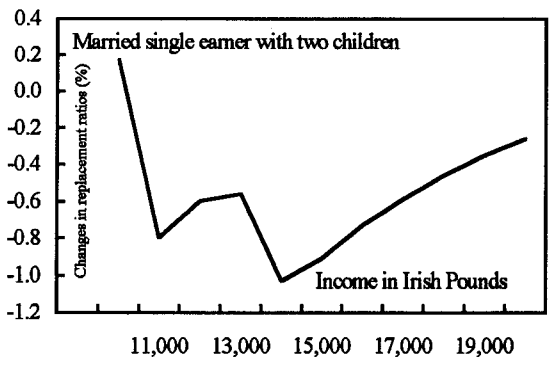
[41] However, in reality its importance for improving incentives to work is limited by a low uptake of this benefit.



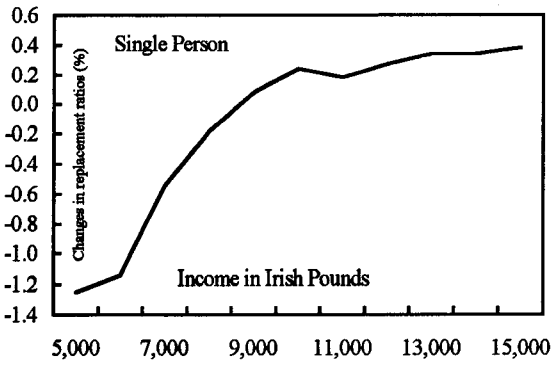
Source: The Department of Finance, and staff estimates.

17. These measures, however, are not expected to have a significant effect on replacement ratios (See figures below). Gains from increases in social welfare benefits would in many cases offset at least, partially, improvements arising from the tax package.

Changes in 1999 budget over 1998[1/]



Changes in 1999 budget over 1998[1/]



1/ A negative number denotes a decline in the replacement ratio (for a specific type of worker at given income level) due to measures in the 1999 budget. Median annual earnings in 1999 are estimated at IR£15,000.

D. Labor Market Effects of the Introduction of the Minimum Wage[42]

18. The government has announced its intention to set the minimum wage at IR £ 4.40 per hour when it is introduced early next year. However, unions are currently pressing for a realignment of the rate to two-thirds of current median earnings—approximately IR£5 per hour as of December 1998.

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[42] The section is based on the study of "The Impact of the Minimum Wage in Ireland", prepared by the *Inter-Departmental Group on the Implementation of a National Minimum Wage*.

19. Even at IR£4.40 per hour, the proposed NMW rate appears high compared with minimum wages of other industrialized countries (see table below). In addition, although the share of employees affected by the introduction of the NMW has fallen by more than 40 percent in comparison with that estimated in 1997, it is still high by international standards: about 13.5 percent of all employees would have a wage rate below IR£4.40 per hour in 2000, which is broadly in line only with Mexico and France, where the share of employees affected by minimum wages was 17.6 percent and 11 percent, respectively.[43] As suggested by OECD, in all other cases the share of those affected by minimum wages was significantly lower than that in Ireland, varying in the range of 3.7-5.1 percent of total employment, which suggests that the effects of the NMW on the wage structure in Ireland could be larger than in other countries.

Table 1. Minimum Wages in 1998

	U.S. Dollar/hour	As a ratio of average earnings
Ireland (proposed)	6.0	0.58
France	7.2	0.55
United Kingdom	5.4	0.38
United States	5.2	0.39

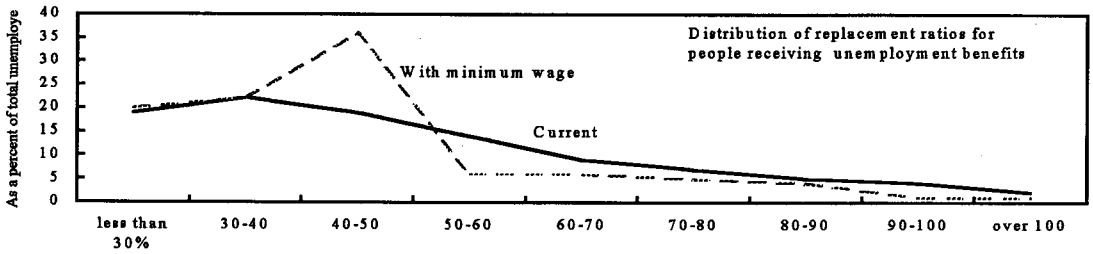
Source: Authorities and staff estimates.

20. An Inter-Departmental Group commissioned by the government to study the likely impact of the NMW on employment, competitiveness, and inflation, however, found that the employment effects of the NMW are likely to be relatively limited. In the long run the introduction of the NMW was expected to result in a reduction in employment of less than 1 percent, and an increase in the unemployment rate of 0.5 percentage points. The Group's report suggests that the introduction of the NMW would also improve incentives to work and be instrumental in raising the labor supply, although the effects on the labor demand appear to be downplayed. The effect on prices would also be limited with consumer prices estimated to rise by 0.5 percent. However, the NMW is not likely to meet its ultimate objective of poverty reduction, given that most families gaining from the minimum wage in terms of disposable income are in the middle of the income distribution. These findings are discussed in greater detail below.

[43] OECD.

NMW and incentives to work

21. While most families gaining from the NMW in terms of disposable income are in the middle of the income distribution, low-paid workers and the unemployed are also expected to benefit. The work incentives of these two groups will improve significantly, and thus replacement ratios will decline, since the level of wages they face on the free market is significantly below the proposed NMW rate. The figure below shows how the distribution of replacement ratios for the unemployed shifts when the NMW is introduced. In particular those currently experiencing a replacement ratio above 50–60 percent (i.e., most unemployed, low-wage earners) would find their ratio pushed down below 50 percent (peaking at 40–50 percent).



22. Gains from the introduction of the NMW vary by the composition of the household. The majority of those gaining from the introduction of the NMW are single employees or two-earner families, and only 3 percent of single earner families are likely to be affected by the NMW. The effect is likely to be particularly significant for younger men with low education levels. However, the tax implication of returning to work and the reduction in social welfare payments are likely to weaken the incentives for people with more children.

23. The report estimates that the NMW will have a positive supply effect on labor force participation. (See table below.) Increased labor force participation itself was expected to generate an increase in unemployment of 23,700 (a 1.4 percentage point increase in unemployment rate), but this figure was scaled down by a factor of 10 on the assumption that only one-tenth of the potential labor market entrants will succeed in finding employment, and the rest will remain in their current non-participant status. Although not articulated in the report, there could be stronger effects on unemployment in the short run since even if only one-tenth of potential entrants succeed in finding jobs, many more previous nonparticipants would be looking for jobs, which automatically brings them into the labor force. If they do not succeed in finding a job, they would boost unemployment rates at least for the period of the job search.

Table 2. Summary of the Long-term Effects of the Minimum Wage on the Labor Market

	Employment		Unemployment		Labor Force	
	In thousands of people	As percent of total effect on employment (In percent)	In thousands of people	As percent of total effect on unemployment (In percent)	In thousands of people	As percent of total effect on the labor force (In percent)
Overall change	-13.5	100.0	8.9	100.0	-4.6	100.0
Direct demand effect 1/	-6.2	-45.8	4.6	51.3	-1.6	-35.3
Indirect demand effect 2/	-7.3	-53.8	1.9	20.9	-5.4	-116.2
Supply effect 3/	0.0	0.0	2.5	27.7	2.5	52.1

Sources: The Report of the Inter-Departmental Group and staff estimates.

1/ Direct demand effects include changes in demand for labor arising from an increase in labor costs, associated with the introduction of the NMW.

2/ Indirect demand effects include reduction in labor demand caused by a loss of competitiveness and/or restoration of wage relativities, triggered by the NMW.

3/ Supply effects reflect increase in labor supply as a result of improved by the NMW incentives to work.

NMW and labor demand

24. The report of the Inter-Departmental Group also looked at the demand implications of the NMW. As indicated by the table, the minimum wage will have a limited impact on employment which would decline by 13.5 thousand persons (or almost 1 percent). However, job losses would not automatically translate into an increase in unemployment since it is assumed that better skilled workers would leave the country in search of job opportunities elsewhere, and others would probably drop out of the labor force. Thus only two-thirds of those who lose their jobs would move into unemployment. Again, there could be higher effects on unemployment in the short run until the changes in the labor force take place.

25. The report takes the view that the direct implications of the NMW for labor demand will be different in tradable and nontradable sectors. In the tradable sector, where firms are price-takers, NMW is expected to raise labor costs, worsen competitiveness and reduce demand for labor. In the nontradable sector, where firms are price-setters, the demand for labor would not be affected by the NMW, since higher wages will be passed on to consumers in the form of higher prices. Increases in wages in the nontradable sector would translate into price inflation, which would have a dampening effect on real wages in the economy in general, assuming no attempts are made to restore wage relativities.

26. As suggested by the report, substitution and scale effects are much higher in the traded, rather than in the non-traded sector. Thus the long-run elasticity for labor demand is expected

to be significantly higher in the traded (-2.2 in food processing, for example), than in the nontraded sectors (-0.5 in traditional sectors).[44]

27. Notwithstanding the view that nontradable sectors overall would not shed labor in response to an increase in the wage rate, sectoral model simulations indicated that employment in the building and construction sector is likely to suffer most from the NMW (-2.5 thousand workers). Tradable sectors would also cut employment—in the high technology sector about 1.4 thousand workers are expected to be laid off, and another 1.2 thousand workers would lose their jobs in the traditional sector. The report estimated that almost 60 percent of the decline in employment in the traditional and food sectors would arise from a loss of competitiveness vis-à-vis the United Kingdom. An estimated increase in unit labor costs of 0.5 percent is expected to hit the international competitiveness of the traditional sector.

Summary of Firms' Survey

28. The survey of businesses undertaken by the Inter-Departmental Group is the only source of information on the potential reaction of employers to the introduction of the NMW. In the survey, respondents were asked to consider a situation in which the hourly wage of adult employees who were paid less than IR£4.50 were to rise to a minimum basic hourly rate of IR £4.50. The table below summarizes the results of the survey, indicating the share of those who gave positive responses to the respective questions.

Table 3. Summary of Positive Replies to the Survey Questions

Potential measures in response to the introduction of the NMW	Proportion of respondents who answered positively (In percent)
Cut back profit margins	59.7
Improve staff morale	61.8
Substitution of capital for labor	7.7
Productivity increase	22.0
Going out of business	16.7
Retraining/ upgrading staff	27.4
No effect on business	40.1
Reduce non-wage labor costs	15.1
Improve industrial relations	38.9
Reduce staff turnover	28.2

[44] Report, p. 68. The substitution effect reflects the substitution of a more expensive factor of production with a less expensive one, under the assumption that total income remains unchanged. The scale effect is the effect of the decline in output on employment.

29. As suggested by the table, private sector views were mixed regarding the impact of the minimum wage on their businesses: almost 60 percent of respondents did not rule out the possibility of the need to cut back profit margins, with the highest share of positive responses coming from the companies operating in the manufacture of textiles and apparel. Respondents also took an optimistic view on the effect of the NMW on the staff morale. Only 16.7 percent of all respondents considered the possibility of going out of business as a result of the introduction of the NMW. The reaction was particularly strong on the part of the manufacturers of textiles and apparel businesses and the hotel and restaurant sector—with respectively 37 percent and 25 percent of respondents deeming a bankruptcy possible.[45] The responses of the hotel and restaurant sector are noteworthy, given that the macro analysis implied that nontradable businesses would not be significantly affected by the introduction of the NMW, reflecting the assumption that they would be able to pass additional costs on consumer prices. A relatively low proportion of respondents believed that the introduction of the NMW would improve labor productivity, or would force workers to upgrade their skills.

E. Conclusion

30. The long-term unemployed are most likely to be low skilled and poorly educated individuals, with a potential "free market" wage rate close to the subsistence level of living. Wage rates of low skilled workers are likely to decline as the demand for low skilled labor weakens. This makes the objective of improving work incentives of the unemployed more challenging, as the level of social welfare benefits converges to their "free market" wages. The government has made progress in reducing the tax distortions for people on the low end of the wage structure. The replacement ratios, however, did not change significantly, in part because social welfare benefits were increasing in line with average earnings.

31. The study of the Inter-Departmental Group founds that the introduction of the NMW is not likely to be important for poverty alleviation, but would help to improve the work incentives of low-paid workers and unemployed. The study also found that the long-term effect of the NMW on employment and the unemployment rate is likely to be limited, but the transitory effect could be stronger.

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[45] While the share of the manufacture of textiles and apparel and the hotel and restaurant industry in total employment is not large—about 13 percent—the number of employees, whose wages are below the perceived IR£ 4.50 is high—33.2 percent and 49.3 percent, respectively.

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V. Structure and Performance of the Financial Sector[46]

1. This paper discusses **indicators of financial system soundness** based on the authorities' responses to the Fund's *Questionnaire for Financial Sector Surveillance,* [47] other official documents, as well as mission discussions . Following a description of the structure of the banking system in Ireland, the paper examines indicators on the vulnerability and solvency of the financial system and concludes with a brief description of supervision arrangements.

A. Structure of the Financial System

2. Ireland's **banking system** comprises banks and building societies, the latter whose role has been gradually declining. The broader **financial system** includes, in addition, a variety of nonbank financial institutions, including Collective Investment Schemes (mutual funds); investment intermediaries such as securities trading companies, portfolio management companies; exchanges and their member firms; and insurance and leasing companies. A **depositor protection scheme** provides coverage of 90 percent (including on nonresidents' deposits) up to a maximum of Euro15,000 (about IR£12,000). The fund, which amounted to IR£85 million at end-1998, is paid for by banks and administered by the Central Bank. In line with EU directives, legislation for an **investor compensation fund** was passed in August 1998. In the event an investment firm (e.g., stockbrokers, investment and insurance intermediaries) is unable to meet its obligations, the fund will pay out 90 percent of the amount invested by a client up to a maximum of Euro 20,000 (about IR£ 6,000). The scheme is funded by contributions from investment firms and is overseen by the Investor Compensation Company Ltd., a separate legal body, independent of the Central Bank.

3. As indicated by Table 1, **the banking system has expanded rapidly during 1995-98, primarily as a result of the growing number of foreign banks** in the International Financial Services Center (IFSC).[48] While foreign institutions currently own

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[46] Prepared by Sharmini Coorey, Natasha Koliadina, and Zenon Kontolemis.

[47] Based on the *Guidance Note for the Monitoring of Financial Systems under Article IV Surveillance* (SM/98/151), June 19, 1998.

[48] The IFSC, established in 1987, has developed into a significant center for a wide range of internationally traded financial services. The distinguishing feature from the rest of the financial system is qualification for tax advantages including a reduced (10 percent) rate of corporate taxes, relief from local municipal taxes, and tax relief for capital expenditure and rents on property. There are currently about 350 active projects employing some 4,500–5,000 people. The IFSC competes with other jurisdictions such as Luxembourg, the Channel Islands, and the Cayman Islands for international financial services business.

more than half of total assets, their role in the domestic market is limited since they are mainly involved in dealings with nonresidents. [49]

Table 1. Structure of the Banking System

	1995	1996	1997	1998
Number of banks:	44	45	48	54
Majority state-owned (as a percent of total assets)	6.65	6.03	5.14	4.83
Majority foreign-owned (as a percent of total assets)	33.21	39.19	48.55	52.98
Foreign branches (as a percent of total assets)	21.09	22.49	22.60	20.68
Number of banks accounting for:				
25 percent of total assets			3	3
75 percent of total assets			67	74
Nonbank deposit-taking institutions 1/	4	4	4	3
Percent of total assets	6.6	6.6	5.3	5.1
Percent of GDP	10.4	11.8	12.6	14.4

1/ Building societies.

4. **The banking system is highly concentrated.** As indicated by Table 1, 25 percent of total assets is concentrated in only 3 banks. If the IFSC is excluded, the concentration is even higher, with two banks accounting for almost half of private sector lending to residents.

B. Indicators of Vulnerability

5. As shown by Table 2, the assets of the banking system have grown rapidly in the last few years. Total banking system assets and loans to the nongovernment sector increased by about 70–80 percent in relation to GDP in the three years up to end-1998, mainly because of the growth of IFSC business with non-residents. **Lending to residents has also grown rapidly,** albeit at a somewhat slower pace. During 1995–98, the ratio of credit to the resident nongovernment sector to GDP increased by almost 40 percentage points, with most of the increase taking place during the last two years.

6. Growth in lending was backed in part by the **strong expansion in deposits**, although both for the system as a whole and vis-à-vis residents, deposits increased less sharply than assets. Central Bank lending to credit institutions rose sharply in 1997–98 to about 3½ percent of GDP, reflecting partial offset of the effects on market liquidity of foreign exchange market interventions in support of the Irish pound. The Central Bank has not

[49] The consolidated balance sheet of credit institutions includes both domestic credit institutions and IFSC-based institutions. IFSC activities are identified only by their qualification for tax advantages; no distinction is made between domestic and offshore operations from a regulatory point of view.

provided liquidity support to the banking system during the past five years and there are no formal lender of last resort facilities in place. (Compensation has never been paid under the depositor protection scheme).

7. **The foreign currency-denominated asset and liability positions remained closely matched.**[50] With the increasing importance of IFSC activities, the ratio of foreign assets in total bank assets rose from roughly 60 percent of assets in 1995 to some 80 percent of assets in 1998. However, **net external liabilities rose sharply to almost 11 percent of total domestic assets in 1998,** as assets vis-à-vis residents grew more rapidly than domestic liabilities.

Table 2. Assets and Liabilities of the Banking System

	1995	1996	1997	1998
		Total		
Total assets as a percent of GDP	156.6	177.6	235.7	279.2
Foreign currency-denominated				
Assets (as a percent of total assets)	60.6	67.8	76.7	79.3
Liabilities (balance sheet/ as a percent of total assets)	59.6	66.9	75.8	80.3
of which, less than 30 days to maturity (as a percent total assets)	4.7	3.2	2.9	2.8
Total loans to non-government sector (as a percent of GDP)	98.1	113.6	151.2	168.7
of which, real estate (as a percent of total loans)	24.4	22.04	18.3	17.9
Contingent and off-balance sheet accounts (percent of total assets)			447.0	454.5
Total deposits, excluding interbank (as a percent of GDP)	95.2	104.2	123.1	136.8
Central Bank credit to banks (as a percent of GDP)	0.32	0.72	3.51	3.34
		Vis-à-vis residents		
Total Assets as a percent of GDP	95.4	97.2	110.7	124.3
Total Liabilities as a percent of GDP	84.0	89.5	104.1	110.8
Total Loans to non-government sector (as a percent GDP)	74.2	78.9	91.5	102.9
of which, real estate (as a percent of total loans)	38.0	37.6	35.3	34.3
Household credit (as a percent of GDP)	-	33.2	35.8	39.1
Total Deposits as a percent of GDP	69.4	74.2	79.7	86.0
Net External Liabilities (vis-à-vis non-residents)	11.4	7.8	6.6	13.5
Net External Liabilities as a percent Total Assets	11.9	8.0	6.0	10.9

8. **Credit to the resident private sector is concentrated in real estate activity**, with the ratio of real estate credits to total loans amounting to some 34 percent in 1998, following a small decline over the past few years. Households accounted for 38 percent of credit to the resident nongovernment sector in 1998. Nonbank financial intermediaries (especially leasing

[50] Although no limits are imposed on open position in foreign currencies, capital adequacy requirements are imposed on open foreign exchange positions. Off-balance sheet items are included in the calculation of the open position.

companies), which also lend to households, accounted for another 27 ½ percent. Mortgages accounted for more than 75 percent of lending to the household sector.

9. Banks are required not to have risk assets amounting to more than 200 percent of own funds (capital) concentrated in any one sector or economic activity which is subject to a common predominant risk factor. Where a common risk could be considered to apply to two or more separate sectors (e.g., property development and building sectors), no more than 250 percent of own funds can be employed with such sectors in aggregate.

10. **There appears to be substantial activity related to derivatives**, with total contingent and off-balance sheet accounts amounting to over 450 percent of total assets in 1998.[51] The bulk of the derivatives seems to comprise foreign exchange and interest swaps and the amount of complex transactions is apparently not large. The central bank requires institutions to have proper procedures and measurement systems in place for derivative activities and imposes capital requirements on such activities in line with best international practices.

C. Indicators of Profitability and Solvency

11. **Profitability remains relatively high by international standards.** However, the average pre-tax returns declined from 1.4 percent in 1995 to 1.1 percent in 1998 in part reflecting increased competition and a reduction in borrowing-lending spreads (Table 3).

Table 3. Indicators of Profitability

	1995	1996	1997	1998
Average pretax return on total assets (in %)	1.4	1.37	1.3	1.1
Net interest margin (in %)	3.1	2.7	2.4	1.8
Risk-weighted capital/asset ratio	14.4	13.5	12.4	15.7
Overall stock market price index	2,232	2,726	4,054	4,996
Bank stock price index	2,551	3,018	5,309	8,173

12. Notwithstanding rapid growth in lending, **credit institutions remain well capitalized**: The average risk-weighted capital-asset ratio increased from 12.4 percent in1997 to 15.7 percent in 1998—with required capital-asset ratios for individual institutions

[51] The reporting of off-balance sheet items is in accordance with the provisions of the EU solvency ratio and capital adequacy Directives which set out requirements in relation to calculating the credit equivalent amount and application of applicable risk weightings to capture credit and market risks. In the case of interest-rate and foreign exchange related items these are marked-to-market in determining the appropriate credit equivalent.

ranging from 8 percent to 20 percent.[52] The recent rise in the average capital-asset ratio may be attributed at least partly to increased retained profits.

13. Credit institutions are expected to review their **asset quality** at least on an annual basis. For assets of a deteriorating quality, this review should take place quarterly. No standard asset quality criteria are applied, but the Central Bank expects each institution to assess the quality of its loan book on a conservative basis—rating and scoring systems are encouraged. Asset quality and the systems used to assess them are subject to review by supervisors during on-site inspections. Aggregate data on **nonperforming loans** are available only for 1997 and 1998, and do not show a deterioration in the ratio of nonperforming loans to total lending.[53] This indicator, however, tends to lag the economic cycle and, hence, would not necessarily capture the quality of the portfolio in the event of an adverse shock, or an economic downturn.

Table 4. Provisioning Against Bad Loans

	1995	1996	1997	1998
Nonperforming loans, substandard or lower quality (percent total loans)			2.77	2.43
Total provisions for loan losses (percent of nonperforming loans):			41.80	42.34
Specific provisions			22.90	21.62
General provisions			18.89	20.71
Total provisions for loan losses (percent of total loans):	2.07	1.49	1.16	1.03
Specific provisions	1.45	0.97	0.63	0.53
General provisions	0.62	0.52	0.52	0.50

14. Total **provisions** against bad loans comprise specific provisions and general provisions. Specific provision is made against a loan or other receivable, when the estimated repayment is likely to fall short of the balance. General provision is made in relation to latent losses which, although not specifically identified, are known to be present in any portfolio. The Central Bank can request institutions to increase the level of provisions if it is deemed inadequate; its recommended level of general provisioning is 1 percent of the loan portfolio. Total provisions as a share of total loans has declined since 1995, mainly as a result of a fall in specific provisions. General provisions have remained broadly unchanged at around 0.5 percent, reflecting the increase in the number of IFSC banks which typically have a very high quality loan portfolio comprising sovereign or sub-sovereign exposures.

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[52] If new IFSC-based banks were included, the risk-weighted capital-asset ratio was estimated to be 38.6 percent in 1998.

[53] Aggregate data in nonperforming loans are not available prior to 1997 because these data were not collected as part of the monthly statistical returns from credit institutions. Such information would, however, have been provided by individual credit institutions during reviews and inspections.

D. Supervision

15. The **Central Bank** has full responsibility for the supervision and regulation of the banking system and most non-bank financial institutions and exchanges, including those operating within the IFSC, other than insurance and assurance companies (a total of 933 institutions of which 78 are banks). The **Minister of Finance** has a statutory role in specified circumstances (e.g., with regard to the refusal to grant a banking license or to the revocation of a banking license or acquisition of banks with significant assets in Ireland). Insurance and assurance companies, including those based in the IFSC, are subject to statutory regulation by the **Minister of Enterprise, Trade and Employment**.[54]

16. The **legislative basis** for the Central Bank's supervision comprises 15 statutes and 19 EU directives that together provide a modern supervisory framework which meet or exceed international standards. All relevant EU directives on banking regulation and supervision have been implemented. In certain circumstances, supervisory decisions may be subject to appeals procedures or judicial review by the High Court.

17. **The objectives of supervision,** as stated by the Central Bank, are to protect the stability of the banking and financial system and to provide a degree of protection to depositors and investors. The prevention of commercial failures is not an objective of regulation.

18. The **licensing/authorization process** is fundamental to supervision as the process seeks to prevent the establishment of unsuitable financial institutions in Ireland. Where necessary, detailed supervisory requirements are imposed at the time of authorization. Central Bank has the exclusive authority to license banks, although when a license application is refused or an existing license is revoked, the consent of the Minister of Finance is required. Written licensing guidelines are provided in the *Licensing and Supervision Requirements and Standards for Credit Institutions* issued by the Central Bank

19. The approach to supervision is tailored to reflect the risks associated with each type of institution and activity. A range of supervisory techniques, both quantitative and qualitative, is used:[55]

- **Quantitative techniques** include requirements in relation to capital, liquidity, large exposures, sectoral concentrations, holding of client assets, etc.

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[54] There has been a rapid increase in the number of insurance companies in the IFSC recently.

[55] The Central Bank currently has [34] staff involved in banking supervision who are involved in all aspects of supervision including off-site and on-site inspection as well as the evaluation of applications for licenses.

- Monitoring of compliance with quantitative requirements is carried out off-site by means of **regular mandatory reporting** to the Bank. All credit institutions must submit monthly prudential returns on a consolidated basis (also quarterly for banking groups). Reporting requirements include details of solvency, liquidity, large exposures, sectoral concentrations, nonperforming loans, bad debt provisions, and arrears statistics. These are used as **early warning indicators** by the Bank in assessing potential difficulties in individual banks and the banking system as a whole.

- **Regular review meetings** are held with senior management of supervised entities at which a wide range of supervisory issues is discussed. These meetings would also assist in predicting potential financial system difficulties.

- **With regard to internal controls**, credit institutions have a statutory requirement to put in place comprehensive risk management systems incorporating continuous measuring, monitoring and controlling of risk, accurate and reliable management information systems, timely management and thorough audit and control procedures.

- The Central Bank's policy is for each credit institution to be subject to **periodic on-site inspections** which include examination of books and records, assessment of compliance with supervisory and legislative requirements. Inspections can be broad, examining most of the institution's main activities, or can focus on a specific area. Supervisors usually examine internal audit functions and evaluate internal control systems. The allocation of inspection resources reflect the different nature of supervised institutions and the risks involved. Frequency ranges from one or more inspections a year to one every 2–3 years. Annual inspections are carried out on institutions for which the Central Bank has ultimate home country control with coverage planned to ensure that all significant institutions are inspected annually. Some 116 inspections were carried out in 1998 (including 25 inspections of banks) compared with 87 inspections in 1997 (of which 30 were of banks). Coverage amounted to about 39 percent for banks and building societies. A post-inspection meeting is held and letter issued to the Chairman of the institution setting out findings and recommendations, and requesting a formal response from the Board. The adequacy of the response is assessed by the Bank and followed up, as appropriate.

- In general, the Bank has discretion regarding the **action** to be taken when prudential standards are breached, although in certain cases, the law obliges specific actions.

20. Supervisors also rely on banks' **external auditors** who have specific obligations under the law. While external audits of prudential returns are not specifically required, external auditors have a statutory duty to report to the Central Bank if, during the course of their audit, they believe that there are material inaccuracies or omissions in returns to the Bank. External audits are required on banks' annual financial statements, and any material inaccuracies in or omissions from banks' financial statements relevant to the ability to issue a "clean" opinion have to be brought to the attention of the Bank.

21. **No distinction is made between entities operating inside or outside the IFSC from a regulatory point of view.** About half of the Central Bank's supervisory resources are devoted to IFSC-based entities. According to the Bank, the majority of the licensed banks in the IFSC concentrate on relatively low-risk, low-margin credit facilities to high-quality international corporate customers, central and regional governments, and banks. For the most part, funding is obtained from wholesale sources and from parent banks. IFSC banks that engage in derivatives and other complex financial transactions are subject to stricter limits and controls than those with lower risk business. Since April 1998, the Bank has allowed ownership of banks by commercial companies. Such entities are subject to quite stringent additional requirements to address potentially high risks arising from this ownership link. Similarly, as larger investment intermediaries typically carry more risk than smaller firms, they are subject to a more rigorous regulatory regime.

22. As noted in the 1998 *Annual Report* of the Central Bank, given the high rates of credit growth, **supervisory authorities have focused their recent activities on risk assessment systems.** The Bank has warned credit institutions on a number of occasions against the dilution of traditional lending standards, particularly with regard to house purchases. The Bank has also carried out on-site inspections and reviews of credit institutions, focusing on underwriting standards, derivative transactions and other trading activities, as well as on the adequacy of internal control systems. In 1998, the Bank undertook a survey of lending practices by credit institutions engaged in mortgage lending covering such items as loan to value ratios, income multiples, and underwriting practices including stress testing, credit scoring, and mortgage indemnity insurance. According to the Bank, the results indicated reasonable lending standards were being applied and there was no evidence of a deterioration in asset quality. Nevertheless, the Bank decided to specifically monitor the situation with regard to mortgage lending. Following a series of inspections, the Governor wrote to these institutions in April 1999 highlighting a number of specific concerns and requesting a response from the Boards of the institutions. Following a preliminary examination of the responses, the Bank recently decided to ask credit institutions to carry out specific sensitivity analysis with regard to a deterioration in macroeconomic conditions.

Table A1. Ireland: National Accounts

	1994	1995	1996	1997	1998 Prel.	1999 Proj.
	(In millions of Irish pounds at 1995 prices)					
Consumption	28,120	29,111	30,783	32,866	35,189	37,567
Private	22,114	22,934	24,432	26,211	28,142	30,239
Public	6,006	6,177	6,351	6,655	7,047	7,329
Investment	6,147	7,552	8,752	10,409	12,144	13,345
Gross domestic fixed capital formation	6,275	7,124	8,280	9,724	11,355	12,945
Stockbuilding	-128	428	472	685	789	400
Total domestic demand	34,267	36,663	39,535	43,275	47,333	50,912
Exports of goods and nonfactor services	25,779	30,837	34,462	40,326	48,604	54,048
Aggregate demand	60,046	67,500	73,997	83,601	95,937	104,960
Imports of goods and nonfactor services	22,719	26,369	29,539	34,293	42,260	47,648
Net exports	3,061	4,468	4,923	6,033	6,344	6,399
GDP at market prices	36,479	41,028	45,210	51,823	59,637	66,869
Net factor income from abroad	-3,576	-4,508	-5,063	-6,321	-7,454	-8,399
GNP at market prices	32,885	36,503	40,146	45,500	52,183	58,431
			(Real growth rates)			
Consumption	4.3	3.5	5.7	6.8	7.1	6.8
Private	4.3	3.7	6.5	7.3	7.4	7.5
Public	4.1	2.9	2.8	4.8	5.9	4.0
Investment	12.0	22.9	15.9	18.9	16.7	9.9
Gross domestic fixed capital formation	12.0	13.5	16.2	17.4	16.8	14.0
Stockbuilding 1/	--	1.5	0.1	0.5	0.2	-0.7
Total domestic demand	5.6	7.0	7.8	9.5	9.4	7.6
Exports of goods and nonfactor services	14.7	19.6	11.8	17.0	20.5	11.2
Aggregate demand	9.3	12.4	9.6	13.0	14.8	9.4
Imports of goods and nonfactor services	15.1	16.1	12.0	16.1	23.2	12.7
Net exports 1/	0.9	3.8	1.1	2.5	0.6	0.1
Gross domestic product	5.8	9.5	7.7	10.7	8.9	7.5
Net factor income from abroad 2/	-0.2	-2.6	-1.5	-3.0	-2.2	-2.0
Gross national product	6.3	8.0	7.2	9.0	8.1	6.7

Sources: Central Statistics Office, National Income and Expenditure; and data provided by the Irish authorities.

1/ Contribution to GNP growth.
2/ Contribution to GDP growth.

Table A2. Ireland: Distribution of National Income

	1992	1993	1994	1995	1996	1997	1998 Prel.
	(In millions of Irish pounds at current prices)						
Income from agriculture, forestry, and fishing	2,147	2,202	2,301	2,441	2,499	2,390	2,301
Wages and salaries 1/	234	236	237	243	241	254	260
Income from self-employment and other trading income other trading income	1,913	1,966	2,064	2,199	2,258	2,136	2,041
Nonagricultural income	23,901	26,361	27,855	31,774	35,004	40,004	46,623
Wages and salaries 1/	14,868	16,030	17,069	18,414	19,959	22,089	24,542
Of which: Employers' contributions to social insurance	962	1,040	1,104	1,192	1,202	1,353	1,508
Profits, professional earnings, interest, dividends, and rents	10,431	10,956	11,595	14,276	15,376	18,229	22,548
Adjustment for stock appreciation	-162	-246	-420	-360	115	-46	76
Adjustment for financial services	-1,235	-1,419	-1,493	-1,749	-1,648	-1,621	-2,051
Net factor income from abroad	-3,225	-3,541	-3,594	-4,525	-5,064	-6,323	-7,454
Statistical discrepancy							
Net national product at factor cost	243	254	194	103	329	556	201
(= national income)	21,830	23,856	25,263	28,044	31,120	35,006	39,620
Indirect taxes less subsidies	3,264	3,181	3,907	4,322	4,498	5,387	6,489
Depreciation	3,087	3,334	3,715	4,137	4,528	5,107	6,074
Gross national product at market prices	28,181	30,370	32,885	36,503	40,146	45,500	52,183

Sources: Central Statistics Office, National Income and Expenditure; and data provided by the Irish authorities.

1/ Including employers' social insurance contributions.
2/ Deflated by personal consumption deflator.

Table A3. Ireland: Gross Capital Formation

	1992	1993	1994	1995	1996	1997
	(In millions of Irish pounds at constant 1990 prices)					
Gross domestic fixed capital formation	4,699	4,532	5,085	5,640	6,410	7,106
Building and construction	2,833	2,573	2,905	3,272	3,882	4,397
Dwellings	1,330	1,199	1,518	1,695	1,991	2,199
Roads	246	311	255	286	296	335
Other	1,257	1,063	1,132	1,291	1,595	1,863
Machinery and equipment	1,866	1,959	2,180	2,368	2,527	2,708
Transport	724	722	920	1,091	1,124	1,237
Agricultural	88	88	124	147	151	149
Other	1,054	1,149	1,136	1,129	1,252	1,322
Change in stocks	-79	-129	-228	347	414	555
Agriculture	88	-5	53	87	95	125
Nonagriculture	-166	-124	-281	261	319	430
Gross domestic capital formation	4,620	4,403	4,857	5,988	6,824	7,661
	(Changes in percent)					
Gross domestic fixed capital formation	-1.9	-3.6	12.2	10.9	13.7	10.9
Building and construction	-0.1	-9.2	12.9	12.6	18.6	13.3
Dwellings	7.4	-9.8	26.6	11.7	17.5	10.4
Roads	11.5	26.4	-18.0	12.2	3.5	13.2
Other	-8.7	-15.4	6.5	14.0	23.5	16.8
Machinery and equipment	-4.5	5.0	11.3	8.6	6.7	7.2
Transport	-11.5	-0.3	27.4	18.6	3.0	10.1
Agricultural	4.5	0.0	40.9	18.5	2.7	-1.3
Other	0.2	9.0	-1.1	-0.6	10.9	5.6
Gross domestic capital formation	-14.9	-4.7	10.3	23.3	14.0	12.3
Memorandum items:						
As percent of nominal GNP						
Domestic fixed capital formation	18.7	17.6	18.5	19.3	21.0	22.5
Domestic capital formation	18.4	17.1	18.0	20.5	22.1	23.8
As percent of nominal fixed capital formation						
Building and construction	60.9	57.2	58.1	59.1	63.0	66.2
Machinery and equipment	39.1	42.8	41.9	40.9	37.0	33.8

Sources: Central Statistics Office,□National Income and Expenditure; and data provided by the Irish authorities.

1/ Preliminary.

Table A4. Ireland: Sectoral Origin of Gross National Product

	1991	1992	1993	1994	1995	1996	1997	1998
				(In millions of Irish pounds at current prices)				
Agriculture, forestry, and fishing	1,873	2,155	2,211	2,303	2,444	2,501	2,391	2,302
Industry	8,537	9,086	9,904	10,786	12,757	13,548	16,151	18,860
Distribution, transport, and communications	4,152	4,292	4,754	4,949	5,463	6,113	6,975	7,885
Public administration and defense	1,510	1,603	1,719	1,771	1,817	1,908	2,039	2,184
Other domestic	8,197	9,074	10,221	10,768	12,095	13,318	14,885	17,617
Adjustment for financial services	-1,095	-1,235	-1,419	-1,493	-1,749	-1,648	-1,621	-2,051
GDP at factor cost	26,744	28,142	30,731	32,572	36,706	40,711	46,437	53,148
Net indirect taxes	2,840	3,264	3,181	3,907	4,322	4,498	5,387	6,489
GDP at market prices	29,584	31,406	33,912	36,479	41,028	45,210	51,823	59,637
Net factor income from abroad	-2,809	-3,225	-3,541	-3,594	-4,525	-5,064	-6,323	-7,454
GNP at market prices	26,775	28,181	30,370	32,885	36,503	40,146	45,500	52,183
				(As percent of GNP)				
Agriculture, forestry, and fishing	7.0	7.6	7.3	7.0	6.7	6.2	5.3	4.4
Industry	31.9	32.2	32.6	32.8	34.9	33.7	35.5	36.1
Distribution, transport, and communications	15.5	15.2	15.7	15.0	15.0	15.2	15.3	15.1
Public administration and defense	5.6	5.7	5.7	5.4	5.0	4.8	4.5	4.2
Other domestic	30.6	32.2	33.7	32.7	33.1	33.2	32.7	33.8
Adjustment for financial services	-4.1	-4.4	-4.7	-4.5	-4.8	-4.1	-3.6	-3.9
GDP at factor cost	99.9	99.9	101.2	99.0	100.6	101.4	102.1	101.8
Net indirect taxes	10.6	11.6	10.5	11.9	11.8	11.2	11.8	12.4
GDP at market prices	110.5	111.4	111.7	110.9	112.4	112.6	113.9	114.3
Net factor income from abroad	-10.5	-11.4	-11.7	-10.9	-12.4	-12.6	-13.9	-14.3
GNP at market prices	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
				(Real growth rates)				
Agriculture, forestry, and fishing	-2.1	8.2	-7.6	-2.4	-2.3	4.1	3.0	0.5
Industry	2.9	6.3	2.4	10.2	14.9	8.7	15.0	13.6
Distribution, transport, and communications	0.3	-8.9	8.4	2.7	10.3	16.2	10.0	9.5
Public administration and defense	-0.5	1.8	0.1	-0.5	1.3	1.7	0.3	9.5
Other domestic	3.8	4.8	3.5	4.3	5.7	2.9	5.4	7.0

Source: Central Statistics Office, National Income and Expenditure.

Table A5. Ireland: Industrial Production
(Annual volume changes in percent)

	1992	1993	1994	1995	1996	1997	1998	1998			
								Qtr 1	Qtr 2	Qtr 3	Qtr 4
Food	9.4	5.0	7.6	10.9	0.8	1.0	7.4	16.2	2.1	7.2	4.6
Beverages and tobacco	-0.2	-0.2	5.9	5.2	4.9	6.4	0.4	4.7	3.7	-3.2	-3.3
Textiles	5.7	2.5	2.4	0.7	-5.2	2.2	1.8	3.5	8.8	-4.9	0.2
Clothing, footwear, and leather	-4.9	-6.4	-4.5	-3.6	0.6	-14.3	-10.5	-14.2	-14.9	-7.3	-3.9
Wood and furniture	2.3	1.1	10.6	5.4	7.9	19.5	4.8	18.3	20.7	-1.4	-13.9
Paper and printing	9.3	7.0	2.0	11.0	0.3	8.6	5.0	-2.3	9.0	11.0	2.5
Chemicals	17.0	10.2	19.6	15.7	18.3	32.1	29.7	34.1	26.0	30.4	28.6
Nonmetallic mineral products	4.0	-3.7	10.8	9.0	9.9	20.6	5.7	18.8	1.8	2.0	1.6
Metals and engineering (including transport equipment)	11.4	5.9	15.9	33.8	8.0	17.5	17.3	13.7	18.9	16.9	19.6
Miscellaneous industries	4.3	-2.0	8.1	6.8	-1.3	5.8	2.8	10.6	9.1	1.9	-8.8
Total manufactures	10.0	5.4	12.7	20.2	8.2	16.8	16.7	17.4	16.7	16.2	16.4
Mining, quarrying, and turf	-8.4	21.7	-4.3	11.8	3.3	-5.5	3.2	4.0	-5.4	-0.4	12.7
Total transportable goods industries 2/	9.6	5.6	12.5	20.2	8.1	16.1	16.6	18.0	15.7	16.5	16.2
Electricity, gas and water	3.9	5.6	4.9	3.1	5.2	3.9	2.4	0.9	5.7	1.2	1.8
All industries 3/	9.1	5.6	11.9	19.0	7.9	15.4	15.7	16.0	16.2	15.2	15.5

Source: Central Statistics Office, Industrial Production Index.

1/ Quarterly data are seasonally adjusted.
2/ Includes manufacturing, mining, quarrying, and turf production.
3/ Includes transportable goods, electricity, gas, and water.

Table A6. Ireland: Summary of Balance of Payments

	1992	1993	1994	1995	1996	1997	1998
			(In millions of Irish Pounds)				
Current account balance	320	1,249	998	1,070	1,264	1,282	563
Trade balance	3,501	4,827	5,396	7,459	8,755	11,071	14,869
Exports of goods	16,505	19,460	22,424	27,698	30,723	36,515	45,562
Imports of goods	-13,004	-14,633	-17,028	-20,239	-21,968	-25,444	-30,693
Services	-1,217	-1,367	-1,978	-2,991	-3,781	-4,755	-7,890
Services: Credit	2,376	2,573	2,884	3,139	3,618	4,125	4,743
Services: Debit	-3,593	-3,940	-4,863	-6,130	-7,399	-8,880	-12,633
of which Royalties	-654	-897	-1,218	-1,617	-2,071	-2,618	-4,232
Credit	23	45	60	82	63	78	121
Debit	-677	-942	-1,278	-1,699	-2,134	-2,696	-4,353
Balance on goods and services	2,284	3,461	3,418	4,468	4,974	6,316	6,979
Factor incomes	-3,210	-3,521	-3,575	-4,508	-5,063	-6,322	-7,454
Credit	1,981	1,945	2,402	3,245	3,540	4,930	7,032
Debit	-5,191	-5,466	-5,977	-7,753	-8,603	-11,252	-14,486
Balance on goods, services and incomes	-925	-60	-158	-40	-89	-6	-475
Current transfers (net)	1,245	1,309	1,156	1,110	1,353	1,288	1,038
Capital and financial account	-589	-2,016	-2,217	-934	-1,182	-3,767	-1,233
Capital transfers	463	513	252	511	489	578	661
Private capital	-743	-471	-1,375	-1,824	-535	-2,616	-3,345
Official capital	-167	542	-1,335	24	38	-2,180	-1,255
Credit institutions	-1,344	-844	140	1,798	-1,229	-303	4,350
Official external reserves	1,201	-1,756	102	-1,443	55	754	-1,645
Net residual	269	767	1,218	-136	-82	2,485	670
			(In percent of GNP)				
Memorandum items:							
Trade balance	12.4	15.9	16.4	20.4	21.8	24.3	28.5
Balance on goods and services	8.1	11.4	10.4	12.2	12.4	13.9	13.4
Balance on goods, services and incomes	-3.3	-0.2	-0.5	-0.1	-0.2	0.0	-0.9
Current account balance	1.1	4.1	3.0	2.9	3.1	2.8	1.1
Overall balance	1.0	2.5	3.7	-0.4	-0.2	5.5	1.3

Sources: Central Statistics Office; and data provided by Irish authorities.

1/ Including adjustments for balance of payments purposes.

2/ Computed on a transactions basis, I.e., change in total reserves less valuation changes and allocations of SDRs. Minus (-) equals net in increase in reserves.

Table A7. Ireland: Merchandise Trade 1/

	1993	1994	1995	1996	1997	1998
Value (in millions of Irish pounds)						
Balance of trade	3,501	4,827	5,396	7,459	11,071	14,869
Exports, f.o.b.	16,505	19,460	22,424	27,698	36,515	45,562
Imports, c.i.f.	13,004	14,633	17,028	20,239	25,444	30,693
Growth in value (in percent)						
Exports, f.o.b.	18.4	14.7	22.3	9.3	16.2	26.7
Imports, c.i.f.	12.8	16.1	19.3	8.8	15.4	20.1
Volume growth (in percent)						
Exports	10.0	14.8	20.1	9.9	14.9	24.1
Imports	7.0	13.2	14.4	10.0	14.9	17.0
Unit value growth (in percent)						
Exports	7.6	-0.1	1.8	-0.6	1.1	2.6
Imports	5.2	2.6	4.3	-1.2	0.5	2.3
Terms of trade						
Index (1990 = 100)	98.5	95.9	93.6	94.2	94.7	95.1
Percentage change	2.3	-2.6	-2.4	0.6	0.6	0.4

Sources: Central Statistics Office, Statistical Bulletin; and data provided by the Irish authorities

1/ Data on customs basis; not adjusted for balance of payments purposes.

Table A8. Ireland: Exports by Sector of Origin 1/
(In percent)

	1993	1994	1995	1996	1997	1998
Share in total exports						
Agriculture, fishing, and forestry 2/	13.9	12.5	11.5	9.2	7.9	6.6
Industrial exports	81.4	84.6	86.1	89.0	90.6	91.2
Unclassified 3/	4.7	2.9	2.4	1.8	1.5	2.2
Total exports	100.0	100.0	100.0	100.0	100.0	100.0
Of which: High technology 4/	33.6	34.2	36.0	36.2	36.4	37.2
Modern sector/total manufacturing ratio	55.9	54.8	54.6	55.9	57.2	60.5
Total exports (in millions of Irish pounds)	19,460	22,424	27,698	30,723	36,515	45,562
Volume growth						
Agriculture, fishing, and forestry 2/	-9.8	3.6	10.6	-12.5	-0.7	3.6
Industrial exports	8.8	19.5	22.3	13.6	17.0	25.0
Total exports	10.1	14.9	20.2	9.8	14.9	23.5
Memorandum items:						
Export volume growth of manufactures	8.3	19.6	26.8	7.8	13.0	19.8
Partner country non-oil import volume growth	0.7	9.3	8.2	6.5	9.8	5.7

Sources: Central Statistics Office, Statistical Bulletin; IMF, World Economic Outlook; and data provided by the Irish authorities.

1/ Data on a customs basis.
Including the value of EC intervention stocks sent for storage abroad, which is excluded from merchandise exports for balance of payments purposes.
3/ From 1993, includes Intrastat Survey Estimates which are not classified by main use.
4/ Comprises SITC divisions 09, 54, 75, 76, and 87.

Table A9. Ireland: Foreign Trade Shares
(At current prices)

	1993	1994	1995	1996	1997	1998
	(Percentage distribution)					
Exports						
United Kingdom	28.3	27.6	25.5	24.1	24.3	21.4
Germany	13.4	14.0	14.4	13.0	12.3	15.0
France	9.3	9.2	9.4	8.4	7.8	8.2
Other EC	20.3	21.1	22.8	22.7	16.9	15.7
Total EC (12)	71.3	72.0	72.1	68.2	61.2	60.4
United States and Canada	10.1	9.4	9.1	10.4	12.1	14.5
Other countries	18.6	18.7	18.8	21.4	26.7	25.1
Total	100	100	100	100	100	100
Imports						
United Kingdom	36.5	36.4	35.5	33.6	33.3	33.5
Germany	7.4	7.1	7.0	7.3	5.9	6.5
France	4.0	3.6	3.7	3.8	4.6	4.2
Other EC	20.3	21.1	22.8	22.7	16.9	15.7
Total EC	59.2	58.3	56.1	55.4	53.1	53.1
United States and Canada	17.9	19.2	18.4	16.6	15.7	16.8
Other countries	18.6	18.7	18.8	21.4	26.7	25.1
Total	100	100	100	100	100	100

Source: IMF, Direction of Trade Statistics.

Table A10. Ireland: Imports Classified by End Use
(Percentage distribution)

	1993	1994	1995	1996	1997	1998		
						Qtr 1	Qtr 2	Qtr 3
Producers' capital goods ready for use	9.3	9.9	10.0	10.7	11.6	13.2	13.8	10.7
Consumption goods	23.6	22.7	20.4	21.3	21.4	20.0	20.0	21.3
Of which:								
Food, drink, and tobacco	6.7	6.5	5.8	5.7	5.4	4.6	5.2	5.5
Other	16.9	16.2	14.6	15.6	16.0	15.4	14.8	15.8
Materials for further production	59.9	60.6	63.5	62.2	62.1	62.0	60.8	62.3
Of which:								
Agriculture	3.1	3.1	2.7	2.5	2.0	2.1	1.5	1.2
Industry	56.8	57.5	60.8	59.7	60.1	59.9	59.3	61.1
Unclassified	7.2	6.8	6.2	5.8	4.9	4.8	5.3	5.7
Total	100	100	100	100	100	100	100	100

Source: Central Statistics Office, Statistical Bulletin.

1/ From 1993, includes Intrastat Survey Estimates which are not classified by main use.

Table A11. Ireland: Consumer, Wholesale, and Tradables Price Indices
(Percentage change from one year earlier) 1/

	1993	1994	1995	1996	1997	1998	1998				1999
							Qtr 1	Qtr 2	Qtr 3	Qtr 4	Q1
Consumer price index	1.4	2.3	2.5	1.7	1.5	2.4	1.9	2.7	2.9	2.2	1.5
Of which:											
Food	0.3	3.5	3	2	1.7	4.2	2.8	4.7	4.8	4.2	4.7
Services	3.4	3.6	3	1.1	1.6	3.5	2.9	3.8	3.6	3.5	4.3
Fuel and light	0.3	0.7	0.1	1.7	-0.1	--	0.8	0.9	-0.3	-1.2	-1.8
Durable household goods	0.1	2.3	1.1	1	0.1	0.7	0.1	1.1	0.7	0.7	-0.1
Implicit GDP deflator	5.2	1.7	2.7	2.3	3.5	5.6	...	...	...	...	...
Wholesale price index 2/	4.7	0.7	2.3	0.4	-0.4	...	3.1	2.3	1.5	...	...
Of which:											
Manufacturing	4.6	1.1	2.6	0.6	-0.6	0.9	2.6	1.6	0.7	-1.4	-1.6
Capital goods	2.8	2.3	3	1.3	2.3	2.4	3	2.8	2.5	1.5	1.4
Of which:											
Building and construction	2.7	2.3	3.6	1.2	3.5	2.8	4.4	3.3	2.5	1.1	1.1
Export unit value	7.6	-0.1	1.8	-0.6	1.1	2.6	5.1	3.2	3.7	-1	...
Import unit value	5.2	2.6	4.3	-1.2	0.5	2.3	3.5	3.3	2.7	-0.3	...
Terms of trade	2.3	-2.6	-2.3	0.6	0.6	0.3	1.6	-0.2	0.9	-0.7	...

Sources: Central Statistics Office, Statistical Bulletin ; and data provided by the Irish authorities.

1/ Annual data are based on period averages.

2/ Wholesale price indices are exclusive of VAT.

Table A12. Ireland: Wage and Productivity Indicators in Manufacturing
(Percentage change from one year earlier)

	1994	1995	1996	1997	1998 (Prel.)		
					Qtr 1	Qtr 2	Qtr 3
Average hourly earnings	1.7	2.3	2.7	3.0	4.7	5.9	5.8
Average weekly earnings	2.9	2.2	2.5	2.9	4.1	5.1	5.2
Output per person employed 1/	10.9	13.5	4.0	9.9	12.9	11.7	...
Output per person-hour	9.5	13.7	4.1	10.0	13.7	12.8	...
Unit wage costs 2/	-7.1	-10.0	-1.3	-6.6	-7.9	-5.9	...
Real unit wage costs 3/	...	...	-2.0	-6.0	-10.2	-7.4	...

Source: Central Statistics Office, Industrial Employment, Earnings, and Hours Worked.

1/ The Central Statistics Office defines productivity as output per person employed.
2/ Defined as the change in hourly earnings divided by the change in output per person-hour.
3/ Unit wage costs deflated by the manufacturing output price index.

Table A13. Ireland: Population and Employment

	1991	1992	1993	1994	1995	1996	1997	1998
	(At mid-April in thousands, unless otherwise indicated)							
Population	3,526	3,553	3,574	3,586	3,601	3,626	3,661	3,705
Natural increase	22.0	21.0	20.0	17.0	17.0	17.0	20.0	21.0
Net migration	-2.0	7.0	--	-5.0	-2.0	8.0	15.0	23.0
Labor force	1,342	1,362	1,382	1,407	1,440	1,489	1,537	1,566
Employment	1,156	1,165	1,183	1,221	1,282	1,329	1,380	1,495
Unemployment (labor force survey data) 1/	198	197	220	211	177	179	159	127
First-time job seekers	34	31	35	34	31	32	31	...
Long-term unemployed	120	117	125	128	103	103	86	...
Live register: annual average	254	283	294	282	278	279	254	227
	(In percent of labor force)							
Unemployment rate								
Standardized	14.7	15.2	15.5	14.1	12.1	11.5	9.8	7.7
First-time job seekers	2.5	2.3	2.5	2.4	2.1	2.2	2.0	...
Long-term unemployed 2/	61.9	57.7	58.6	62.8	60.2	58.9	...	...
Live register 3/	18.9	20.8	21.3	20.1	19.3	18.8	16.6	14.5
Participation rate 4/	...	...	...	...	...	54.5	54.7	56.5
Males	...	...	...	...	...	68.1	67.8	69.4
Females	...	...	...	...	...	41.4	42.0	44.0

Source: Central Statistics Office, Live Register and Quarterly National Household Survey (QNHS).

1/ Unemployment data are collected in two ways: Labor Force Surveys and the Live Register. The labor force survey involves an annual sampling of about 4.5 percent of the population and the results are presented by reference to April of that year. The Live Register consists of claimants for Unemployment Benefit, applicants for Unemployment Assistance, and other persons registered as unemployed at the local offices of the Department of Social Welfare. The Live Register is subject to rule changes which affect its composition, the latest of which were in May 1992. Accordingly, there is a discontinuity in the series from that date.

2/ Those unemployed for a period exceeding one year. In percent of total unemployed.

3/ Annual numbers are the annual average of the live register in relation to the labor force estimated at mid-April.

4/ Defined as persons aged 15 years and over either at work or unemployed (including first time job-seekers) expressed as a percentage of the total population aged 15 years and over.

Table A14. Ireland: Employment by Sector
(In thousands)

	1992 April	1993 April	1994 April	1995 April	1996 April	1997 April	1998 Mar.-May	1998 June-Aug.	1998 Sept.-Nov.
Total employment 1/	1,165	1,183	1,221	1,282	1,329	1,380	1,495	1,560	1,545
Agriculture, forestry, and fishing	157	150	148	149	141	142	136	137	137
Industry	329	324	344	361	367	399	438	455	450
Manufacturing	n.a.	n.a.	252	264	267	289	301	311	302
Construction	n.a.	n.a.	92	97	101	110	136	144	147
Services	679	709	729	772	820	840	921	968	959
Commerce, insurance and finance	n.a.	n.a.	352	374	393	404	466	498	484
Transport and communications	n.a.	n.a.	56	57	61	65	80	85	88
Public administration and defense	n.a.	n.a.	66	71	76	72	73	75	74
Education and health	n.a.	n.a.	182	192	210	213	213	212	214
Other services	n.a.	n.a.	74	78	80	85	89	98	99
Memorandum items:									
Manufacturing 2/	198	199	202	214	223	236	244	...	...
Traditional	145	143	143	147	148	153	156	...	...
Modern	53	56	59	67	75	83	88	...	...

Sources: Central Statistics Office, *Labor Force Surveys, Quarterly National Household Surveys* and *Quarterly Industrial Inquiry*.

1/ Labor force survey data up to 1997 and Quarterly National Household Survey (QNHS) data from 1998 onward. Some 20,000 of the observed increase in employment between 1997 and 1998 has been attributed to improvements in the survey questionnaire and the underlying increase in employment in the year was estimated at 95,000.
2/ *Quarterly industrial Inquiry* and CSO *Statistical Bulletin* data; annual average. For 1998 estimates are based on latest available June 1998 data.

Table A15. Ireland: Overview of Public Finances

	1992	1993	1994	1995	1996	1997	1998 Budget	1998 Outturn	1999 Budget
					(In millions of Irish pounds)				
Current budget									
Revenue	9,360	10,140	11,203	11,667	12,954	14,619	15,497	16,503	17,736
Expenditure	9,806	10,519	11,188	12,029	12,662	14,015	14,388	14,412	15,401
Balance	-446	-379	15	-362	292	604	1,109	2,091	2,335
Capital Budget									
Resources 1/	1,575	1,773	1,543	2,368	2,278	2,635	3,202	2,018	2,920
Expenditure	1,842	2,084	2,230	2,633	3,007	3,475	4,400	3,362	4,330
Balance	-267	-311	-687	-265	-729	-840	-1,198	-1,344	-1,410
Total									
Revenue/resources	10,935	11,913	12,746	14,035	15,232	17,254	18,699	18,521	20,656
Expenditure	11,648	12,603	13,418	14,662	15,669	17,490	18,788	17,774	19,731
Exchequer balance	-713	-690	-672	-627	-437	-236	-89	747	925
General government balance	-752	-775	-616	-882	-120	584	1,038	1,410	1,057
Memorandum items:									
Service of national debt	2,355	2,390	2,227	2,405	2,360	2,755	2,625	2,559	2,542
					(In percent of GDP)				
Current revenue	29.8	29.9	30.7	28.4	28.7	28.2	26.0	27.7	26.5
Current expenditure	31.2	31.0	30.7	29.3	28.0	27.0	24.1	24.2	23.0
Current balance	-1.4	-1.1	0.0	-0.9	0.6	1.2	1.9	3.5	3.5
Capital resources	5.0	5.2	4.2	5.8	5.0	5.1	5.4	3.4	4.4
Capital expenditure	5.9	6.1	6.1	6.4	6.7	6.7	7.4	5.6	6.5
Capital deficit	-0.9	-0.9	-1.9	-0.6	-1.6	-1.6	-2.0	-2.3	-2.1
Total revenue/resources	34.8	35.1	34.9	34.2	33.7	33.3	31.4	31.1	30.9
Total expenditure	37.1	37.2	36.8	35.7	34.7	33.7	31.5	29.8	29.5
EBR	-2.3	-2.0	-1.8	-1.5	-1.0	-0.5	-0.1	1.3	1.4
General government balance	-2.4	-2.3	-1.7	-2.1	-0.3	1.1	1.7	2.4	1.6
Memorandum items:									
Service of national debt	7.5	7.0	6.1	5.9	5.2	5.3	4.4	4.3	3.8

Sources: Department of Finance, *Budget*; Central Bank of Ireland, *Quarterly Bulletin*; and information provided by the Irish authorities.

1/ Includes non-Exchequer capital resources and expenditure.

Table A16. Ireland: Public Sector Debt

	1993	1994	1995	1996	1997	1998
	(In millions of Irish pound)					
Outstanding debt (year end)						
Government 1/	28,357	29,227	30,209	29,912	30,689	29,543
Of which: External	11,386	10,978	10,563	8,718	8,288	1,773
Semi-state bodies	5,660	5,748	5,802	5,638	6,222	6,538
of which: External	1,512	1,142	1,012	661	796	787
Total	34,017	34,975	36,011	35,550	36,911	36,081
	(In percent of GDP)					
Outstanding debt (year end)						
Government 1/	83.6	80.1	73.6	66.2	59.2	49.5
Of which: External	33.6	30.1	25.7	19.3	16.0	3.0
Semi-state bodies	16.7	15.8	14.1	12.5	12.0	11.0
of which: External	4.5	3.1	2.5	1.5	1.5	1.3
Total	100.3	95.9	87.8	78.6	71.2	60.5
Memorandum items:						
External government debt total government debt	40.2	37.6	35.0	29.1	27.0	6.0
External semi-state debt/ total semi-state debt	26.7	19.9	17.4	11.7	12.8	12.0
External debt/total debt	37.9	34.7	32.1	26.4	24.6	7.1

Sources: Department of Finance, *Budget*; and information provided by the Irish authorities.

1/ The cumulative net debt of Central government excluding non-commercial state-sponsored bodies. It also excludes the debt of local authorities and the commercial state sponsored bodies.

Table A17. Ireland: Summary of Current and Capital Budgets

(In millions of Irish pounds)

	1994	1995	1996	1997	1998		1999
					Budget	Outturn	Prov.
Current revenue	11,203	11,667	12,954	14,619	15,497	16,503	17,736
Tax	10,835	11,335	12,520	14,274	15,167	16,129	17,335
Nontax	368	332	434	345	330	374	401
Current expenditure	11,188	12,029	12,662	14,015	14,388	14,412	15,401
Central Fund	2,821	2,983	3,161	3,691	3,403	3,436	3,407
Supply services	8,367	9,046	9,501	10,324	10,985	10,976	11,994
Current budget balance	15	-362	292	604	1,109	2,091	2,335
Capital expenditure 1/	2,230	2,633	3,007	3,475	4,400	3,362	4,330
Capital resources 2/	1,543	2,368	2,278	2,635	3,202	2,018	2,920
Non-Exchequer resources of state bodies and local authorities 2/	998	1,362	1,471	1,853	2,398	1,281	2,084
Exchequer resources and receipts	545	1,006	807	782	804	737	836
Capital budget	-687	-265	-729	-840	-1,198	-1,344	-1,410
Exchequer borrowing requirement	-672	-627	-437	-236	-89	747	925

Sources: Department of Finance, *Budget, Public Capital Program*; and data provided by the Irish authorities.

1/ Includes non-Exchequer capital expenditure.
2/ Includes borrowing of state bodies and local authorities.

Table A18. Ireland: Central Government Current Expenditure
(In millions of Irish pounds)

	1992	1993	1994	1995	1996	1997	1998		1999
							Budget	Outturn	Budget
Service of public debt	2,309	2,390	2,227	2,405	2,360	2,755	2,625	2,557	2,542
Interest	2,096	2,159	2,004	2,156	2,099	2,468	2,310	2,243	2,195
Sinking funds, etc.	213	231	223	249	261	287	315	314	347
Economic services	891	962	989	1,093	1,225	1,290	1,322	1,308	1,404
Industry and labor	280	320	389	493	522	574	632	583	667
Agriculture, fisheries, and forestry	584	614	565	564	668	672	642	673	690
Tourism	27	28	35	36	35	44	48	52	47
Infrastructure	75	54	80	81	89	97	91	99	56
Social services	6,997	7,551	8,049	8,670	8,976	9,764	10,282	10,471	11,219
Health	1,722	1,907	2,121	2,272	2,333	2,678	2,943	3,079	3,371
Education	1,569	1,727	1,876	1,964	2,088	2,362	2,351	2,445	2,603
Social welfare	3,534	3,743	3,879	4,261	4,381	4,567	4,866	4,809	5,103
Subsidies, etc.	172	174	173	173	174	157	122	138	142
Security	899	950	1,013	1,032	1,106	1,221	1,300	1,358	1,454
Other	948	1,110	1,355	1,344	1,605	1,840	1,879	1,858	2,226
EU budget	354	453	507	547	589	517	673	779	768
Supply services	577	631	761	766	804	904	1,101	983	1,361
Other Central Fund	17	26	87	31	212	419	105	96	97
Total (gross)	12,119	13,017	13,713	14,625	15,361	16,967	17,499	17,651	18,901
Less supply services and PRSI receipts	2,373	2,494	2,540	2,585	2,674	2,939	3,091	3,284	3,479
Total (net)	9,746	10,523	11,173	12,040	12,687	14,028	14,408	14,367	15,422
Memorandum item:									
Exchequer pay and pensions bill included in above	3,761	4,087	4,356	4,560	4,804	5,297	5,639	5,766	6,112

Sources: Department of Finance, *Budget*; and data provided by Irish authorities.

Table A19. Ireland: Public Capital Program

	1993	1994	1995	1996	1997	1998		1999
						Budget est.	Outturn	Prov.
				(In millions of Irish pounds)				
Sectoral economic investment	579	730	954	1159	1298	1472	580	803
Of which:								
Agriculture, fisheries, forestry	187	263	315	380	272	276	196	301
Industry	340	407	573	697	927	1076	336	419
Tourism	52	60	66	82	99	120	48	83
Productive infrastructure	1103	932	1031	1128	1363	1722	1679	2220
Of which:								
Energy	355	227	228	242	301	441	423	567
Transport	123	151	173	149	202	309	219	413
Roads, sanitary services, etc.	433	366	405	444	543	625	632	816
Telecommunications, broadcasting, post	192	188	225	293	317	347	405	424
Social infrastructure	402	570	647	720	814	1067	1103	1307
Of which:								
Housing	191	283	321	336	355	439	384	496
Education	82	99	101	110	127	224	280	239
Hospitals	44	65	96	119	131	147	147	155
Government construction, computerization	85	123	129	155	201	257	292	417
Total 1/	2084	2232	2632	3007	3475	4261	3362	4330
Memorandum item:								
Real increase over previous year 2/ (in percent)	8.6	5.1	14.7	11.3	11.2	15.5	-8.8	23.0
				(In percent of total)				
Sectoral economic investment	27.8	32.7	36.2	38.5	37.4	34.5	17.3	18.5
Of which:								
Agriculture, fisheries, forestry	9.0	11.8	12.0	12.6	7.8	6.5	5.8	7.0
Industry	16.3	18.2	21.8	23.2	26.7	25.3	10.0	9.7
Tourism	2.5	2.7	2.5	2.7	2.8	2.8	1.4	1.9
Productive infrastructure	52.9	41.8	39.2	37.5	39.2	40.4	49.9	51.3
Of which:								
Energy	17.0	10.2	8.7	8.0	8.7	10.3	12.6	13.1
Transport	5.9	6.8	6.6	5.0	5.8	7.3	6.5	9.5
Roads, sanitary services, etc.	20.8	16.4	15.4	14.8	15.6	14.7	18.8	18.8
Telecommunications, broadcasting, post	9.2	8.4	8.5	9.7	9.1	8.1	12.0	9.8
Social infrastructure	19.3	25.5	24.6	23.9	23.4	25.0	32.8	30.2
Of which:								
Housing	9.2	12.7	12.2	11.2	10.2	10.3	11.4	11.5
Education	3.9	4.4	3.8	3.7	3.7	5.3	8.3	5.5
Hospitals	2.1	2.9	3.6	4.0	3.8	3.4	4.4	3.6
Government construction, computerization	4.1	5.5	4.9	5.2	5.8	6.0	8.7	9.6
Total 1/	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Sources: Public Capital Program; and information provided by the Irish authorities.

1/ Excludes Community initiatives.
2/ Deflated by the GNP deflator.

Table A20. Ireland: Central Government Current Revenue
(In millions of Irish pounds)

	1993	1994	1995	1996	1997	1998		1999
						Budget est.	Outturn	Budget est.
Taxes on income	4,664	4,973	5,275	5,988	6,916	7,448	7,801	8,233
Personal income tax	3,712	3,841	4,129	4,562	5,218	5,522	5,736	5,944
Corporation tax	952	1,132	1,146	1,426	1,699	1,926	2,065	2,289
Taxes on capital	87	117	117	178	225	198	305	316
Taxes on goods and services	4,327	4,806	5,282	5,683	6,325	6,676	7,092	7,928
Value-added tax	2,332	2,598	2,889	3,105	3,718	4,017	4,270	4,837
Excise	1,757	1,959	2,139	2,320	2,507	2,659	2,822	3,091
Motor vehicle duties 1/	238	249	254	258	100	...	...	...
Customs duties	159	191	200	159	180	176	160	158
Other duties and levies 2/	467	510	461	512	627	669	771	700
Tax amnesty	...	238	...	...	...	...	...	...
Total tax revenue	9,704	10,835	11,335	12,520	14,274	15,167	16,130	17,335
Nontax revenue	436	368	332	434	345	330	374	401
Total current revenue	10,140	11,203	11,667	12,954	14,619	15,497	16,503	17,736
Memorandum item:								
Taxes on personal income as a percentage of total tax revenue	38	35	36	36	37	36	36	34

Sources: Department of Finance, *Budget*; and information provided by the Irish authorities.

1/ Including road tax; these revenues have been assigned to local authorities since mid-1997.
2/ Including Employment and Training Levy, Income Levy, Agricultural Levies, and Stamp Duties. Employment and Training Levy was abolished in April 1998.

Table A21. Ireland: Public Sector Employment 1/

	1988-98	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999 proj.
Exchequer financed	9.9	178.0	169.6	171.7	174.8	177.7	181.1	183.7	188.8	192.2	192.5	195.6	199.7
Local authorities	-12.5	30.3	26.9	26.5	26.7	26.7	26.8	27.1	26.5	26.5	26.5	26.5	26.9
Public service	6.6	208.3	196.5	198.2	201.5	204.4	207.9	210.8	215.3	218.7	219.0	222.1	226.6
Commercial semi-state bodies	-19.6	73.3	72.0	72.0	71.9	66.8	64.7	63.5	62.8	61.9	60.5	58.9	57.1
Total public sector	-0.2	281.6	268.5	270.2	273.4	271.2	272.5	274.3	278.1	280.6	279.5	281.0	283.7
Percent change		-4.3	-4.7	0.6	1.2	-0.8	0.5	0.6	1.4	0.9	-0.4	0.5	1.0

Source: Informationa provided by the Irish authorities, and staff estimates.

1/ Figures are for full-time equivalence as of January 1 of each year.

Table A22. Ireland: EU Receipts, Loans and Contributions
(In millions of Irish pounds)

	1994	1995	1996	1997	1998	1999 Budget
A. Subsidies and grants						
FEOGA:	1304.6	1293.1	1515.1	1685.7	1460.4	1427.0
Guarantee Section	1173.7	1150.2	1364.5	1519.8	1274.8	1300.0
Guidance Section	130.9	142.9	150.6	165.9	185.6	127.0
European Social Fund	277.1	256.2	253.0	271.0	313.1	323.2
European Regional Development Fun	175.6	358.1	297.1	356.2	470.0	493.0
Cohesion Fund	68.3	102.0	137.1	162.7	112.9	167.0
Miscellaneous	15.8	13.8	17.3	28.8	18.8	23.3
Total	1841.4	2023.2	2219.6	2504.4	2375.2	2433.5
(In percent of GDP)	5.0	4.9	4.9	4.8	4.0	3.6
Net of FEOGA guarantees	667.7	873.0	855.1	984.6	1100.4	1133.5
(In percent of GDP)	1.8	2.1	1.9	1.9	1.8	1.7
B. Less Contributions 1/	505.5	542.8	541.1	513.5	779.2	768.0
(In percent of GDP)	1.4	1.3	1.2	1.0	1.3	1.1
C. Net subsidies and grants	1335.9	1480.4	1678.5	1990.9	1596.0	1665.5
(In percent of GDP)	3.7	3.6	3.7	3.8	2.7	2.5
D. Loans from EIB	232.1	268.0	150.0	159.0	121.0	100.0
(In percent of GDP)	0.6	0.7	0.3	0.3	0.2	0.1

Sources: Department of Finance, Budget; and informationa provided by the Irish authorities.

1/ Contributions to the budget of the European Communities net of refunds and other small contributions (to EIB and ECSC).

Table A23. Ireland: Financing of the Exchequer Borrowing Requirement

	1992	1993	1994	1995	1996	1997	1998
			(In millions of Irish pounds)				
Net sales of domestic securities	-1092	1379	462	867	1191	952	-676
To nonbank public 1/	282	-162	584	162	540	1798	-482
To commericial banks 2/	435	-131	299	100	-383	276	462
To nonresidents	-1809	1672	-421	605	1034	-1122	-656
Small savings	145	238	377	297	322	60	183
Other Irish pound	...	...	-100	...	...	...	...
External borrowing by Government, net 3/	1008	-60	-388	-672	-1009	-1041	-748
Small savings reserve 4/	...	...	...	...	...	288	119
Change in balances at Contral Bank	652	-867	321	134	-67	-24	376
Total Exchequer borrowing requirement 5/	713	690	672	626	437	235	-746

Sources: Central Bank of Ireland, *Quarterly Bulletin*; and data provided by the Irish authorities.

1/ Data for 1994 onward refer to the public excluding credit institutions.
2/ Data for 1994 onward refer to credit institutions.
3/ Excludes sales of government securities to nonresidents.
4/ The fund was established in 1994 to address the interest accrued liabilities in Government personal savings scheme.
5/ Excluding privatization receipts of IRP 270 million in 19991.

Table A24. Ireland: Exchange Rates and Interest Rates 1/

	Exchange rates						Interest rates		Interest rate differentials			
	US$/IR£	St/IR£	DM/IR£ 1/	Nominal effective exchange rate	Bilateral rates (1990=100) Against st£	Bilateral rates (1990=100) Against DM 1/	3-month Interbank	10-year bond	Ireland-United Kingdom Short-term	Ireland-United Kingdom Long-term	Ireland-Germany Short-term	Ireland-Germany Long-term
1997												
Jan.	1.6	1.0	2.6	102.6	105.9	97.8	5.8	6.5	-0.5	-1.0	2.8	0.7
Feb.	1.6	1.0	2.7	102.8	105.0	99.2	5.8	6.3	-0.4	-0.8	2.6	0.8
Mar.	1.6	1.0	2.7	102.5	104.9	99.1	5.7	6.8	-0.6	-0.6	2.5	1.0
Apr.	1.6	1.0	2.7	101.7	102.5	99.1	6.3	6.6	-0.2	-1.0	3.0	0.7
May	1.5	0.9	2.6	98.6	99.7	96.2	6.2	6.6	-0.3	-0.5	3.1	0.8
June	1.5	0.9	2.6	98.4	98.6	97.1	6.3	6.4	-0.5	-0.7	3.1	0.7
July	1.5	0.9	2.7	98.9	96.4	100.1	6.3	6.2	-0.8	-0.8	3.1	0.6
Aug.	1.5	0.9	2.7	98.8	97.6	99.9	6.2	6.3	-1.0	-0.8	3.0	0.6
Sep.	1.5	0.9	2.7	99.3	99.6	98.9	6.2	5.9	-1.1	-0.8	2.9	0.3
Oct.	1.5	0.9	2.6	97.0	96.9	96.3	6.1	6.0	-1.2	-0.5	2.6	0.4
Nov.	1.5	0.9	2.6	97.8	95.8	97.2	6.2	5.8	-1.4	-0.8	2.5	0.2
Dec.	1.5	0.9	2.6	96.6	94.4	96.6	6.1	5.5	-1.6	-0.9	2.4	0.2
1998												
Jan.	1.4	0.8	2.5	93.2	91.0	93.7	6.1	5.3	-1.5	-0.8	2.5	0.2
Feb.	1.4	0.8	2.5	92.6	90.3	93.2	6.1	5.2	-1.5	-0.8	2.6	0.2
Mar.	1.4	0.8	2.5	92.0	88.6	93.2	5.7	5.1	-1.9	-0.9	2.2	0.2
Apr.	1.4	0.8	2.5	93.1	89.4	94.1	6.1	5.2	-1.4	-0.7	2.5	0.3
May	1.4	0.9	2.5	94.8	93.2	94.0	6.4	5.1	-1.1	-0.8	2.8	0.1
June	1.4	0.9	2.5	94.5	91.8	94.1	6.2	5.0	-1.5	-0.8	2.7	0.2
July	1.4	0.9	2.5	94.3	91.6	93.9	6.2	4.9	-1.6	-1.0	2.7	0.2
Aug.	1.4	0.9	2.5	94.8	92.6	93.7	6.1	4.6	-1.7	-1.0	2.6	0.2
Sep.	1.5	0.9	2.5	95.8	94.3	93.6	5.4	4.2	-2.0	-0.9	2.0	0.2
Oct.	1.5	0.9	2.5	96.5	96.7	93.0	4.0	4.4	-3.2	-0.6	0.5	0.3
Nov.	1.5	0.9	2.5	95.6	95.8	92.9	3.7	4.2	-3.3	-0.7	0.1	0.1
Dec.	1.5	0.9	2.5	95.7	96.0	92.8	3.2	4.0	-3.3	-0.5	-0.1	0.1
1999												
Jan.	1.2	0.7	...	95.2	75.7	...	3.1	3.8	-2.9	-0.4	-0.1	0.1
Feb.	1.1	0.7	...	93.9	74.1	...	3.1	4.2	-2.5	-0.2	--	0.3
Mar.	1.1	0.7	...	92.8	72.3	...	2.9	4.1	-2.5	-0.6	-0.1	0.1
Apr.	1.1	0.7	...	92.2	71.5	...	2.6	3.9	-2.8	-0.7	-0.1	0.0
May	1.1	0.7	...	91.8	70.8	...	...	...	...	...	...	...

Sources: IMF, International Financial Statistics; Research Department.

1/ As of January 1, 1999 the euro is the currency of Ireland, the irrevocably fixed conversion rate between the euro and the Irish pound is 0.787564.

Table A25. Ireland: Exchange Rate Developments 1/

	US$/IR£		£ Sterling / IR£		Trade -Weighted Index		Real effective exchange rate	
	Level	Annual percent change	Level	Annual percent change	1990= 100	Annual percent change	1995= 100	Annual percent change
1990	1.7	16.9	0.9	-6.9	100.0	6.1	107.4	4.6
1991	1.6	-2.6	0.9	1.8	98.6	-1.4	104.2	-3.0
1992	1.7	5.6	1.0	-5.5	101.7	3.2	106.9	2.6
1993	1.5	-14.0	1.0	-1.1	96.6	-5.0	99.1	-7.2
1994	1.5	2.1	1.0	-0.1	96.8	0.2	99.4	0.3
1995	1.6	7.1	1.0	-3.8	98.2	1.4	100.0	0.6
1996	1.6	-0.2	1.0	-0.9	100.2	2.0	101.9	1.9
1997	1.5	-5.2	0.9	10.6	98.7	-1.6	101.6	-0.3
1998	1.4	-6.1	0.9	7.7	93.5	-5.2	97.0	-4.5
1997 1st qtr.	1.6	1.0	1.0	5.4	102.0	3.0	105.0	4.7
2nd qtr.	1.5	-3.0	0.9	10.6	98.7	-0.9	101.7	0.7
3rd qtr.	1.5	-8.2	0.9	13.8	97.8	-2.9	100.6	-1.7
4th qtr.	1.5	-10.2	0.9	12.9	96.2	-5.3	99.2	-4.7
1998 1st qtr.	1.4	-13.8	0.8	17.0	91.7	-10.1	94.7	-9.9
2nd qtr.	1.4	-7.8	0.9	9.6	93.2	-5.6	96.8	-4.8
3rd qtr.	1.4	-3.5	0.9	5.4	93.9	-3.9	98.0	-2.6
4th qtr.	1.5	1.4	0.9	-0.5	95.2	-1.1	98.6	-0.5
1999 1st qtr.	1.1	-18.3	0.7	21.6	...	...	...	...

Sources: Central Bank of Ireland, Quarterly Bulletin; and IMF, International Financial Statistics.

1/ Period averages.

2/ Official index computed by the Central Bank of Ireland; based on 15 major currencies using total trade weights.

3/ Based on relative consumer prices using total trade weights in manufacturing.

Table A26. Ireland: Selected Interest Rates

(In percent; end-of-period data)

	Central Bank	Interbank Market			Associated Banks		Yields on Government Securities		
	Short-term facility rate 1/	Call money	One-month deposit rate	three-month deposit rate	Prime over-draft rate 2/	Deposit rate 3/	One year to maturity 4	Five year to maturity	Fifteen year to maturity 4/
1993	7.0	6.9	6.6	6.3	7.0	1.5	5.7	5.9	6.5
1994	6.3	5.3	5.8	6.4	6.2	1.0	6.4	8.7	8.8
1995	6.5	5.7	5.5	5.5	6.0	1.3	5.0	6.6	7.6
1996	6.3	5.0	5.7	5.9	6.3	1.0	6.0	6.0	6.9
1997	6.8	7.0	6.4	6.1	6.8	1.5	5.3	5.0	5.7
1998	4.1	...	...	3.2	3.9	...	2.7	3.2	4.4
1998									
Jan.	6.8	6.3	6.4	6.1	6.8	1.5	4.6	4.7	5.5
Feb.	6.8	6.3	6.3	6.1	6.8	1.5	4.7	4.6	5.4
Mar.	6.8	6.6	6.2	5.7	6.6	1.5	4.5	4.6	5.3
Apr.	6.8	6.5	6.4	6.1	6.9	1.5	5.0	4.8	5.3
May.	6.8	6.8	6.6	6.4	7.0	1.5	5.2	4.8	5.3
Jun.	6.8	6.5	6.3	6.2	6.8	1.5	5.2	4.7	5.2
Jul.	6.8	6.1	6.4	6.2	6.9	1.5	5.1	4.5	5.1
Aug.	6.8	6.1	6.3	6.1	6.8	1.5	4.9	4.2	4.9
Sep.	6.8	6.3	6.1	5.4	6.6	1.5	4.1	3.8	4.6
Oct.	5.8	4.9	4.3	4.0	5.4	1.5	3.6	3.6	4.7
Nov.	4.5	4.1	3.8	3.7	4.4	1.0	3.5	3.5	4.5
Dec.	4.1	2.8	3.2	3.2	3.9	1.0	2.7	3.2	4.4
1999									
Jan.	4.5	3.1	3.1	3.1	3.6	0.75	...	3.3	...
Feb.	4.5	3.1	3.1	3.1	3.6	0.75	...	3.5	...
Mar.	4.5	3.0	3.0	2.9	3.5	0.75	...	3.3	...
Apr.	3.5	2.6	2.5	2.6	3.1	0.75	...	3.1	...
May.	3.5	2.5	2.5	2.6	3.1	0.75	...	...	...

Source: Central Bank of Ireland, Quarterly Bulletin.

1/ The short-term facility was suspended in November 1992 and reopened in February 1993.

2/ Up to December 1991, the maximum rate for overdrafts and term loans up to one year for AAA customers is used. After that date, the prime rate is used.

3/ Deposits of £Ir 25,000 to £Ir 100,000; maximum rate.

4/ As of 1999 these series are no longer reported by the Central Bank.

Table A27. Ireland: Monetary Survey 1/
(In millions of Irish pounds; end-of-period data)

	1993	1994	1995	1996	1997	1998			
						Mar.	June	Sept.	Dec.
Net foreign assets	1,802	1,257	998	1,628	1,439	-503	316	1,213	-648
Official external reserves	4,278	4,041	5,472	4,960	4,636	4,950	5,618	5,699	6,448
Net external position	-2,476	-2,784	-4,474	-3,332	-3,197	-5,453	-5,302	-4,486	-7,096
Net domestic credit	25,844	29,216	33,014	37,172	47,447	50,122	51,248	53,068	57,483
Net claims on Government	3,202	4,043	3,673	2,918	3,065	2,925	1,970	2,473	3,067
Claims on nongovernment sector 2/	22,642	25,173	29,342	34,254	44,382	47,197	49,278	50,595	54,416
Other items, net	-3,516	-3,877	-4,109	-4,151	-6,596	-6,490	-6,641	-7,064	-7,221
Broad money									
M3 3/	17,268	19,209	21,910	27,038	...	...	...	...	...
Narrow money (M1)	3,934	4,455	5,070	5,899	7,458	7,221	7,845	8,275	9,394
Savings deposits 4/	13,334	14,754	16,840	21,139	...	...	...	...	...
M3E 5/	24,130	26,596	29,903	34,649	42,290	43,129	44,923	47,217	49,614

Sources: Central Bank, *Quarterly Bulletin*; and data provided by the Irish authorities.

1/ Consolidated balance sheet of the Central Bank. All interbank items are excluded. Borrowing abroad for onlending to the Government under revolving credit facilities is also excluded.

2/ Credit to the private sector, local authorities, state-sponsored bodies, and the Agricultural Intervention Agency.

3/ M3 was discontinued from July 1997.

4/ Unavailable as a result of reclassification of credit institutions.

5/ From December 1990, a new broad measure of money supply, "M3E", is used.
"M3E" comprises the public's holdings of notes and coins, plus current and deposit accounts denominated in both the Irish pounds and foreign currency, and incouding accrued interest, of resident private sector entities at licensed banks, building societies, state-sponsored financial instituituions and the Post Office. It replaces the previous broad measure of money supply (broad money and other liqud assets) used until then.

Table A28. Ireland: Distribution of Private Sector Credit
(End of period)

	November 1996		November 1997		November 1998	
	In millions of Irish pounds	Percent share of total	In millions of Irish pounds	Percent share of total	In millions of Irish pounds	Percent share of total
Sectoral distribution						
Agriculture, forestry, and fishing	1,868	5.6	2,039	4.8	2,275	4.3
Energy	207	0.6	185	0.4	174	0.3
Manufacturing	2,173	6.5	2,459	5.8	3,269	6.2
Building and construction	671	2.0	739	1.7	1,385	2.6
Distribution	3,102	9.3	3,804	9.0	4,580	8.7
Transport and communications	471	1.4	567	1.3	903	1.7
Financial services	6,982	20.8	11,549	27.2	14,445	27.5
Business and other services	3,325	9.9	3,728	8.8	3,746	7.1
Personal services	14,267	42.6	17,275	40.7	20,578	39.2
Other	58	0.2	95	0.2	1,127	2.1
Total	33,487	100.0	42,422	100.0	52,482	100.0

Source: Central Bank of Ireland, Quarterly Bulletin.

Table A29. Ireland: Official External Reserves
(In millions of Irish pounds unless otherwise specified) 1/

	Total reserves minus gold		Foreign Exchange	SDRs	Reserve Position in the Fund	Gold
	(US$ millions)	(IR£ millions)				
1992	3,440	2,111	1,890	76.2	144.6	66.9
1993	5,925	4,200	3,955	94.0	151.0	87.2
1994	6,115	3,952	3,714	95.6	143.4	91.1
1995	8,630	5,376	5,093	99.2	182.8	85.3
1996	8,205	4,881	4,589	98.3	193.4	85.1
1997	6,526	4,562	4,208	116.1	237.8	81.1
1998	9,397	6,318	5,797	129.8	391.5	88.9
1998						
Jan.	6,631	4,829	4,461	120.6	247.1	75.0
Feb.	6,666	4,871	4,397	123.9	349.4	75.3
Mar.	6,609	4,852	4,381	123.2	347.3	75.6
Apr.	6,711	4,785	4,324	120.6	340.0	77.0
May	6,770	4,791	4,311	121.9	358.3	77.1
Jun.	7,742	5,549	5,053	123.1	372.9	77.4
Jul.	9,114	6,451	5,962	121.4	367.7	75.7
Aug.	8,182	5,768	5,255	125.9	386.7	76.1
Sep.	8,429	5,650	5,153	122.3	375.2	75.9
Oct.	8,447	5,606	5,100	124.4	381.5	71.0
Nov.	8,378	5,735	5,215	129.6	390.7	71.2
Dec.	9,397	6,318	5,797	129.8	391.5	88.9
1999						
Jan.	6,408	5,629	4,987	167.4	474.4	47.5
Feb.	4,992	4,530	4,023	28.0	478.9	47.5
Mar.	5,173	4,816	4,285	28.6	502.3	50.3
Apr.	5,061	4,776	4,290	28.8	456.6	50.3
May	5,082	4,860	4,368	32.5	461.0	51.0

Source: IMF, International Financial Statistics.

1/ End of period data. Foreign reserves converted into local currency at end of period exchange rates.

Table A30. Ireland: External Debt

	1992	1993	1994	1995	1996	1997	1998 est.
	(In millions of Irish pounds, at end of period)						
External public debt	12,284	12,898	12,120	11,575	9,379	9,084	9,228
Government 1/	10,122	11,386	10,978	10,563	8,718	8,288	8,441
State-sponsored bodies	2,162	1,512	1,142	1,012	661	796	787
Net external liabilities of financial institutions	3,571	2,476	2,784	4,474	3,332	3,197	7,096
Total external debt	15,855	15,374	14,904	16,049	12,711	12,281	16,324
Debt service payments on external public debt	2,125	2,612	2,696	2,636	2,300	2,306	2,116
Government debt	1,695	2,224	2,224	2,248	2,041	1,893	1,604
Interest	712	787	782	782	689	848	522
Principal	983	1,437	1,442	1,466	1,352	1,045	1,082
State-sponsored bodies	430	388	472	388	259	413	512
Interest	186	177	149	122	72	57	80
Principal	244	211	323	266	187	356	432
	(In percent)						
Ratios to GNP							
External public debt	43.6	42.5	36.9	31.7	23.4	20.0	17.7
Government	35.9	37.5	33.4	28.9	21.7	18.2	16.2
State-sponsored bodies	7.7	5.0	3.5	2.8	1.6	1.7	1.5
Net external liabilities of financial institutions	12.7	8.2	8.5	12.3	8.3	7.0	13.6
Total external debt	56.3	50.6	45.3	44.0	31.7	27.0	31.3
Ratios to exports of goods and services							
External public debt	65.1	58.5	47.9	37.5	27.3	22.4	18.3
Debt service payments on external public debt	11.3	11.9	10.7	8.5	6.7	5.7	4.2
Interest	4.8	4.4	3.7	2.9	2.2	2.2	1.2
Principal	6.5	7.5	7.0	5.6	4.5	3.4	3.0
Debt service payments on government debt	9.0	10.1	8.8	7.3	5.9	4.7	3.2
(In millions of Irish pounds)							
Memorandum items:							
Government bonds held by nonresidents 2/	2321	4047	3679	4352	5370	4137	3504
Nominal GNP	28181	30370	32885	36503	40146	45500	52183
Proportion of external public debt outstanding at variable interest rates (in percent) 3/	54	68	52	47	46	37	43

Sources: Central Bank of Ireland, *Quarterly Bulletin*; Department of Finance; and data provided by the Irish authorities.

1/ Central government gross external debt.

2/ Government bonds held by nonresidents are not included in the figures for external public debt.

3/ 1993 to 1996 percentages are for Government debt only.

Table A31. Ireland: External Government Debt 1/

	1992	1993	1994	1995	1996	1997	1998
Gvernment debt outstanding at end of period	10,856	12,275	11,518	10,906	8,718	8,289	7,376
			(In percent of total debt)				
Currencies in which loans are repayable							
U.S. dollar	18.2	15.6	19.8	20.6	20.0	20.7	
Deutsche mark	42.5	32.1	19.2	19.0	15.2	19.6	71.2
Pound sterling	0.5	7.5	14.3	14.7	27.9	26.4	23.9
Swiss franc	19.3	16.8	11.9	15.0	11.3	13.7	
Japanese yen	9.3	10.1	10.4	6.4	4.7	1.7	
French francs	2.7	3.4	8.3	12.7	13.9	10.9	2.5
Dutch guilder	3.0	6.7	7.0	4.4	1.9	2.8	1.9
ECU	4.3	7.8	9.0	7.0	2.8	2.1	
Other	0.1			0.2	2.4	2.2	0.5
Total external debt	100.0	100.0	100.0	100.0	100.0	100.0	100.0

Sources: Central Bank of Ireland, *Annual Report* and *Quarterly Bulletin*.

1/ Amounts outstanding are calculated by reference to the exchange rates and interest rates obtaining at that date. Actual debt servicing may differ from that indicated in the table because of net new debt contracted after December 31, 1998, or because of restructuring of existing debt.