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Catching Up with the Leaders: The Irish Hare

FOR MANY DECADES Ireland's output per capita ranked about twenty-fourth among the world's industrial nations. Suddenly, in the mid-1990s Ireland started to move up, from twenty-second in 1993 to eighteenth in 1997 and an amazing ninth in 1999.[1] The many facets of Irish success over these years, from a disproportionate representation in popular music to the largest current account surplus in the industrial world, caught the public imagination at home and abroad. This paper examines the startling turnaround in Irish economic performance that began in the mid-1980s. By comparison with Ireland's previous economic performance there is indeed a miracle to explain, but from a global perspective the question is surely why it took so long for Ireland to catch up with the rest of Europe.

Although most attention has focused on aggregate output growth rates—real GDP growth averaged 10 percent a year over the period 1995–2000—we will show that the salient feature of Ireland's catch-up has been an increase in the proportion of the population at work. This is partly a function of demographic trends and partly of a remarkable reduction in the rate of unemployment, neither of which can be repeated. When the data are correctly interpreted, there has been no productivity miracle, as some have claimed, and Ireland's ranking in terms of average living

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1. Official GDP per capita data for 2001 put Ireland ahead of all the other EU countries except Luxembourg.

standards has not been quite as good as implied by the conventional statistics quoted above—although the performance of the labor market during the 1990s was marvelous. Dissecting the sources of output growth and understanding the transformation of the labor market are the two central tasks of this paper. In addition, we describe how inappropriate fiscal and perhaps monetary policies held Ireland back in earlier years, with the result that convergence, when it occurred, was telescoped into a short period.[2]

Catching up, and doing so rapidly, requires a favorable institutional, policy, and external environment. Several individual institutions and policy entities in Ireland are each quietly confident that it is the unique source of the turnaround. As our story unfolds, it will become evident that the credit must be widely shared, and that a much improved external environment also played its part.

Background

In a letter to David Ricardo in 1817, Robert Malthus said, "a population greatly in excess of the demand for labour" was "the predominant evil of Ireland."[3] This was a generation before the famines of the 1840s triggered large-scale emigration and a decline in the national population that continued until the 1960s. Irish adjustment during the nineteenth century has been cited as a good example of how globalization fostered convergence of living standards. The island was transformed from a poverty-stricken, peasant economy that had served as a source of cheap labor for booming cities in Britain and North America to an economy that, at the start of the twentieth century, boasted wages—in some sectors of the urban economy at least—close to those prevailing across the Irish Sea.[4]

But the rural population and unskilled urban workers, who predominated, continued to lag behind, and in the course of the twentieth century

2. We prefer Aesop's hare, long somnolent, dashing to catch up with the slow and steady tortoise, as a metaphor for the Irish economy's recent performance over the more widely touted "Celtic tiger." The latter is zoologically improbable, whereas the hare is one of the largest wild animals actually native to Ireland.

3. Quoted in Sraffa (1952, p. 175).

4. O'Rourke and Williamson (1999, pp. 21–22).

Ireland seemed—like Aesop's hare—to take a breather. Feeding Britain through two world wars provided adequate export revenue for what was still primarily an agrarian economy, especially that part of the island that became the Republic of Ireland, which is the subject of this paper.

Economic historians characterize the third quarter of the twentieth century as the "Golden Age" of European growth.[5] Most Western European economies, having recovered from wartime damage by around 1950, continued to grow more rapidly than before or since until the first oil shock in 1973. Ireland did not share in this happy experience—indeed, only the United Kingdom had a lower rate of per capita output growth over those years. In the 1950s Ireland stumbled badly, with a renewed surge of emigration, and it continued to exhibit the symptoms of a labor-surplus economy, not so much in the rate of unemployment as in emigration and a declining population, a low participation rate of women in paid employment, and continued dependence on a largely subsistence agriculture.

Conditions became more promising during the 1960s. Growth accelerated somewhat, and the overall policy stance looked increasingly benign in terms of macroeconomic management, human capital formation, and openness to the international economy. The exchange rate was pegged to the pound sterling, macroeconomic policy was characterized by a modest balance of payments deficit, and the fiscal stance was conservative, observing the "golden rule" of borrowing only to finance public capital investment. Taxation was relatively low, taking less than 30 percent of GNP, compared with an average of over 36 percent across all member countries of the Organization for Economic Cooperation and Development (OECD). Inward foreign direct investment (FDI) was encouraged by grant incentives, a profits tax exemption, and, from the 1970s onward, duty-free access to the rest of the European Economic Community (EEC), which Ireland joined in 1973.[6] Educational attainment was rapidly increasing as a result of the belated introduction of universal free secondary education in 1967.

Although income per capita was low relative to that in the United Kingdom (by far Ireland's largest trading and financial partner, the main destination for its emigrants, and at that stage still the dominant reference point

5. van Ark and Crafts (1996).

6. Although foreshadowed earlier, the shift to an outward-oriented policy is usually dated to a suite of policy changes launched in 1958. Another early milestone was the Anglo-Irish Free Trade Area Agreement (1965).

for economic policy), nonagricultural income per worker was already close to the U.K. level. Ireland's continued backwardness reflected, above all, the modest share of the population in higher-productivity nonagricultural activities. That GDP per capita was 27 percent lower than in the United Kingdom in 1973 (table 1) reflected, first, a labor force participation rate that was 19 percent lower, and second, the fact that almost a quarter of those at work in Ireland were engaged in agriculture, where income per capita was 40 percent below that in the United Kingdom. Average nonagricultural output per person engaged was virtually the same in both countries. These points illustrate the trap into which the uncritical discussion of convergence based on the broadest aggregates can lead.

Thus, in 1973, an optimist could—and some did—foresee a steady convergence in living standards to reach those of the United Kingdom and other advanced European economies within a generation, especially as rising participation by a better-educated work force in the modern, export-driven, nonagricultural sector lifted average income per capita.[7] Indeed, the situation at the end of the twentieth century can be seen as the fulfillment of that prediction. The policy stance had by then reverted to the earlier one: once more there was a fixed exchange rate, and the current account and the fiscal accounts were both in surplus for most recent years. Tax revenue as a share of GNP was again in the lowest third of the OECD countries, and unemployment was at a historic low—and lower than in most other industrial countries. The nonagricultural work force now includes 40 percent of the population, compared with 28 percent in 1973 (figure 1). The dependency ratio peaked in 1986 at 224 dependents per 100 employed. By 2001 it was down to 124. As a result, GNP per capita is now close to the industrial-country average.[8]

Ireland's convergence on the leaders in terms of output per capita in the last quarter of the century was thus essentially the result of employing a new generation—one with higher educational qualifications and, in the case of women, a higher propensity to labor force participation—in the modern sector and, notably, outside of traditional agriculture. At one level, therefore, Ireland's achievement does not seem all that special:

7. Higher incomes in agriculture were also in prospect, thanks to the stimulus of high EEC support prices.

8. Our characterization of Irish convergence here finds some U.S. echoes in Caselli and Coleman (2001).

Table 1. Productivity and Employment in Ireland and the United Kingdom, 1973
Units as indicated

Item	*Ireland*	*United Kingdom*	*Ratio (percent)*
Alternative productivity measures[a] *(Irish pounds)*			
GDP per capita	856	1,173	73
GDP per worker	2,380	2,642	90
Agricultural output per worker[b]	1,634	2,726	60
Nonagricultural output per worker	2,605	2,640	99
Employment			
Total employment (percent of population)	36.0	44.4	81
Agricultural employment (percent of total employment)	23.2	3.0	780
Nonagricultural employment (percent of population)	27.6	43.1	64

Sources: Economic and Social Research Institute (ESRI) database; Eurostat; United Kingdom Office for National Statistics, *Annual Abstract of Statistics*, 1985; and Hitchens, Wagner, and Birnie (1990).
a. Based on official productivity data. These data are later adjusted to take account of overstated profits from foreign MNCs, but the adjustment for 1973 would be less than 2 percent.
b. Includes forestry and fishing.

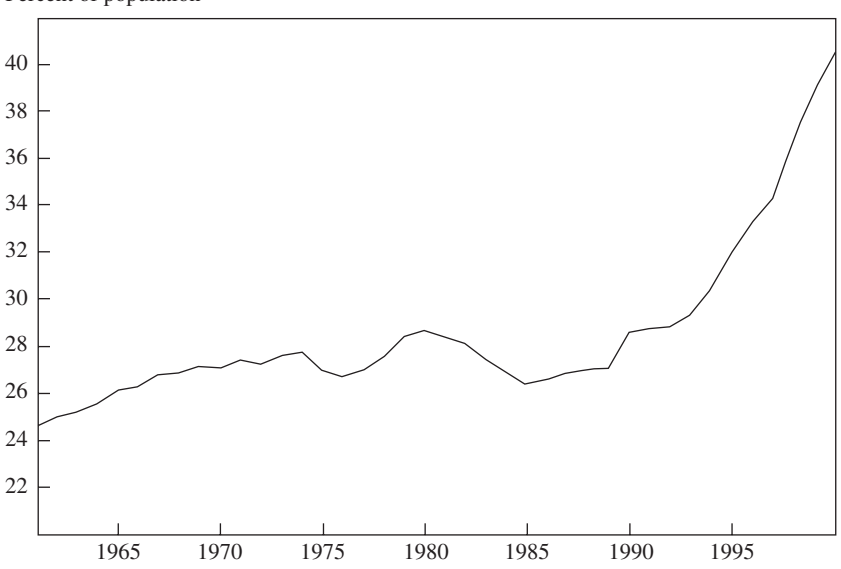
Ireland has finally caught up with the early modernizers to take its place among the world's most productive and prosperous countries.[9] The challenge is to explain the belatedness and speed of the catch-up and especially the employment boom of the 1990s.

The two snapshots, as of 1973 and as of 2001, conceal the fact that the path between them was anything but stable. Thrown badly off course by the first oil crisis and the policy response to it, Ireland lacked the conditions for continued steady convergence for the first fifteen years or so of the intervening period. Lacking in particular were a stable fiscal environment and a wage formation process that would keep Irish labor competitive.

Instead, an attempt to force a quick recovery from the slump of the mid-1970s gave rise to wage pressures and fiscal imbalances that left Ireland ill prepared for the high global interest rates and weak foreign demand of the early 1980s, not least from Margaret Thatcher's Britain. Thus the aggressive fiscal expansion in the late 1970s helped drive up real wages and crowd out sustainable growth of productive capacity. Subsequently, the spiraling debt, high tax rates, and high interest rates of the early 1980s perpetuated conditions hostile to sustained growth. High

9. Ó Gráda and O'Rourke (2000).

Figure 1. Nonagricultural Employment, 1961–2001



Sources: Authors' calculations based on data from Central Statistics Office Ireland, Demography and Labour Force data; and Economic and Social Research Institute (ESRI) database.

taxes placed upward pressure on the supply price of labor and, together with the apparently inexorable rise in debt, sapped business confidence. In addition, fiscal policy resulted in a sizable net withdrawal of demand as the authorities struggled to limit deficits even as external debt service grew rapidly. Thus, although inflation and the external deficit came down, these were years of deep recession in Ireland, when the economy presented a very weak picture. The net result was that, by 1986, there was a lot more catching up to do.[10]

By this time everyone concerned realized that a more disciplined demand management policy was required. But that realization was not in itself sufficient to ensure convergence. When fiscal and demand conditions stabilized, real wage moderation took center stage in smoothing the process of employment transition. We will argue that the institutional arrangements for wage bargaining and the harsh realities of high unem-

10. "Poorest of the Rich" was the title used by *The Economist* in January 1988 for its survey of the Irish economy. When it revisited the topic in May 1997, the title was "Europe's Shining Light."

ployment in Ireland and the United Kingdom were the factors that reduced real wage growth below the rates recorded in Ireland's trading partners and greatly facilitated employment growth. In contrast to the East Asian miracle economies, accumulation of physical capital, including public infrastructure, has not played an important driving role, although our measures may miss a crucial change in the quality of investment in the 1990s.

Although the rapid reduction in unemployment, the fiscal turnaround, and the very high recorded rates of output growth in the subsequent fifteen years reflect a strong improvement in competitiveness (measured as wage rates relative to those of Ireland's trading partners, expressed in a common currency), partly associated with a successful process of centralized wage bargaining, they also owe much to more favorable external conditions. The external impetus provided by FDI from the United States and other countries has had a multidimensional impact on economic performance. These have been the booster rockets that were needed to lift Ireland into the higher orbit in which it travels today.

The whole period since 1973 thus appears as a long business cycle, with a deep and prolonged trough in the first half of the 1980s and a climacteric around end-century, superimposed on a secular transition in the population structure and in the patterns of labor force participation and employment.[11] Although we emphasize convergence, some distinctive features of the Irish economy at the start of the twenty-first century clamor for attention. It is among the most globalized economies in the world, with (for example) more than half of its manufacturing and financial sectors owned by foreigners. The total value of exports exceeds GNP and is just a little below GDP (a constant source of puzzlement to undergraduates).

An exceptional propensity to emigrate has long been an Irish characteristic, and during the boom this was replaced by a high immigration rate. This aspect of Ireland's openness to the rest of the world has undoubtedly contributed to the economy's ability to experience rapid employment growth: the roughly 50,000 jobs added annually in the 1990s are only a small fraction of overall employment in the industrial coun-

11. The business cycle was also partly driven by developments in the United Kingdom. The openness of the economy, including its openness to migration, and the pegged exchange rate regime in place for much of the time have always made defining, measuring, and explaining an Irish business cycle a nonstandard exercise.

tries. But the substantial presence of high-technology multinational corporations puts an unduly flattering gloss on some Irish economic statistics, notably measures of productivity, which, when correctly interpreted, appear solid rather than miraculous.

The remainder of the paper looks at these three key elements. It starts by focusing on demand management policy, explaining the failures and successes of fiscal and monetary policy that first delayed and then strongly assisted the economic convergence. (Box 1 discusses the political economy of this period.) The next section looks at how the labor market functioned. The fact that this market, long cleared through emigration, suddenly saw enough job creation to achieve both full employment and net immigration is the nub of the matter. We then analyze trends in the level and composition of output and of productivity, showing that the distinctive patterns of Ireland's productive structure and faster productivity growth played limited roles in the recent success. (An appendix explores the implications of the exceptional industries dominated by affiliates of U.S. corporations for measures of income and productivity.) Finally, we ask what lessons can be exported to other countries and, in particular, whether one can isolate any policy ingredient as being *the* determining factor in Ireland's success.

Managing Demand: Fiscal and Monetary Policy

Ireland is not alone in having experienced severe macroeconomic imbalances in the past quarter century, but their amplitude has been greater than in almost any other OECD country. The early 1980s saw the worst extremes. In 1981 inflation was 21 percent, the current account deficit was about 15 percent of GNP, and public sector borrowing was running at an even higher rate. The attempt to rein in the twin deficits caused taxation to jump by 10 percentage points of GNP in seven years, while overt unemployment soared to 16 percent of the labor force in 1986 and net emigration approached 1 percent of the population. Nevertheless, government debt continued to grow, on some measures reaching almost 130 percent of GNP in 1986.

Contrast those figures with the situation in 2001, when the unemployment rate fell as low as 3.8 percent, despite a dramatic rise in the labor force participation rate and substantial net immigration. Taxation had

Box 1. Why Did Governments Act As They Did? Interpreting Fiscal Policy in the 1970s and Early 1980s

How is one to explain the three contrasting approaches to fiscal policy in Ireland in the last quarter century: aggressively expansionary from 1977, tax-and-spend from 1981, and aggressively cost-cutting from 1987?[1] The explanation is to be found partly in the government's pursuit of flawed economic models, partly in shifting external developments, and partly in parliamentary dynamics. But above all it can be interpreted in terms of shifting political cost-benefit calculations.

The strategy adopted by the incoming government in 1977 was prompted by the high levels that unemployment had reached, making its resolution seem the appropriate primary goal of policy, and by the low—indeed, sharply negative—real interest rates that had prevailed for the previous few years. Also influential was an ingrained skepticism about the likelihood that private enterprise would ever generate sufficient employment. Given this environment, borrowing to finance an expansion in employment seemed more attractive than ever before. But the policy was flawed on three fronts. First, the low real interest rates would prove, unsurprisingly, to be a temporary aberration. Second, the ability of a "buy Irish" campaign to neutralize the balance of payments consequences of the fiscal expansion (whether through spending or competitiveness effects or both) was largely illusory. Third, the responsiveness of the Irish unemployment rate to expansionary fiscal policy was much less than one for one with job creation. (As a rule of thumb, summarizing econometric evidence, for every two jobs created, one person was added to the work force in the short term, mainly through the return migration flow but also through rising participation.) Jobs were created, and unemployment did fall, but too many of the jobs were dependent either directly on government spending or indirectly on deficit finance, both of which would prove unsustainable.

In the event, external events worsened affairs even more than the government ought to have provided for. Global developments in 1979–80 heightened the realization that the fiscal path was unsustainable, and this was widely recognized by the time of the change of government in 1981. From then until

(*continued*)

1. As shown by Lane (1998), fiscal policy was definitely procyclical in this period, and it may have continued to be so to the end of the century, although deciding this is bedeviled by the acute difficulty of measuring the output gap appropriately.

Box 1. Why Did Governments Act As They Did? Interpreting Fiscal Policy in the 1970s and Early 1980s (*continued*)

1987 there was a succession of insecure coalition or minority governments, whose fiscal policy replaced the defeat of unemployment with a new overriding objective of stabilizing the fiscal position subject to the constraint of maintaining adequate levels of public services and income support mechanisms. Continued support from the Labour Party required the latter, and it was a hallmark of the ensuing recession that rates of unemployment assistance and other income support payments were maintained in real terms.[2] These dual goals implied a continued increase in spending, as interest rates and unemployment continued to rise, combined with spiraling tax rates, calculated in each budget more or less as a residual: what would be needed after the debt markets had been tapped to the maximum extent possible. This holding operation was barely sustainable; suspension of much of the public capital spending program helped reduce the primary deficit substantially, but rising debt service charges meant that the debt was still growing faster than GNP. Furthermore, with the high tax rates and massive borrowing certainly discouraging private sector initiative, and the deep recession in the United Kingdom inhibiting outmigration for several years, unemployment continued its inexorable rise.

A new political configuration from 1987 onward allowed a more single-minded approach to fiscal stabilization.[3] By stealing the outgoing government's rhetoric, the new leaders made cutting government expenditure no longer a political taboo, and at last fiscal policy was addressed to an attainable objective function. Furthermore, external circumstances improved dramatically, with a worldwide fall in interest rates accompanied by a tightening of labor market conditions in the United Kingdom, which allowed emigration in the late 1980s to lower Irish unemployment and its associated fiscal costs. Stricter enforcement of the social welfare code became more politically tolerable as the numbers dependent on transfers began to decline.

2. By comparison with the continental European countries, however, income support payments have long been set at a relatively low percentage of average income.

3. Seidmann (1987) showed that although the new government also relied on independent deputies, it was more secure, as measured in terms of Shapley value (a measure of the power of opposition groups to form winning coalitions), than any of the previous governments during the decade. Additionally, the leader of the opposition committed the main opposition party to supporting the government's fiscal stabilization (in the so-called Tallaght strategy).

been falling steadily as a percentage of GNP, but this did not prevent the fiscal surplus from exceeding 5 percent of GNP in 2000, bringing the government debt–to–GNP ratio down to 38 percent by the end of 2001. There was just a small deficit in the current account that year, and inflation, although above the European Central Bank's target, fell to around 4.5 percent.

This compares trough with peak, however, and indeed from mid-2001 the economy began to slow, with unemployment rising slightly and the fiscal accounts deteriorating quite sharply. Nevertheless, the contrast over the two decades is startling, and to interpret it requires a narrative approach explaining what happened and why.

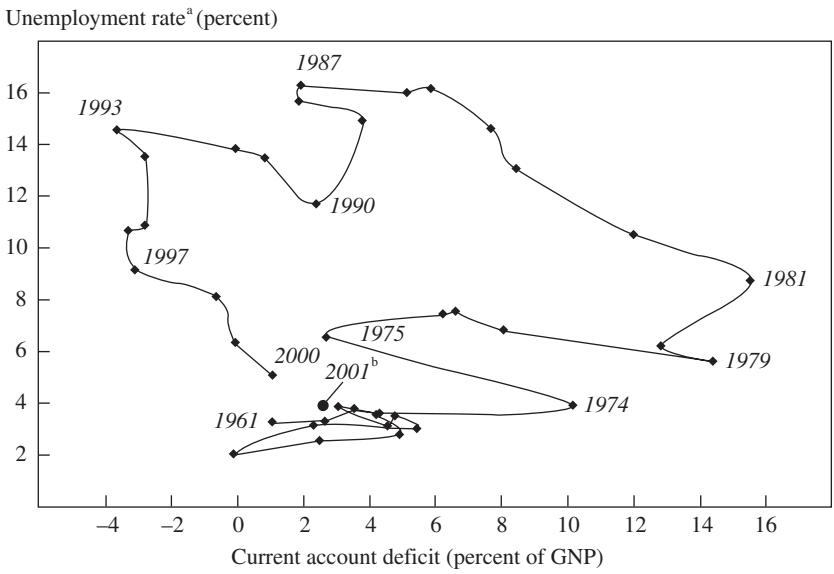
Falling into the Debt Trap

Happily, it is possible to abstract from higher-frequency fluctuations and concentrate on the big picture of a single long cycle in macroeconomic imbalances in Ireland during the last quarter of the twentieth century.[12] Figure 2 shows this cyclical evolution of internal and external balance, with the former measured by unemployment and the latter by the current account deficit. Although the figure echoes developments in other countries for parts of the period, the amplitude and duration of this single cycle are unique among the industrial countries. And, given the fact that immigration was high when unemployment was low (and vice versa), the figure even understates the amplitude of the internal disequilibria.[13] Recognizing the existence of this long cycle has methodological implications for our analysis. First, it means that we are not dealing only with growth theory—as have most previous attempts to understand the Irish miracle—but that an important part of the analysis needs to focus on stabilization policy: on the fiscal and monetary policy responses to external shocks and shifting state variables over the period. Second, to the extent that the whole period represents a single observation or cycle, it limits the kind of econometric work that can be done on the broad time-series characteristics: numerous slow-moving variables also display a single cycle over this

12. Here and elsewhere in the paper, for data before 1995 we use the consistent historical series maintained by the Economic and Social Research Institute. We are very grateful to John FitzGerald for making this database available to us.

13. On the other hand, the coincidence of high inflation and nominal interest outflows means that the current account deficit is somewhat overstated at its height.

Figure 2. Internal and External Balance, 1961–2001



Sources: Central Statistics Office Ireland, *National Income and Expenditure*, 2000; and ESRI database.
a. Measured by the International Labour Office (ILO) definition.
b. Central Bank of Ireland estimate.

period; attempts to identify which were causal are almost inevitably inconclusive.[14]

The length and amplitude of this cycle must, however, be mainly attributed to some serious policy errors. Figure 3 traces several macroeconomic and budgetary aggregates over the period. In essence, the oil price crisis of 1973–74 triggered a sequence of short-termist demand management responses that kept the economy out of equilibrium and inhibited sustainable job creation for almost two decades. The initial decision to finance the oil crisis with borrowing paralleled decisions in the United Kingdom. Government debt and inflation surged, while unemployment rose in tandem with that in Britain. A fiscal correction was initiated by 1976, but it was the decision to respond to the lingering high

14. We chose the variables in figure 2 in preference to plotting wage inflation against unemployment (such a plot would also generally move in a large loop, though with many eddies); that alternative is not easy to read as a shifting Phillips curve, not only because high international labor mobility has implied a significant medium-term influence of U.K. unemployment conditions on those in Ireland, but also because, especially before 1979, fluctuations in external inflation were rapidly imported through the fixed exchange rate.

unemployment with an aggressively expansionary fiscal policy beginning in 1977 that, by the end of the decade, had placed government finances on a dangerously unstable path.[15] New spending programs, expansion of public sector employment, and higher rates of transfer payments all translated into a hard-to-finance ratcheting up of current government expenditure. The debt-to-GNP ratio was rising rapidly (top left panel of figure 3), with an increasing share of the debt being borrowed from abroad and denominated in foreign currency. This left the government with little room to maneuver in response to the next adverse shock, which came with the Iranian revolution in 1979 and the tightening of U.K. and global monetary policy.

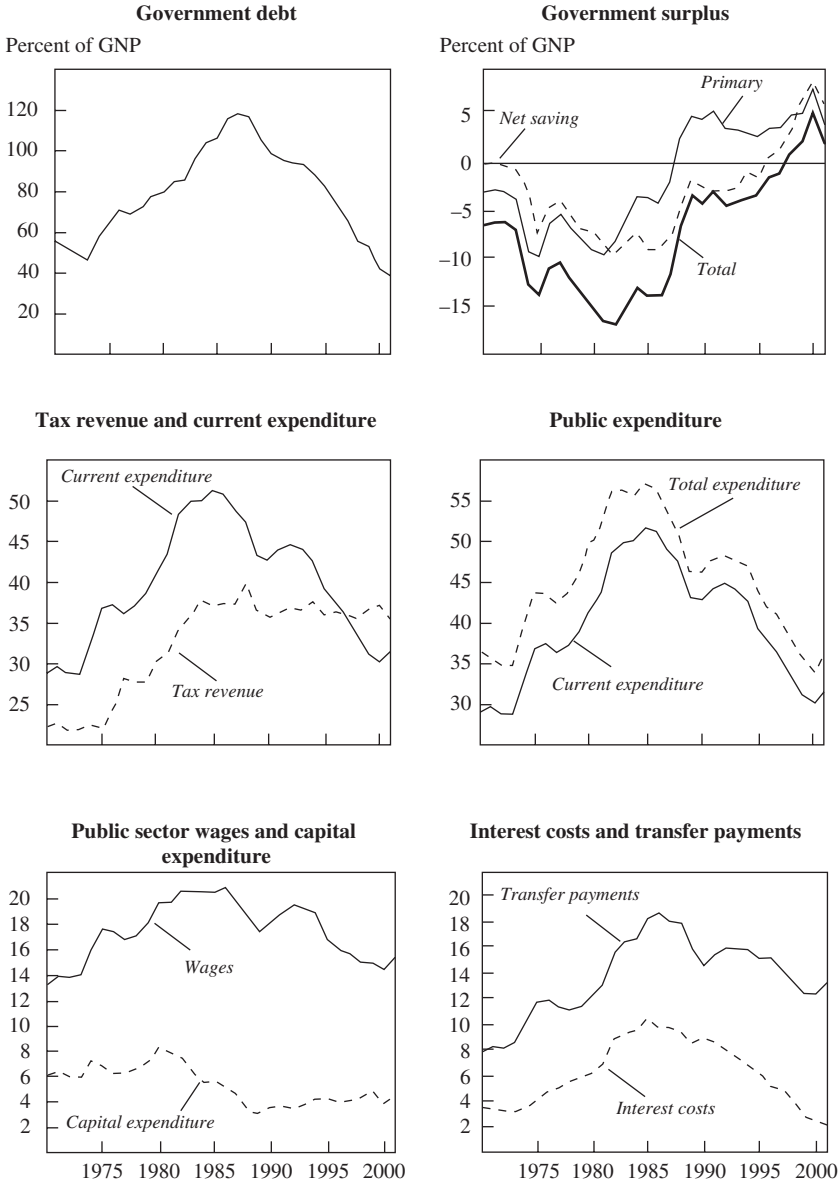
By 1981 rising interest rates and weakening external demand conditions meant that the fiscal deficit was increasing rapidly (top right panel of figure 3) even though policy had turned contractionary.[16] Thus the automatic stabilizers, especially income support payments, worked against the early attempts at fiscal correction, as unemployment soared as a result of the combined effect of the cutback in the primary deficit and adverse shocks from the deteriorating labor market conditions in the United Kingdom. The impact of these deflationary forces on employment and output was aggravated by the fact that the liberalized trading environment had weakened many of Ireland's traditional, formerly heavily protected industries. Employment in these industries contracted by about 25 percent—or 30,000 jobs—in the first half of the 1980s. The rapid demise of these jobs was undoubtedly hastened by the contraction of demand, which it in turn intensified.

By the mid-1980s even paying for current spending programs was proving difficult. Every year from 1979 on, the share of taxes in GNP

15. An alternative, generational accounting approach to fiscal policy presents a very different picture for Ireland. Indeed, because of relatively favorable demographics (discussed below), Ireland has, from this alternative perspective, had one of the stronger fiscal positions among OECD countries throughout the period under review (McCarthy and Bonin, 1999; Cronin and McCoy, 2000). In a sense, then, the Irish fiscal crisis was one more of liquidity than of underlying long-term imbalance, but there is a limit to what one can borrow in the markets on the strength of a favorable generational account balance.

16. The last column of table 2 presents a model-based measure, due to Duffy and others (2000), of the discretionary change in fiscal policy in each year from the previous year. It shows that discretionary fiscal policy was progressively tightened in each of the four years 1981 to 1984. Further, and sharper, tightening occurred in each of the three years 1987 to 1989. Although cyclically adjusted budget figures are controversial, the Blanchard (1990) approach gives a broadly similar time path of the budgetary stance.

Figure 3. Macroeconomic and Budgetary Aggregates, 1970–2001



Sources: Authors' calculations based on data from Central Statistics Office Ireland, *National Income and Expenditure*, 2000; ESRI database; and Department of Finance, *Budget 2002*, 2002.

rose, from 28 percent to almost 38 percent in 1984, as government scrambled to find additional revenue to meet the soaring spending (middle left panel of figure 3). Tax rates on alcohol and tobacco, as well as on television sets and other consumer durables, were so high that cross-border smuggling from Northern Ireland to the Republic became rampant. Some rates were above revenue-maximizing levels and were subsequently lowered, with an apparent gain in revenue.[17] The spiraling tax take had put upward pressure on wage rate negotiations despite rising unemployment. Although the primary deficit began to fall as early as 1983, the debt ratio grew to perilous levels, sufficient to prompt suggestions that default would be an attractive option.[18] By 1986 fiscal policy was at the crossroads.

The Fiscal Recovery: An Expansionary Fiscal Contraction?

The rapid turnaround in the fiscal accounts—for which the decisive date is 1987—took everybody by surprise. Not only was the marked tightening of policy by the incoming government unexpected (see the last column of table 2, and box 1), but the speed with which borrowing and the debt ratio responded was also unforeseen. However, the contribution of greatly improved external conditions (table 3) should not be underrated.

With the economy turning around, it is not surprising that some authors pointed to the dramatic fiscal correction as an important part of the explanation of Ireland's altered fortunes, arguing that this was an example of an "expansionary fiscal contraction" (EFC).[19] Subsequent work cast doubt on the mechanisms proposed.[20] Indeed, a glance at the sequence of events (exports leading consumption, which in turn leads investment; see the first four data columns of table 2 for 1987–90) shows that the confidence story underlying the simplified version of the EFC hypothesis has an uphill struggle to find empirical support in Ireland.

Yet the fiscal correction was undoubtedly a necessary precondition for the subsequent improved performance. Spiraling tax rates and an apparently runaway debt-to-GNP ratio cannot have encouraged entrepreneurial

17. FitzGerald and others (1988).
18. This view was espoused, for example, by Dornbusch (1989).
19. Giavazzi and Pagano (1990); McAleese (1990).
20. Barry and Devereux (1994); Bradley and Whelan (1997).

Table 2. Growth of Real GDP and Its Components and Alternative Aggregate Measures, 1973–2000

Percent

Year	Consumption		Investment[a]	Exports	Imports	GDP	GNP	Adjusted gross national disposable income[b]	Adjusted GDP[c]	Fiscal impulse[d]
	Private	Government								
1973	7.5	6.9	17.7	10.9	19.0	6.0	5.3	7.9	4.9	
1974	1.4	9.2	–7.3	0.7	–2.3	2.9	2.9	–1.2	3.6	
1975	–2.8	6.5	–5.1	7.2	–10.2	0.4	0.1	0.2	1.4	
1976	2.8	2.7	8.9	8.1	14.7	3.2	2.7	3.1	1.6	3.4
1977	6.8	2.0	5.1	14.0	13.3	6.0	5.3	6.4	6.2	–0.0
1978	9.0	8.2	18.2	12.3	15.7	7.9	7.0	8.5	6.7	2.5
1979	4.4	4.6	15.0	6.5	13.9	3.8	3.6	2.6	4.6	0.9
1980	0.4	7.1	–5.0	6.4	–4.5	2.0	1.8	–0.8	3.4	0.4
1981	1.7	0.3	7.2	2.0	1.7	2.4	1.9	0.3	2.3	–0.3
1982	–7.1	3.2	–3.3	5.5	–3.1	–0.1	–2.0	–0.9	0.5	–0.1
1983	0.9	–0.4	–9.3	10.5	4.7	–0.1	–0.9	0.9	–0.2	–2.9
1984	2.0	–0.7	–2.0	16.6	9.9	3.0	1.5	1.7	2.7	–0.9
1985	4.6	1.8	–7.4	6.6	3.2	2.3	1.3	2.4	1.5	0.7
1986	2.9	2.6	0.5	3.1	6.3	0.5	–0.2	2.3	0.6	1.6
1987	3.0	–4.8	–3.0	13.7	6.2	3.4	3.3	3.0	3.9	–2.3
1988	4.4	–5.0	–2.1	8.9	4.9	3.0	1.5	1.4	–0.3	–2.4
1989	6.2	–1.0	13.9	10.3	13.5	5.8	5.0	5.8	4.6	–0.6

1990	1.1	5.4	10.1	8.6	4.9	6.8	6.9	5.2	10.4	1.3
1991	1.8	2.8	–6.2	5.7	2.4	1.9	2.3	1.3	2.6	–1.9
1992	2.9	3.0	–1.8	13.9	8.2	3.3	2.3	0.7	1.2	1.1
1993	3.0	–0.4	–3.5	9.7	7.5	2.7	3.4	4.9	2.4	–2.1
1994	4.4	4.1	11.9	15.1	15.5	5.8	6.3	4.0	4.7	1.8
1995	4.4	3.0	12.8	19.9	16.4	10.0	8.4	6.4	6.9	–0.1
1996	6.3	3.2	16.5	12.2	12.5	7.8	7.4	8.1	8.0	0.0
1997	7.3	5.5	17.9	17.4	16.8	10.8	9.4	9.4	8.3	1.3
1998	7.3	5.5	16.5	21.4	25.8	8.6	7.9	7.5	6.2	0.6
1999	8.2	6.5	14.0	15.7	11.9	10.8	8.2	7.3	6.2	1.7
2000	9.9	5.4	7.0	17.8	16.6	11.5	10.4	7.5	8.3	–1.4
Memorandum: 2000 levels expressed as a percent of 2000 GDP										
	50.8	12.0	20.8	103.9	87.3	100.0	83.9	n.a.	n.a.	n.a.

Sources: Central Statistics Office Ireland, *National Income and Expenditure*, 2000; ESRI database; Kearney and others (2000).

a. Gross fixed capital formation.

b. Adjusted for changes in terms of trade.

c. Real GDP scaled by nominal foreign profit outflows as a share of nominal GDP.

d. Change in the fiscal deficit resulting from discretionary policy changes, as estimated by Kearney and others (2000).

Table 3. External Conditions Facing Ireland in the 1980s

Percent a year

Item	*1981–84*[a]	*1986–89*
Average U.K. GDP growth	1.6	4.1
Average annual change in U.K. unemployment rate	1.4	–1.2
Average U.S. short-term nominal interest rate[b]	10.7	6.7

Source: Directorate General for Economic and Financial Affairs, *European Economy, Statistical Annex,* no. 44, 1997.

a. Data for 1985 are omitted because it is a transition year.

b. U.S. inflation was about 1.2 percentage points higher in 1981–84 than in 1986–89. The dollar appreciated 40 percent over 1981–84 and depreciated 24 percent over 1986–89.

or investor confidence in Ireland.[21] Even though taxation as a percentage of GNP had peaked in 1984 (apart from a spike in tax receipts under the amnesty of 1988; middle left panel of figure 3) and marginal rates had started to fall sharply (figure 4), only by 1988–89 was it clear that the debt situation had been brought under control, which was perhaps a precondition for the recovery of investment. Comparing 2001 with 1985, the top rate of income tax has come down from 65 percent to 42 percent; of standard corporate tax from 50 percent to 16 percent; of capital gains tax from 60 percent to 20 percent; and of capital acquisitions tax from 55 percent to 20 percent.

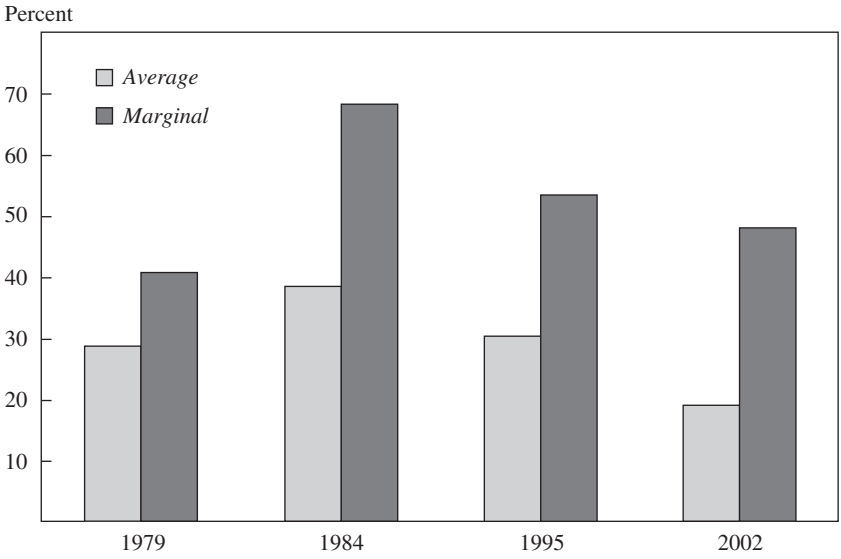
The specific fiscal steps taken in 1987 were quite orthodox: a temporary freeze on all public sector recruitment—implying a sharp fall in numbers employed, and thus in the public sector wage bill[22]—combined with (further) cutbacks in public capital spending (bottom left panel of figure 3). The better external conditions helped turn the automatic stabilizers around (the bottom right panel of figure 3 shows that transfer payments fell), as first emigration and then a pickup in labor demand at home lowered unemployment. Falling interest rates also helped, and when the debt-to-GNP ratio started to fall in 1987, the positive feedback became cumulative.[23]

21. Certainly it also put upward pressure on wage rates (see Curtis and FitzGerald, 1996; FitzGerald, 1999).

22. Already not all vacancies were being filled, putting an end to any expectation that government would act as an employer of last resort.

23. Actually, the decline in inflation during the early 1980s meant that the measured fiscal accounts flattered reality. Inflation-adjusted accounts show a less steep cyclical amplitude in both fiscal and international payments deficits; qualitatively, however, the story is unaffected by such an adjustment.

Figure 4. Average and Marginal Income Tax Rates on Average Earnings, 1979–2002[a]



Source: Authors' calculations based on data from Department of Finance annual *Budget* for the relevant year.
a. Male industrial worker taxed as a single person; includes social security employee levies.

Monetary and Exchange Rate Policy in the 1980s: A Complicating Factor

Abandonment of the link to sterling in 1979 in favor of membership in the new adjustable-peg regime of the European Monetary System (EMS) was an additional, and on the whole unhelpful, element of stabilization policy. The decision to join the EMS was made on strategic diplomatic and political grounds, with economic arguments playing only an incidental role. It certainly did not reflect any attempt to escape the discipline of Ireland's quasi-currency board arrangement, which had been in place in one form or another for 150 years. If anything, policymakers expected the new regime to result in an appreciation of the Irish pound against sterling (which had been notably weak since the mid-1960s), and subsidies were granted from Europe to ease the burden of adjusting to what was believed would be a tougher regime.

In the event, realignments in the EMS were frequent, and, at least for the first decade, Ireland was not slow to avail itself of these opportunities to retain wage competitiveness. In seven of the eleven realignments in the

first decade of the EMS, the Irish pound was devalued against the deutsche mark. With two exceptions, Ireland always pursued the modal realignment. The exceptions were triggered by the two sharp real appreciations that occurred as a result of a weakening sterling in 1983 and 1986. And they imparted an additional cumulative 9 percent depreciation to the Irish pound in the 1980s, making it weaker than all but the French franc and the lira in that period. Rather than a "zone of monetary stability" or a genuine hard currency peg, the EMS proved to be, for Ireland, a dragging anchor. All in all, membership weakened anti-inflationary discipline and increased uncertainty. Interest rates, adjusted for currency depreciation, averaged about 250 basis points above those in Germany—and much higher during several pre-realignment surges. This has been interpreted as a "peso" premium,[24] although domestic policy in the form not only of high government borrowing, but also of technical deficiencies in monetary policy implementation, added to the volatility and average level of interest rates before 1988.[25]

On the other hand, decoupling from sterling just as it was about to appreciate in the early 1980s fortuitously protected Ireland from an additional severe competitiveness shock.[26] Relative to those of Ireland's main trading partners, exchange rate–corrected wage rates increased on average by about 1 percent a year, in both the 1970s and into the 1980s, with no evident acceleration after EMS membership. After 1986, however, there does appear to have been a sharp improvement in the trend of wage competitiveness (figure 5).[27]

The devaluation of 1986, initiated as a defensive measure in light of the loss of competitiveness associated with a rapid depreciation of sterling, was especially timely in that sterling suddenly recovered, leaving Ireland well placed in terms of wage competitiveness to benefit from the

24. Honohan and Conroy (1994); Walsh (1993).

25. Honohan and Conroy (1994).

26. The sharp appreciation of sterling against all EMS currencies during 1979–81 brought the Irish pound to as low as 74 U.K. pence—a nominal bilateral depreciation of over 25 percent in just two years.

27. The competitiveness indicator shown in figure 5 represents a weighted average of the hourly earnings in Ireland's main trading partners divided by the same measure in Ireland (all expressed in a common currency, and relative to the projection of a linear trend from 1975 to 1987). The series shown is that published by the Department of Finance in its annual *Economic Review and Outlook*. (The series in the Central Bank of Ireland's *Bulletin* shows a stronger improvement in competitiveness during the 1990s, apparently because of different country weights.)

Figure 5. Wage Competitiveness and Total Employment, 1975–2000

Source: Authors' calculations based on data from Department of Finance annual *Economic Review and Outlook*, various years.
a. Average of hourly earnings in Ireland's main trading partners (expressed in a common currency) divided by earnings in Ireland, shown as a percentage of the 1975–87 linear trend in that ratio, which is projected forward after 1987.

accelerating economic boom in the United Kingdom and in other trading partners after 1987. As it happened, this was the first step in a sustained improvement in wage competitiveness.

The Turnaround in Wage Competitiveness

The data in figure 5, based on average hourly earnings in industry in Ireland compared with its main trading partners, need to be treated with caution: the series relates only to industry and is not adjusted for important shifts in age, skill, and sectoral composition.[28] Nevertheless, partial

28. At the start of the boom, Irish wage rates were much below U.K., French, and German levels in both skilled and unskilled occupations, but especially in the latter. For example, labor costs in the textile industry were lower in Britain than in Ireland in 1988, but the differential was reversed in the computer sector (Duffy and others, 1997). The diminishing surplus of unskilled labor and higher social welfare benefits subsequently raised unskilled wage rates, while the higher educational levels of the large cohorts leaving the educational system and their lack of external employment opportunities may have exerted downward pressure on skilled wage rates. On the other hand, returning migrants earned a wage premium (Barrett and O'Connell, 2000).

indications for other sectors suggest that the overall trends shown do not mislead. The rapid increase in relative wages up to the mid-1980s was interrupted and may have been reversed.

For Ireland, wage rates are preferable as a measure of competitiveness either to consumer prices (which are affected by substantial increases in indirect taxes not immediately relevant to international competitiveness) or to unit labor costs (which are dramatically influenced by the shift in sectoral composition to sectors with low labor shares). In particular, some observers have mistakenly attempted to judge Irish labor competitiveness by comparing average unit labor costs across industries. Such measures are seriously misleading, exaggerating improvements in competitiveness, because the average is improved by the shifting sectoral composition from high- to low-labor-share technologies, even if marginal or average labor productivity does not change in any sector. Unit labor cost data in Ireland are further distorted by the special characteristics addressed later in this paper.

On the other hand, if the data could be adequately adjusted for these sectoral shifts and other problems, they would likely show some persistent differential productivity growth in Ireland's favor. Indeed, the trend increase in relative Irish wages in the 1970s and early 1980s was usually interpreted as an equilibrium Balassa-Samuelson effect, that is, a reflection of the rise in relative wages and costs in the nontraded sector of an economy enjoying rapid productivity growth in the export sector (although this would not be the case for sharp runups such as that in 1976–80).

Figure 5 represents a compromise in which the differential change in wage rates is detrended by a constant, as if there had been a constant rate of differential marginal productivity growth. Provocatively juxtaposed with the employment data, the resulting wage competitiveness series suggests an important causal factor in the jobs performance of the 1990s. Later we consider the process of wage determination that gave rise to this competitiveness improvement.

Fiscal and Exchange Rate Policy during the Boom

Once economic activity started to pick up in the late 1980s, tax receipts began to flood in (not least the corporate tax, with the surging manufacturing profits taxed at 10 percent), allowing the government to lower tax

rates quite sharply without any significant decline in the share of GNP taken in taxation (after 1990) or any increase in the deficit.[29] As we will see, the ability to lower tax rates gave the government an important bargaining chip in the centralized pay negotiations, potentially generating another virtuous circle, as credible multiyear wage agreements halted the deterioration in wage competitiveness that had been a feature of the previous ten years.

With the fiscal stabilization in place and inflation staying low, maintaining confidence was the watchword, and attitudes toward realignments hardened. Thus, after the departure of sterling from the exchange rate mechanism (ERM) of the EMS in September 1992, the Irish government resisted market pressure to devalue for over four months despite the sudden severe loss of cross-channel competitiveness and soaring interest rates (figure 6). The Irish pound was eventually devalued, in February 1993, and not long thereafter the ERM effectively fell apart and members were allowed a wide margin of fluctuation. During the six years of loosely managed float that followed, real interest rates (and excess returns) were lower than they had been under the ERM.

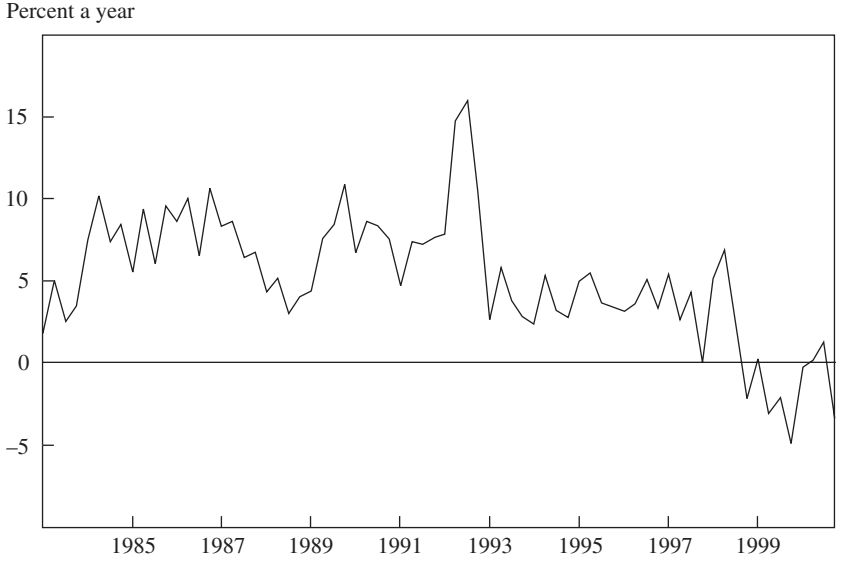
The budget also benefited from the receipt of substantially expanded structural grants from the EU budget after 1988. This came at a crucial moment inasmuch as, using these funds, the government could begin to tackle the backlog of deferred infrastructure projects without threatening the initially fragile recovery in the public finances. Annual receipts from this source peaked at over 3 percent of GNP in 1993, a very substantial sum, although only a fraction of the fiscal turnaround. The wider impact of these funds on the economy is discussed later in the paper.

Although the major contribution to demand growth in the late 1980s and early 1990s came from net exports, attributable both to greater competitiveness and to capital formation in the export sector (as discussed below), by the mid-1990s increased prosperity and lower interest rates were inducing higher private investment in housing. Thus, although the fiscal accounts continued to strengthen until 2001, the current account, which had been in surplus since 1992, began to deteriorate in 1998 and moved into a small deficit by 2000.

By this stage the economy was displaying unmistakable signs of overheating, most conspicuously in property prices: house prices rose by some

29. The role of low taxation of corporation profits in boosting inward FDI is discussed later in the paper.

Figure 6. Real Interest Rate, 1983–2001[a]



Source: Authors' calculations based on data from the Central Bank of Ireland, *Quarterly Bulletin*, various years.
a. Quarterly average of money market rates deflated by the one-quarter-ahead change in the consumer price index.

120 percent between 1996 and 2000. Consumer price inflation accelerated for a while, touching 7 percent in 2000 despite adoption of the euro as the national currency.[30] This inflation spike was largely attributable to the appreciation of the dollar and sterling against the euro in its early months, but local demand pressure also contributed.

This is not the place to discuss the prospects for a successful management of the transition from boom to more normal growth rates, although such a transition was unmistakably under way by mid-2001. As the following sections will show, some of the institutional features that had worked so well in the upturn—the pay bargaining system and the role of

30. Political arguments similar to those that had driven the Irish pound into the EMS in 1979 applied again in the decision to adopt the single currency beginning in 1999. Most economists thought that the economic arguments for and against membership absent the United Kingdom were fairly evenly balanced. As the start of European Monetary Union neared, interest rates converged downward toward those in Germany, adding to the demand pressure in the Irish housing market. In March 1998, in order to dampen inflationary pressure, it was decided to raise the Irish pound's entry rate by adjusting its EMS central rate. This was the only occasion in the twenty-year history of the EMS when a member currency was revalued against the deutsche mark.

inward FDI in high-technology industries—looked by 2001 as if they might be less benign in the downturn. Still, memories of the protracted fiscal crisis of the 1970s and 1980s and of the associated economic malaise were sufficiently fresh to ensure more prudent fiscal management this time around. And although the recent surge in current expenditure is disturbingly reminiscent of the mistakes of the late 1970s, in EMU at least there is now no scope for homegrown monetary policy mistakes.

Employment and the Labor Market

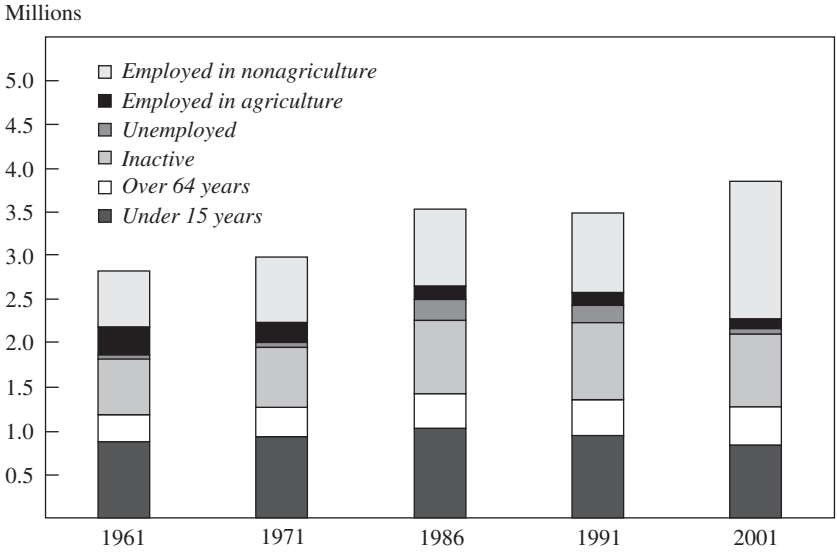
Although demand management failures and the consequences of the struggle to restore order to the public finances explain Ireland's sluggish employment performance during most of the 1980s, and their correction could have been expected to result in some recovery, the rapid and sustained growth in employment especially after 1989 still needs discussion. The new jobs were sufficiently numerous not only to wipe out most of the unemployment, but also to absorb an unusually high natural rate of labor force growth,[31] a sharp increase in labor force participation by women, *and* considerable net immigration that reversed the traditional outflow. (Figure 7 shows how these developments transformed the population structure in favor of productive workers.)

A high elasticity of international migration has long been a hallmark of the Irish labor market, and indeed, the rate of unemployment is loosely anchored to that in the United Kingdom. Net emigration has long seemed to place a ceiling on the gap between Irish and U.K. unemployment. Although Irish unemployment is today slightly below the U.K. rate, rather than well above it as was the case for decades, U.K. labor market conditions still appear to be the major determinant of medium-term fluctuations in Irish unemployment. With complete freedom of movement between the two countries, and a tradition of high mobility, the U.K. labor market acts as a flywheel. When job creation was low in Ireland, net emigration eventually closed any wide gap between Irish and U.K. unemployment rates. (Although the gap jumped to almost 9 percentage points in 1989, this was transitory.) Assisted by the more rapid job creation of recent years, Irish unemployment has dipped close even to what have been historically low

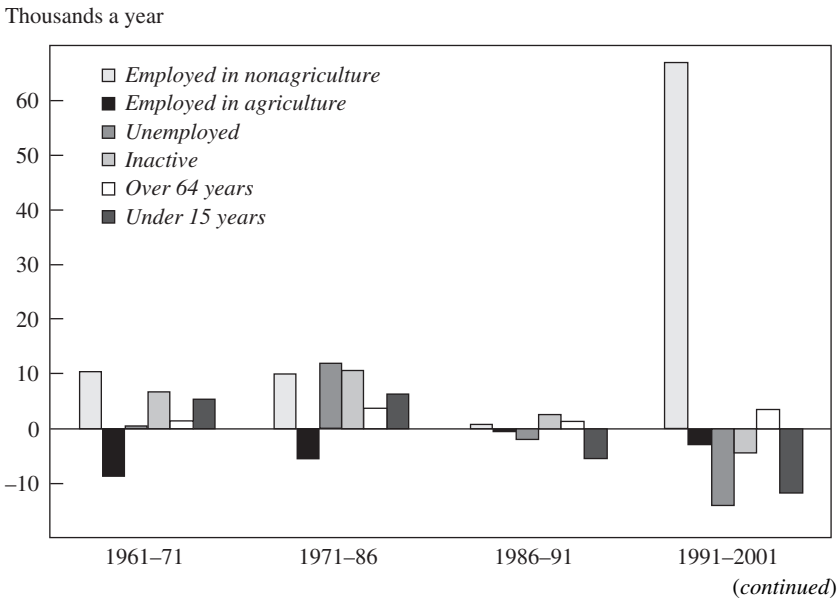
31. This in turn resulted from a baby bulge, which has now matured, the birth rate having declined precipitously after 1980.

Figure 7. Characteristics of Population and Employment, 1961–2001

Population and Its Distribution



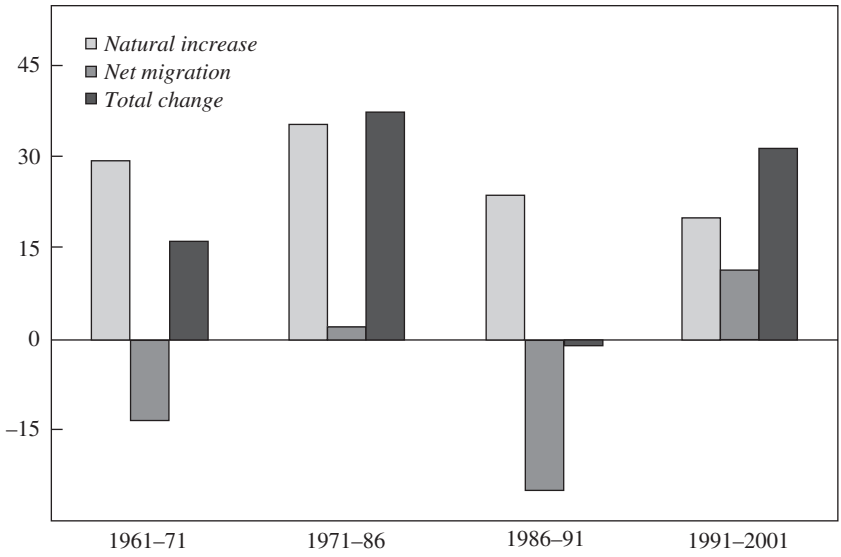
Distribution of Population Change[a]



(*continued*)

Figure 7. Characteristics of Population and Employment, 1961–2001 (*continued*)

Sources of Population Change[a]



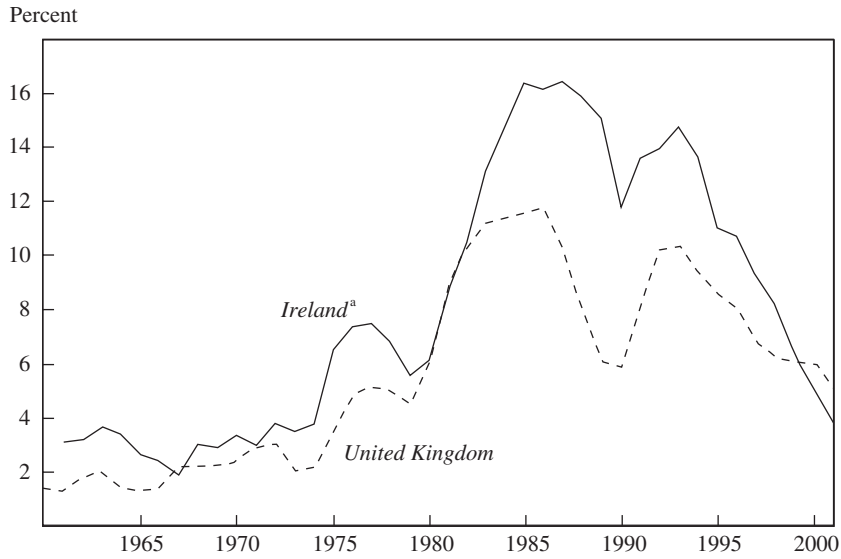
Source: Central Statistics Office Ireland, Demography and Labour Force data.
a. Annual averages.

U.K. rates (figure 8). It was unlikely to fall much lower, even if the global downturn had not intervened.

Econometric analysis of these relations, although not conclusive, corroborates these general assertions (table 4). Even without the change in employment, or the wage variables as additional explanatory variables, an error correction model in which U.K. unemployment is the only driver provides quite a good fit, although the large positive autocorrelation coefficient clearly flags the omission of one or more slow-moving explanatory variables (regression equations 4-1 and 4-2).[32] Omission of the change in employment makes it hard for the equation to match the actual amplitude of the major fluctuation.

32. Although lack of cointegration between U.K. and Irish unemployment rates cannot be rejected, when the percentage change in total Irish employment is included, a three-variable cointegrating relationship—Johansen's test—is obtained. However, the coefficient on the employment change term is rather high, and we prefer to present the results based on using the change in employment as a transitory term as above.

Figure 8. Irish and U.K. Unemployment, 1960–2001



Source: ESRI database.
a. Measured by the ILO definition.

Even if there had been no employment boom in Ireland, the fall in U.K. unemployment in the late 1990s would have exerted its traditional downward pressure on the Irish rate, but through the usual outflow of emigrants and the stagnation of nonagricultural employment. Instead, the effects of higher unemployment and centralized wage bargaining on wage inflation spurred job creation, which not only reduced Irish unemployment but also sucked in Irish emigrants from abroad, young workers from elsewhere in the European Union, and a modest, although much remarked upon, flow of economic migrants and asylum seekers from Eastern Europe and the developing world.

As argued above, wage restraint has been a hallmark of the recovery. This is partly attributable to the high levels of unemployment that had been reached in Ireland and the United Kingdom, partly to union restraint exercised in the process of centralized pay agreements (associated with tax reductions), and partly, perhaps, to reduced union power in much of the economy. This last topic deserves an explicit discussion, to which we now turn.

Table 4. Regressions Linking Irish and U.K. Unemployment Using an Error Correction Model[a]

Independent variable	*4-1*	*4-2*	*4-3*	*4-4*
Constant	1.04	1.24	2.31	2.20
	(6.6)	(6.3)	(2.3)	(1.6)
First difference of U.K. unemployment	0.50	0.47	0.59	0.63
	(7.1)	(6.4)	(4.1)	(3.4)
First difference of Irish employment	–0.37	–0.37		
	(11.7)	(11.5)		
Lagged difference between Irish and U.K. unemployment	–0.08	–0.10	–0.67	0.59
	(2.3)	(2.8)	(3.6)	(2.2)
First-order autocorrelation coefficient	–0.26	–0.33	0.86	0.84
	(1.5)	(1.6)	(6.5)	(4.1)
Summary statistic				
R^2	0.877	0.899	0.578	0.621
Durbin-Watson	2.05	2.08	2.16	2.20
Sample period	1964–2000	1973–2000	1957–2000	1973–2000

Source: Authors' regressions based on data from the ESRI database.

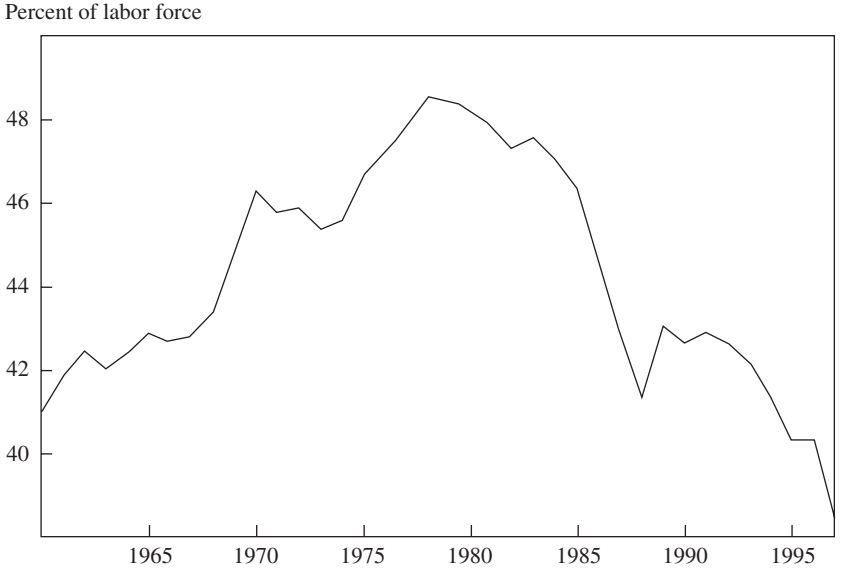
a. The dependent variable is the first difference of Irish unemployment. Variables for employment and unemployment are expressed as a percentage of the labor force. *t* statistics are reported in parentheses.

The Role of Corporatism

One helpful way of thinking about Ireland's distinctive industrial relations and wage bargaining arrangements is to recognize how sharply they have diverged in the past two decades from those in Britain. Both economies have recovered from severe and protracted episodes of mass unemployment, but they have chosen dramatically different routes out of their crises. In Britain the power of the trade and labor unions was undermined in the 1980s by confrontations with the government, such as that which crushed the mineworkers' strike in 1984, and subsequent legislative changes. But in Ireland there was no explicit government agenda to curb union power; on the contrary, the role of unions was greatly strengthened by the revival and deepening, beginning in 1987, of a centralized bargaining process that went beyond wages to cover taxation and other aspects of economic policy.

To be sure, the disastrous labor market trends of the 1980s had hit the Irish trade union movement very hard. Union membership, which had been growing rapidly since the 1960s, peaked in 1980 and declined steadily until the 1990s. Union density declined even more rapidly and did not recover (figure 9), as most of the new jobs created in the booming

Figure 9. Membership in Trade Unions, 1960–97



Source: ESRI database.

economy were in union-free workplaces. It is easy to see why the unions would have been anxious to bolster their power through corporatist institutions; it is less easy to see why the authorities would have wanted to revert to this "partnership approach" to wage bargaining in the late 1980s, which had been abandoned as a failure just a few years before.

It was against a historical background of poor industrial relations that centralized wage bargaining had begun decades before, with an attempt to achieve a more "orderly" development of "wage rounds," that is, pay increases negotiated between employers and unions. Initially the central agreements were confined to the nitty-gritty of percentage pay increases, the treatment of lower-paid workers, cost-of-living adjustments, and mechanisms for resolving disputes, with the government participating mainly as an employer. But in 1976 the government, influenced by the successful experience of such countries as Austria, the Netherlands, Norway, and Sweden, sought an integrated pay agreement, linked to changes in social welfare benefits, and accepted some responsibility for job creation in return for pay moderation. Implicitly, the goal was to move Ire-

land to the left, or centralized, end of the inverted U-shaped curve explaining excess wage inflation as a function of the degree of centralization in wage bargaining.[33] In contrast, Mrs. Thatcher was soon to move Britain to the right.

But the 1979 National Understanding for Economic and Social Development, negotiated against a backdrop of disastrous industrial strife, embodied the government's expansionist approach and provided significant wage concessions. Although this agreement achieved a reduction in the level of strikes, a second agreement collapsed in 1982, and there followed a five-year period of decentralized collective bargaining.[34]

It was not until 1987, at the depth of the crisis, that a new centralized agreement was negotiated. This came about in very altered circumstances, with much-weakened unions and a widespread consensus that generalized belt tightening was needed to reverse the economic decline. This agreement was followed by four others, negotiated over successive three- to four-year horizons extending from 1988 to 2003, each exceeding the previous one in its ambition and scope. The range of objectives now extended far beyond the basic goal of promoting industrial peace and keeping the economy competitive to objectives such as "bringing about a fairer and more inclusive Ireland" and "promoting an entrepreneurial culture."

Impact of Centralized Agreements

Admirers of the partnership approach, with its use of a broad, tax-based incomes policy, give it much credit for contributing to the exceptional growth in employment by almost eliminating industrial disputes and moderating real wage growth.

STRIKES. A comparison of the Irish and British records on industrial disputes is instructive (figure 10). The Irish strike rate was similar to the British rate in the 1970s. There was a dramatic spike in 1979 related to a national postal strike. This concentrated minds on the need to promote industrial peace. The strike rate fell to a much lower level after the new wage bargaining system was launched in 1987, and during the 1990s strikes ceased to be a general problem. The U.K. experience was broadly

33. Calmfors and Driffill (1988).
34. Durkan (1992); Hardiman (2000).

Figure 10. Days Lost to Industrial Disputes in Ireland and the United Kingdom, 1960–2000

Sources: Central Statistics Office Ireland, *Industrial Disputes*, various issues; and United Kingdom Office for National Statistics, *Annual Abstract of Statistics*, various years.

similar, with a dramatic fall in strike activity after the 1984 miners' strike and a rate of virtually zero in the 1990s. Thus the Irish and British records might be viewed as separate paths to the same destination.

Employers welcomed the outbreak of industrial peace and the saving of time and energy at the level of the firm achieved by the centralization and coordination of wage bargaining. It is interesting to note that the affiliates of U.S. firms in Ireland thrived in a setting of centralized pay bargaining completely alien to their domestic industrial relations environment. Many now managed to combine the corporatist approach at the national level with a union-free workplace. Up until the early 1980s, most multinational corporations (MNCs) had accepted the presence of unions as a matter of course; that this stopped being the convention is another reflection of the weakness of unions, and of the unemployment situation, in the mid-1980s.

Of course, the centralized route relies on continuous effort to maintain the consensus. Memories of the bad times fade, and there is already some indication in the last few years of an uptick in Irish trade union militancy.

Starting in 1999 there have been several disruptive strikes, mostly in the public sector or state-owned industries. This underscores the fact that the less confrontational Irish approach to the industrial strife of the 1970s and 1980s did not dislodge the trade union movement from a central role in pay bargaining or reduce its legal prerogatives. Meanwhile the drive to privatize the state-owned industries, where unions continue to exercise considerable insider power, has been half-hearted, compared with what has been done in Britain.

REAL WAGES AND COMPETITIVENESS. Several authors have analyzed why the upward relative trend of Irish wages was halted in 1986, but the underlying factors have proved resistant to an agreed econometric explanation. Much of the short-term fluctuation in the relative position is attributable to autonomous exchange rate changes involving sterling and the dollar. Indeed, once these are allowed for, it is hard to identify a statistically significant role for the domestic unemployment rate, let alone the pay bargaining regime.[35] But exchange rate movements are implausible as an underlying cause of the sustained reversal of trend. How much of this should be attributed to the new pay negotiation environment? Despite the inconclusive econometric results, most observers regard the coincidence of timing of the reversal of the deteriorating trend in competitiveness with the new approach to pay bargaining as suggestive that the latter did pay dividends.

A key feature of the agreements was the lowering of the burden of taxation on employees; this was held to be crucial to the moderation of nominal wage claims. Indeed, crudely plotting the overall share of taxation in GNP in figure 3 against the wage competitiveness measure in figure 5 produces a temptingly close fit (not shown).[36] Thus the reductions in tax rates, already discussed above, were an implicit part of the negotiation of each agreement, with government promising income tax "concessions" in return for pay moderation. Along with the rapidly falling top marginal tax rates, mentioned earlier, income tax thresholds were raised sharply in real terms, taking more and more of the lower paid out of the income tax net.

35. Curtis and FitzGerald (1996); Walsh (2000).

36. An R^2 of 0.91 is obtained with just the tax variable, lagged two years (t statistic of 7), and a linear time trend. Here again, however, we need to be cautious: as has been noted, the twenty-six years of data represents only one cycle.

Of course, this was a somewhat Faustian bargain in that the lowering of tax rates had a natural limit influenced by public perceptions of the adequacy of the provision of public services. The time would eventually come when the government would have nothing more to offer in this dimension to buy wage moderation. Indeed, targeted improvements to public services became part of the pay bargains.

Was there a price paid in terms of inequality? Naïve calculations suggest a huge increase in the share of profits in GDP, but, for reasons discussed in the next section relating to the interpretation of the profits of MNCs, it is hard to be precise about the extent to which wage restraint really did shift relative factor shares.[37] Certainly the boom has brought about a large reduction in absolute income poverty and in nonmonetary measures of deprivation, but there has been no clear trend in relative poverty or in inequality.[38]

By 1998 there was considerable drift in actual private sector wage rates above what was agreed in the national agreements. The era of wage restraint seemed to be nearing its end. Fortuitously, however, the weakness of the euro between 1999 and 2002 helped keep Irish labor competitive despite accelerating nominal wage increases, as figure 5 showed.

Structural Rigidities

Conventional wisdom (repeated in many reports of the OECD and the European Commission) has it that the poor labor market performance of the continental European economies may be partly blamed on rigidities and structural defects in their labor markets. It is widely believed that the interaction of the tax and benefit systems creates serious disincentives to offering and accepting employment. It is thus worth examining whether, aside from the lower tax rates, policy changes of the type advocated by the OECD played a significant role in the transformation of the Irish labor market during the 1990s.

The simplest summary of the impact of the benefit system on work incentives is the replacement ratio, the proportion of the net-of-tax wage income that is replaced by unemployment benefits in various situations.

37. Even after excluding MNC profits, the wage share in factor income has been declining since the mid-1990s, but only slightly, for example from 64.7 percent in 1994 to 62.8 percent in 1999 (Lane, 1997).

38. Nolan, O'Connell, and Whelan (2000).

The extensive evidence on this topic compiled by the OECD shows that, during the 1970s, the relative generosity of Irish benefits increased from a low initial level, reached a plateau in the mid-1980s, and declined gently thereafter, as figure 3 showed. Ireland is close to the OECD average on this index, above countries like the United States but significantly below the Netherlands and the Scandinavian countries.[39] There was no radical reform of the Irish welfare system during the 1990s to which the dramatic improvement of the labor market can be attributed.

But the interactions between social welfare benefits and net-of-tax earnings from employment are complex and not fully captured by the replacement ratio. Some subtle changes were made to the structure of the Irish entitlements system that increased the incentives to take paid employment. An example is the decision in 1999 to allow those enrolling in back-to-work or training schemes to continue to receive rent and mortgage supplements. Still, such changes were relatively minor and occurred after the unemployment rate had begun to fall rapidly.

Others point to the carrot-and-stick approach taken to encourage job search and participation in education and training programs. OECD data reveal that Ireland moved well up the national rankings on spending on such active labor market policies between 1985 and 1997: this spending rose from 14 percent of average industrial earnings per person unemployed in 1985 to 29 percent in 1997, when only the Netherlands and the Scandinavian countries reported higher figures. This level of spending has proved controversial, and although there is some microeconometric evidence to suggest that the increased emphasis on "back to work" measures did help a little in improving the functioning of the labor market in the 1990s, its role should not be exaggerated.[40]

The disincentive effects of these generous benefits appear small compared with those reported in the international literature—elasticities of duration with respect to benefits of only 0.01—and the largest effects are reported among relatively advantaged unemployed groups, and not the long-term unemployed who constitute such a large proportion of the core unemployment problem in Europe.[41] It is all the more remarkable, then, that the long-term unemployment rate was even more responsive than the overall rate to the employment boom, falling from almost 11 percent in

39. OECD (1998).
40. Martin (2000).
41. Layte and Callan (2001).

the late 1980s to just over 1 percent in 2001. Some but not much of this is due to reassigning chronic unemployed persons to out-of-labor-force categories, including work on special ("community employment") schemes.

Where Did All the Jobs Come From?

During the dark days of the long 1980s, pessimists would raise the unanswerable question: Where will all the jobs needed to achieve full employment come from? The lack of a convincing ex ante answer to this question was used to advocate a major expansion of public sector employment. In the event, it was *after* the emphasis on public sector employment was abandoned that jobs were generated at an unprecedented rate.

Table 5 shows how the employment gain was distributed across sectors. The predominance of the so-called market services sector as a provider of new jobs is striking. This heterogeneous category ranges from financial services (banks, insurance companies, and the like), legal services, and accountancy firms to hotels, catering, restaurants, and pubs. It includes employment in what might be regarded as economic base activities (such as tourism and internationally traded financial services) as well as "induced" activities (such as local commercial services). Employment in the publicly financed health and educational services also increased quite rapidly, but the numbers in core public administration were contained.

Export-driven manufacturing has been a particular strength, with the numbers employed growing against the trend of the OECD countries generally. Most of this expansion occurred in newer industries such as electronics, pharmaceuticals, and medical instrumentation, where foreign-owned firms account for over 90 percent of output (the peculiarities of these industries are discussed in the next section). Employment in traditional industries—which include clothing, textiles, furniture, and utilities, where established Irish firms predominate—was more or less static over the period. But by 2000 manufacturing as a whole accounted for only 18 percent of total employment, of which foreign-owned firms contributed about half. Even if a generous allowance is made for the employment indirectly generated by these firms, their contribution to total employment remains small, whatever their wider contribution to the economy (to which we turn in the next section).

Table 5. Employment Growth by Sector, 1985–2000
Percent

Sector	*Share of 1985 employment*	*Average annual growth rate of employment*	*Share of total increase in employment*	*Share of 2000 employment*
Agriculture	15.1	–1.8	–7.3	7.9
Building and construction	6.6	5.4	16.4	10.2
Manufacturing	19.8	2.4	15.9	18.0
Traditional	12.5	0.2	0.6	9.0
High technology[a]	7.3	4.6	13.1	9.0
Market services	36.9	3.8	54.1	42.4
Nonmarket services[b]	21.4	2.9	22.4	21.5
Total	100.0	2.7	100.0	100.0

Source: ESRI database.
a. Approximated by the chemicals and electronics industries.
b. Includes industries such as health services, education, and public administration.

Explaining the Employment Miracle

Ireland's high labor force elasticity is no mystery, especially when the size and openness of the economy are recalled. High initial unemployment, an exceptional gap between Irish and U.K. unemployment rates, low initial participation rates, and a baby bulge endowed with high educational qualifications entering the labor force ensured that there would be no difficulty in filling a large number of newly created jobs.[42] The difference was that in the 1990s these preconditions were actually used to create an employment miracle.

This miracle owes something to a more cooperative approach among the social partners—labor, management, and government—than had been achieved at any time in the past. The key to this outbreak of harmony was the weakening of the trade union movement by the devastating job losses and soaring unemployment of the early 1980s. Faced with a dismal situation in the mid-1980s, the government decided to adopt a conciliatory approach rather than imitate the confrontational Thatcherite strategy.

42. The availability of labor was one of the attractions to FDI, and its quality influenced which industries were attracted.

Various continental models as well as earlier experience at home influenced the new social partnership approach, which achieved industrial peace as well as moderation in nominal and real wage claims in exchange for tax cuts, social welfare improvements, and a growing list of government commitments on other fronts.

The cuts in income tax rates helped moderate the rate of inflation in wage costs, improved the competitiveness of labor, and created the conditions conducive for investment by domestic and foreign entrepreneurs. This led to the creation of employment on an unprecedented scale, not only in the services sector, but even in the manufacturing sector, where foreign-owned firms led the way, and eventually—very strongly—in the building industry as the boom matured. Some reduction in disincentives to employment arising from the social welfare and tax systems, and an increased emphasis on active labor market measures, helped the labor market to function more smoothly, but these measures were secondary.

Output Growth and Productivity

Previous sections have, we hope, managed to explain and interpret much of the essence of the Irish economic miracle of the last fifteen years without mentioning some of the most distinctive elements revealed by even a cursory examination of Irish economic statistics, namely, the extremely high degree of trade openness, the large share of foreign-owned firms in manufacturing, and the high level and recent high growth rate of apparent labor productivity.

All three of these characteristics are interrelated. A very high proportion of Irish trade (over 90 percent of manufacturing exports, and almost 80 percent of all exports) reflects the output of foreign-owned manufacturing enterprises. And the level and growth rate of productivity have been much higher in industries dominated by these firms. This is not, as some skeptics have believed, a mirage; the numbers are correctly recorded. But although productivity has been high and the role of foreign firms important, a simplistic reading of the numbers can greatly overstate their contribution to the Irish boom. This section seeks to explain why this is so, thereby resolving one of the puzzles of the Irish story: how such rapid measured productivity and aggregate output growth could have been achieved during the 1990s.

The Contribution of MNC Production to Trade and Productivity

Ireland was recently rated first in the world in *Foreign Policy* magazine's globalization ranking.[43] One aspect of globalization is the ratio of trade (exports plus imports) to GDP, which in 2000 was 173 percent, a figure approached only by Singapore. This particular comparison alerts us to the near-entrepôt character of a segment of MNC manufacturing in Ireland. Probing deeper, we find that a handful of industries, employing just a small fraction of the manufacturing work force (and much less of total employment), accounts for a very large share not only of economy-wide exports but also of imports, output, and profits and makes a disproportionate contribution to measured aggregate productivity.[44]

To take the most extreme case identified in the official statistics, just two dozen enterprises manufacturing goods classified as "other organic basic chemicals" (NACE code 24.14)[45] and employing 4,800 workers, or just 0.3 percent of economy-wide employment, produced over 18 percent of the economy's total exports in 1999, a sum equivalent to 14 percent of GDP. Even after subtracting the very substantial import component, the value added of this four-digit industry, which produces various pharmaceutical-related chemicals, accounted for 8½ percent of GDP. But what are we to make of an industry where the share of labor in net output is as low as 1.7 percent, and where net output per worker has been as high as $2½ million, or 1.8 million Irish pounds (in 1998)?

Several other industries also display a strikingly low labor share (see the appendix). It is not hard to figure out what is going on when we look at the industries involved: for example, the "other food products" category is dominated by a few large soft-drink concentrate producers; "reproduction of recorded media" includes the manufacture of software packages such as Microsoft Windows. It is not that these are capital-intensive industries—all are estimated to have annual real returns on capital invested in excess of 100 percent.[46] Instead, these are all industries

43. "Globalization's Last Hurrah," *Foreign Policy* (January-February 2002, pp. 38–51).

44. An alternative way of characterizing the impact of the largest MNCs is presented by Keating (2000), who estimates that they directly accounted for 10 billion out of a 1998 GDP of 61 billion Irish pounds, but only for about 3 billion out of a GNP of 53 billion Irish pounds. Whereas GDP at constant factor cost increased by 75 percent between 1990 and 1999, the output of the three sectors dominated by MNCs increased by a factor of 3.7.

45. NACE is the European standard statistical classification of economic activities.

46. Updated from Honohan, Maître, and Conroy (1998).

characterized by highly valuable patented products. Most of the research and development that went into producing these goods was conducted in affiliates of these enterprises in other countries, mainly the United States. Much of the profit, however, is located in Ireland, a natural consequence of the low corporate profits tax rate that has prevailed there for such business, one way or another, for the past half-century. Until 1979 the major concession was the exemption of profits derived from exports from corporate and personal income tax. Thereafter, in order to come into compliance with EU requirements of nondiscrimination as between production for the domestic market and that for exports to other EU states, the exemption was replaced by a preferential 10 percent corporate tax rate applied to manufacturing and certain internationally traded services. Recently, this concession came under pressure from the European Commission, leading to a decision to unify the corporate tax rate economy-wide at 12½ percent beginning in 2003.

Ireland's long-standing and enthusiastic encouragement of inward FDI includes not only low corporate profit tax rates but also an element of grant assistance, freedom to repatriate profits, and an energetic industrial promotion agency. But it is notable that a disproportionate share of the firms attracted by this package has come from industries well placed to take advantage of legitimate tax management within the standard transfer pricing rules.

In effect, since Ireland has by far the lowest standard rate of corporate tax on manufacturing among the advanced economies, these transactions are often booked at transfer prices that have the effect of locating a very high fraction of the enterprise's global profits in Ireland. The pricing of such specific inputs and outputs, many of them traded with affiliates, although governed by rules established by tax authorities, is somewhat arbitrary.[47] What is clear is that, in many cases, the huge profits recorded by the Irish affiliates have very little to do with the manufacturing activities being conducted in Ireland. The low labor shares in value added should not be interpreted as truly implying high economic productivity of the labor and physical capital employed by the enterprises in Ireland.

47. Commission of the European Communities (2001). It is perhaps worth remarking here that the U.S. taxpayer does not necessarily bear the incidence of this use of the Irish tax regime by U.S. MNCs, which mainly affects where overseas investment is located.

This is a caveat whose applicability goes far beyond the analysis of sectoral production statistics. The numbers involved are large and have been growing relative to the total economy, and so they affect growth rates as well as levels. As one rough indication of the scale of the problem, aggregate GDP in 1999 would be more than 15 percent lower if the output of just the four industries discussed in the appendix were repriced at "shadow" prices chosen to make the reestimated apparent labor productivity equal to the mean for corresponding industries in other European countries. At these shadow prices, aggregate exports would be 27 percent lower and aggregate industrial production 52 percent lower. The growth rate of GDP would also be lower, as discussed below.

Obviously, this is a very crude adjustment to the data. For one thing, it does not cover all of the industries to which the issue is relevant. On the other hand, it may err on the conservative side by making no allowance for any special attributes of these industries in Ireland, such as the recent vintage of their physical capital and their favorable product mix. Because of the scale and complexity of this transfer pricing issue, it bedevils aggregate economic analysis. Cross-national analyses of output, productivity, profit shares, and geographical trade patterns, for example, are strongly influenced by how transfer pricing is treated.[48] Unfortunately, however, this aspect is all too often neglected.

Even after adjustments such as the one offered above, the contribution of MNCs to the economy is very large. For example, just under 50 percent of manufacturing employment is in foreign-owned firms, and even at the low tax rate, corporate tax revenue from manufacturing and internationally traded service companies yields almost 7 percent of total tax revenue. Although direct industrial and service linkages are relatively modest (input-output-based calculations suggest that each manufacturing job is associated with one other job in the economy delivering inputs to the manufacturer),[49] it is generally accepted that these firms have, over the years, brought management practices and skills that have since percolated widely throughout the economy. It may also be that reliance on tax incentives, which resulted in self-selection by firms with increasing

48. That the share of the United States in Irish exports jumped from 11.2 percent in 1997 to 17.2 percent in 2000 was partly due to exchange rate movements, but more importantly to the surge in exports of chemicals, notably including Viagra.

49. O'Malley (1995).

returns to scale, dependent not on physical but on intangible knowledge capital, helped to tilt Irish manufacturing toward higher-growth industries. This, of course, was also a goal of the industrial promotion agencies, which claim success in picking winning industries. Whatever the cause, the indications are that Ireland was already capturing an increased share of the stock of U.S. manufacturing FDI into Europe back in the late 1970s (figure 11).[50]

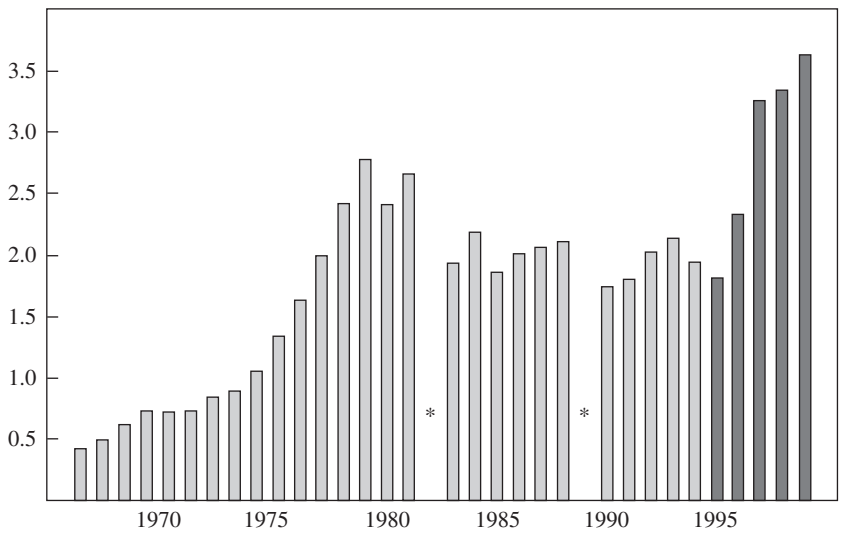
Explicit mention should also be made of the International Financial Service Centre (IFSC) in Dublin. In this rejuvenated and rebuilt zone of what had been a disused part of the capital's inner-city docklands, firms offering approved international financial services to nonresidents of Ireland enjoyed broadly similar corporate tax concessions, together with relief from property taxes beginning in 1988, until, under pressure from the European Commission, the concessions were withdrawn for new startups after 1999. By 2001 the official figure for employment creation at the IFSC had risen to 11,000, which corresponds to a quarter of total financial sector employment in Ireland. There could, however, be some debate about the extent to which this employment is truly additional, as Irish banks have moved substantial parts of their operations physically into the IFSC, in order to be able to claim the low rate of tax on their nonresident business. On the other hand, the IFSC's boast of considerable complementary factor employment outside the IFSC itself is not an empty one.

Productivity and Real Income Growth

Recognizing, then, the need for caution in employing unadjusted output figures for productivity analysis, and that data problems have ham-

50. Plotting Ireland's share of the *flow* rather than the stock of U.S. outward FDI (as, for example, in Duffy and others, 2001) does tend to make Ireland's relative performance in attracting FDI in the 1990s look stronger. It is also important to distinguish between manufacturing and total FDI; the latter includes an important element of financial services investment that has greatly increased, especially since 1998. Recorded average flows of inward FDI from all sources were equivalent to 8 percent of domestic fixed capital formation during 1985–95; this is perhaps an underestimate, but it serves to emphasize the intangible nature of the intellectual capital actually being employed. There is little correspondence between the value of FDI flows and the value of real capital formation in Ireland by investing firms. By 2000 the flow had jumped to almost 100 percent of domestic fixed capital formation, much of it in the financial sector and intended for use in outward portfolio investment through the International Financial Service Centre (see text). Finally, the late 1990s also saw a sharp increase in outward FDI.

Figure 11. Ireland's Share of the Stock of U.S. Manufacturing FDI in the European Union, 1966–99[a]

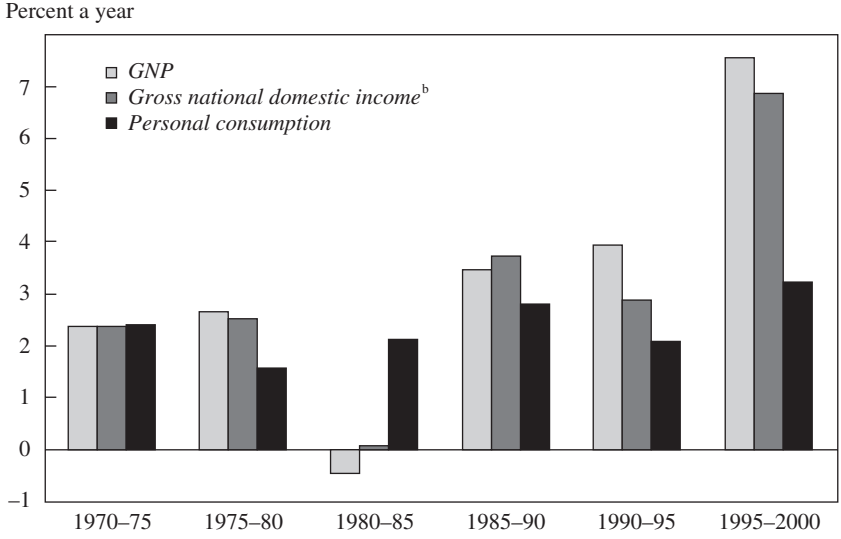


Sources: Bureau of Economic Analysis, direct investment Financial and Operating data, and Balance of Payments and Direct Investment Position data.

a. Two distinctly different series are combined to provide a continuous measure. For 1996–94, data are the percentage of the assets of U.S. firms' foreign affiliates funded by their parent, from BEA direct investment Financial and Operating data. For 1994–99, data are the cumulative value of U.S. parent firms' investments in their affiliates, from BEA Balance of Payments and Direct Investment Position data. Because these data show a larger stock of FDI in the overlap year, 1994, than in the first series, the combined series shown here takes the level of FDI in 1994 from the first series and, starting with 1995, increases it by the percentage change observed for the second series. * indicates missing observation.

pered the development of a solid body of knowledge in the field, we still need to provide a balanced summary of aggregate income and productivity growth during the boom years. Figure 12 shows three different measures of average living standards during the past twenty-five years: GNP, gross national disposable income (GNDI), and consumption (all per capita). Figure 13 shows three measures of productivity growth (each of which is a measure of output growth divided by the relevant employment figure). Each of the six series tells a distinct part of the story. The use of GNP rather than GDP in figure 12 is important: the difference between them has long been greater in Ireland than in any other industrial country. For most countries it makes little difference which measure is used, and GDP is the market leader. For Ireland, however, unadjusted GDP is arguably too misleading to be used in most contexts, and one or another of the adjusted series is preferable, depending on the context. GDP has been

Figure 12. Growth in Measures of Living Standards, 1975–2000[a]



Sources: Authors' calculations based on data from Central Statistics Office Ireland, *National Income and Expenditure*; and ESRI database.

a. All measures are per capita.

b. Adjusted for terms of trade.

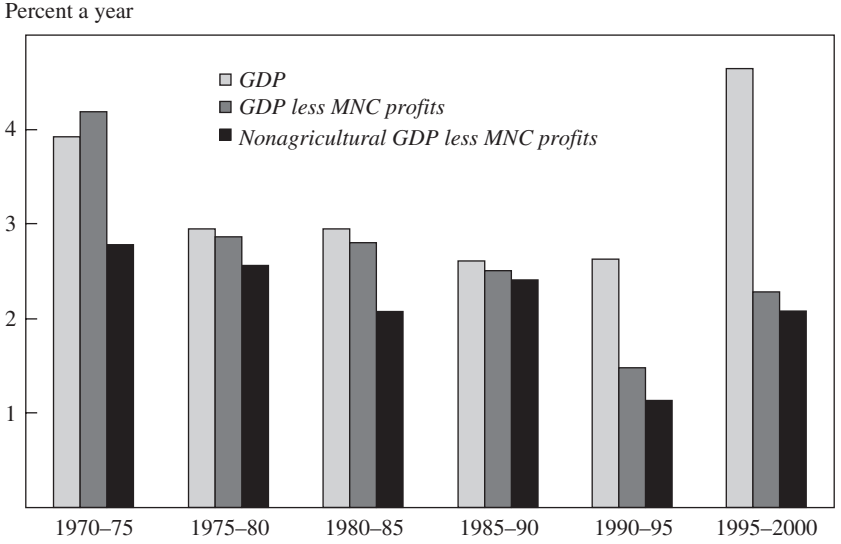
consistently higher than GNP. This partly reflects the large net interest payments to foreign creditors (resulting from the size of government foreign debt, especially in the 1980s), but more the large share in GDP—reaching as high as 24 percent in 2000 if the IFSC is included, and 20 percent for manufacturing alone—accounted for by the profits of foreign-owned firms operating in Ireland.[51] Growth of GDP has been faster than GNP: by 1¼ percentage points on average in the late 1990s.

The second living standards measure, GNDI adjusted for the terms of trade, differs from GNP by adding net current transfers from abroad, mainly from the structural funds of the European Union, as well as by adjusting for terms-of-trade effects, which have tended to be adverse in recent years.[52]

51. Note, however, that recent years have also seen sizable profit inflows attributable to a growing gross outward flow of FDI.

52. Buffeted by international developments common to other oil-importing industrial countries, Ireland's terms of trade have also displayed a trend weakness since the mid-1980s. Part of this may be attributed to rapid price decline due to the short product cycle characteristic of the computer and software industry. Chain-weighted indexes have not yet

Figure 13. Alternative Measures of Productivity Growth, 1975–2000[a]



Sources: Authors' calculations based on data from Central Statistics Office Ireland, *National Income and Expenditure*; and ESRI database.

a. All measures are per worker.

Since 1985, growth in personal consumption per capita has been much more moderate than growth in aggregate income. The government absorbed much of the difference and applied it to debt reduction—an approach that tended at first to conceal the extent of the boom from the general public.

For productivity comparisons, figure 13 shows calculations based on GDP per worker and two adjusted measures that exclude all MNC profits.[53] This adjustment is even cruder than the adjustment made in the appendix but is available for a longer period. It is clearly conceptually an overadjustment, but not a large one, and preferable to simply using GNP to correct for the transfer pricing problem, because that does not allow for the complication of the rise and fall in net interest payments on government debt.

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been employed to alleviate this problem. A further adjustment, not made here, would add net capital transfers from abroad.

53. With fewer farmers and more women in the labor force, hours worked have declined by 15 percent since the 1980s. Productivity growth is higher when this is taken into account.

But the adjusted figures are less puzzling. For example, the level of adjusted GDP per capita converges on the EU and OECD averages (not shown), rather than overshooting sharply. Depending on the adjustment, Ireland's ranking falls quite a few notches. Growth in apparent labor productivity, as adjusted, is now within the range exhibited by other countries and by Ireland itself in earlier periods. Nevertheless, it has been sufficient, when applied to the rapidly increasing share of workers in the population, to generate the observed convergence in living standards.

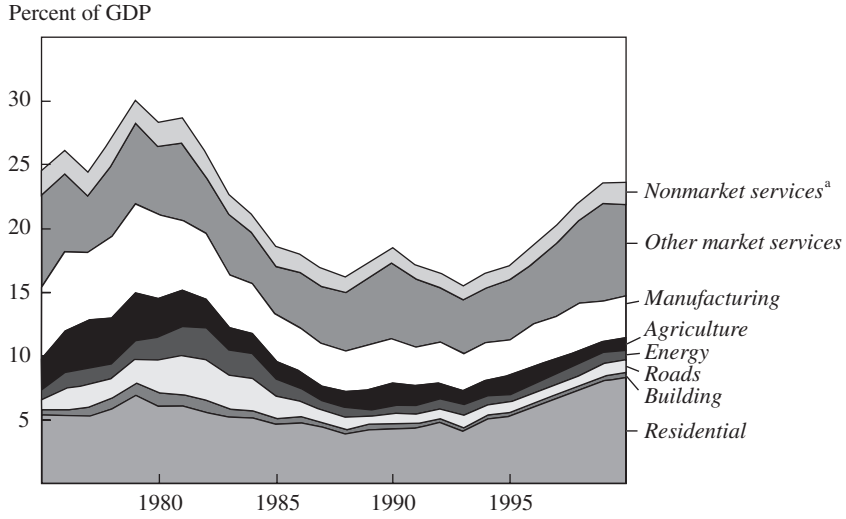
To keep the story simple, we have said little about physical capital formation, because we do not see this as a central part of the story behind the boom. Although (for reasons by now evident) making credible calculations of total factor productivity is problematic, it would be very hard to argue that physical capital formation was a major growth driver. Indeed, having touched 30 percent of GDP in 1979,[54] gross domestic capital formation declined sharply, averaging only 17 percent of GDP during the recovery period 1986–95 (figure 14). Much of the decline was due to the shrinking importance of the public capital program, which fell by almost 4 percentage points of GDP between 1981 and 1990, whereas the recovery in the second half of the 1990s was largely due to a resurgence of investment in housing; the ratios to GNP are, of course, higher. Even in 1996–2000, although high by European standards, Ireland's investment ratio was well below the figures recorded by the other rapidly expanding economies of the 1990s, in the Far East. Furthermore, less than one-seventh of the total was attributable to manufacturing.

Lessons and Conclusion

We have argued that the outstanding performance of the Irish economy in the past decade or so should be interpreted mainly as a delayed structural transformation as the proportion of the population at work outside agriculture, and the productivity of those workers, at last spurted toward the levels long ago achieved in other industrialized countries, while the productivity of the labor force remaining in agriculture also rose. This

54. This figure was boosted by what by all accounts proved to be relatively unproductive public investment, although the modernization of the telephone system and electricity generation capacity, for example, in these years did not go amiss.

Figure 14. Composition of Gross Domestic Capital Formation, 1975–2000



Sources: Central Statistics Office Ireland, *National Income and Expenditure*; and ESRI database.
a. Includes industries such as health services, education, and public administration.

interpretation implies that underlying institutional preconditions for reaching this frontier were in place but that its achievement was delayed by macroeconomic policy errors.

Journalistic commentators have sought to identify a single explanation—a secret ingredient in the hare's diet, such as a particular policy measure or development—that was *the* key to a turnaround in Irish performance. The arguments of these authors are not without merit, but in our view none of the supposed ingredients bears scrutiny as the unique decisive factor, and as such, a lesson to be applied elsewhere. The various ingredients fall into three categories. First are those that prove on examination to have been simmering away on the back burner for decades. These contributed to the improved performance over the long run and certainly formed an important part of the underlying policy environment, but they did not change much during the period of turnaround, and so they cannot explain the "miracle" of the last decade. Second are ingredients that, although useful, fail in quantitative terms: their direct contribution cannot plausibly account for a major part of the gain in output, although they may have played an important catalytic role at the moment of turn-

around. Third are elements already encompassed in our catch-up characterization; as such we see them not as special ingredients but as the removal of obstacles. The unavoidably mundane conclusion is that all of these ingredients have played their part, and thus that improved economic performance requires a strong policy environment on a broad front.

Slowly Simmering Ingredients

The much-vaunted quality of Irish education, contributing to the employability of the young work force, is a key slow burner. The acceleration in the growth of the average educational attainment of the work force dates to the introduction in 1967 of universal access to secondary education free of fees. There is no significant inflection point in the 1980s. Applying the estimated wage gradient to educational attainment suggests that this factor contributed almost 1 percentage point to the annual growth of GNP in the 1980s and 1990s.[55]

A second factor that has also been steadily at work since the early 1970s is the fall in age dependency, documented above. Almost one-third of the population was under the age of 15 in 1971. As the birth rate belatedly declined toward the European average, this proportion began to fall in the 1980s to about 21 percent in 2001, while the share of the elderly in the population remained unchanged.

Lower age dependency eased pressures on the public finances, while the demographic momentum attributable to the high birth rate of the 1970s contributed to the elasticity of the labor supply. Of course, these demographic trends were not wholly exogenous to the improved employment conditions, as witness the reversal of net emigration. Even the fall in the birth rate could be attributed in part to the rise in women's educational attainment and labor force participation rates.

We have already explained that tax concessions for exporting manufacturers have become less rather than more generous since the late 1970s. Although unfavorable fiscal and other developments limited their attractiveness until the late 1980s, their continued liberality is obviously an important but slowly simmering element of the environment.

55. Durkan, FitzGerald, and Harmon (1999); Denny, Harmon, and Redmond (1999); Duffy and others (2001).

Other contributors to economic growth, identified in cross-country studies, include the effectiveness of deep underlying institutions such as those related to the rule of law, the quality of public administration, and the depth and efficiency of the financial system. By comparison with many less developed countries, the essentials in this regard were arguably present in Ireland from an early date. For instance, Ireland scores high on most of the subjective indicators of institutional quality employed by growth researchers. As another example, the underlying soundness of the financial system (seen in the literature as a key to sustained growth) is reflected in the fact that, unlike so many other countries, and despite the severity of the long recession, Ireland escaped an extensive banking crisis in the 1970s and the 1980s.[56] An alternative crude, and somewhat quixotic, indicator of the basic efficiency of the public services was their *ability* to collect well over 40 percent of GNP in tax revenue. Of course, some long-standing institutions had become dysfunctional or sclerotic, and there have been many important institutional changes during the past two decades; our claim here is the limited one that the Ireland of the early 1970s already enjoyed to a reasonable extent what are typically regarded in the growth literature as the underlying institutional essentials. (Obvious exceptions were whatever flaws in political institutions of the 1970s contributed to the policy errors that we have discussed.)

Finally, under this heading can also be mentioned the catchall heading of cultural factors, whose contribution we have no good methodology for measuring. The familiarity to American investors of Ireland's dominant language and of its legal and administrative systems, as well as its Janus-like orientation to both Europe and North America, may be cited as attractions. But if culture was important, it must have been in its ability to react to changed circumstances. The interaction of culturally determined aptitudes with changing technology is one possibility that has already been mentioned. If working with computer-based or communications-intensive technology is a culturally determined comparative advantage of the Irish, this may help explain the speedy convergence once other barriers were removed. It might also be related to the findings of recent happiness surveys, where Ireland tends to score very high: top of the list, for example, in a 1998 survey of workers from thirty-two countries. Is this cause, or

56. Honohan and Kelly (1997).

effect, of the economic boom? Not evidently the latter: attempts to explain happiness and job satisfaction with objective economic conditions still leave Ireland with the largest positive residual.[57]

Catalytic Factors

Among the suggested ingredients whose timing is correct, and which thus no doubt contributed to the turnaround and perhaps conveyed a catalytic effect beyond their direct impact on growth, are the flow of EU structural funds, the devaluations of 1986 and 1993, and the revitalized promotion of tourism and inward FDI (including offshore financial services). Each of these elements also could have a flavor of beggar-thy-neighbor about them, making it especially important to know whether they could have been the decisive factors.

Most often cited by external observers is the expansion in EU structural funds starting in 1988. As mentioned above, these came at an extremely opportune time. They helped fund a resumption of public capital spending, which had been pared down as part of the fiscal adjustment. After the austerity of the 1980s, a backlog of socially productive investment projects was available to absorb the funds, and a further benefit of the European Union's role was to ensure that they were deployed with comparatively little dead weight.[58] They were countercyclical, too, insulating Ireland from the Gulf War recession. The inflow of funds (which still continues, although now running much below the peak) had a demand effect as well as boosting the ability of the infrastructure to sustain the greatly increased level of economic activity. These very substantial transfers are estimated to have lifted the *level* of Irish GDP on a sustained basis by as much as 4 percent. Although not trivial, this boost is dwarfed by the exceptional *growth* rates recorded after 1995.[59]

Unlike that of 1993, the devaluation of 1986 was not simply defensive. Its role has also been discussed above. Here again the direct impact can only have been a transitory one, although by generating external demand at a time when the fiscal correction was restoring confidence, it may have

57. Blanchflower and Oswald (2000).

58. Honohan (1997); Barry, Bradley, and Hannan (2001).

59. Not all the EU inflows have been beneficial. The price support mechanisms of the Common Agricultural Policy represented a large transfer to Ireland but may have long delayed improvements in agricultural efficiency.

had a catalytic effect going beyond the direct contribution to demand and competitiveness.

International tourism and travel receipts did start to rise after 1986 and showed a sustained growth of over 8 percent a year to the end of the century. This development has been generally attributed to airline deregulation,[60] measures taken to expand capacity, and a revitalized promotional strategy, although improved price competitiveness should not be forgotten. Here too there has been a lasting and considerable effect, but total receipts come to little more than 4 percent of GNP. The role of inward FDI promotion has also been discussed above. The major new development was in offshore financial services; the claims of some of the participants in industrial promotion that the strategy was decisively reformed at that time on a wider front lack convincing evidence: the indications are that the agencies have been effective and adaptive to changing circumstances throughout the past half century, as indicated by their long history of success in attracting a large share of U.S. outward FDI in manufacturing. Nonetheless, the timing of the employment boom from 1993 onward does coincide with the gathering pace of the U.S. boom and the U.S. appetite for imports, some of which was met from affiliates located in Ireland.

Absent from our list of catalysts is Ireland's commitment to the EU common currency project. As predicted, interest rates converged to low German levels in the runup to the single currency, removing the premium that had been over 5 percent for much of the 1980s. This contributed to a consumption and property boom from 1997 on, but that was a relatively late development and not altogether welcome in its timing. Also missing from our list are radical overhauls of the social welfare system and the legal labor market framework. The social welfare system was always relatively ungenerous by European standards, and the level of employment protection was relatively low.

Popular Explanations That Did Play a Role

Two dominant explanations of the recovery have been the corporatist social partnership and the lowering of tax rates. Although these were key

60. It was, for Europe, an early step in airline deregulation when in 1986 Ryanair was granted a license to operate on the key Dublin-London route, long cartelized by the state-owned airlines of the two countries. Outward tourism and travel expenditure has also grown by over 8 percent in the same period.

ingredients, we prefer to see them as aspects of the removal-of-barriers hypothesis. They were part of the process that ensured that political economy and wage setting got back on a sustainable path.

As discussed, the importance of the social partnership from 1986 on cannot be dismissed. The partnership agreements did reflect a determination to set aside, for the time being, social class antagonism in favor of a joint effort to remove barriers to employment growth. But at the same time, the key precondition for the adoption of these agreements was the widespread recognition that the crisis in the public finances must be resolved and that the key to unemployment reduction could not be found in fiscal expansion. This did require dismantling of encrusted attitudes and behavior on the shop floor, and it likely also benefited from an erosion of wider institutional sclerosis;[61] these might not have been achieved without the lengthy period of malaise in the early 1980s.

Likewise, the income tax rate reductions, which did have a significant effect on the typical worker's after-tax income, sometimes attributed to the partnership process, were evidently part and parcel of the fiscal normalization. Thus our preferred characterization embodies and encompasses these two important policy ingredients, which can be seen as aspects of the wider normalization.

Our conclusion is that there was no single magic ingredient. Many separate factors contributed. Given the already generally market-friendly and outward-looking orientation of long-standing structural policy, together with the emphasis on education spending, removal of the barriers posed by the unsustainable trajectory of debt and taxation in the 1980s was enough to unleash the hare. The initial gap in the employment-population ratio between Ireland and other countries meant that the room for catch-up was large. Some progress toward convergence was already evident in the 1960s, but in the 1990s the rate of catch-up accelerated dramatically as the upward trend of the tax burden was reversed and confidence was restored in the management of the public finances. A favorable conjuncture of external factors and a collective determination not to repeat the errors of the 1970s also helped.

A Lucky Period for a Regional Economy

With an economy that amounts to only about 1 percent of either euro-area or U.S. GDP and is extremely open to trade and factor flows, and

61. Olson (1998).

with a currency that has mostly been pegged to an external unit, Ireland has many of the characteristics of a relatively small region of a larger economy rather than those we associate with a sovereign country.[62] Viewed as such, its performance during the 1990s was unexceptional by American standards, albeit unmatched in Europe. If Ireland had been a U.S. state, its population growth rate in the 1990s would have ranked twenty-third out of the fifty states—between New Hampshire and Mississippi. No fewer than nine U.S. metropolitan areas with populations over 1 million grew faster than Greater Dublin. To be sure, no other European countries or metropolitan areas achieved Ireland's rates of economic and demographic growth in the 1990s. The percentage increase in employment in Ireland was almost 2.7 times that of the next best performing economy, the Netherlands, and four to five times those of Sweden, Norway, Denmark, and Belgium. This paper does not attempt a comparative assessment of "eurosclerosis," but it is relevant to note that the natural increase in the labor force of other European countries is much lower than in Ireland.

Thus our reading of the Irish miracle is that it was essentially a deferred and telescoped process of bringing more of the population into a modern sector that was already close to the production frontier a quarter century ago; however, we do not deny that Ireland has been well placed to benefit from shifting global technology. Already by the 1980s the country's comparative advantage (especially considering the skills and aptitudes of the labor force) and tax policy had disproportionately favored information technology and pharmaceuticals among manufacturing industries: incumbency allowed Ireland to benefit disproportionately from the strong subsequent growth of MNC production in these industries. Then again, a relatively young and rapidly growing English-speaking work force with relatively high educational attainment was the ideal factor of production to be employed in rapidly growing information technology-using activities ranging from software localization through computer-assisted call centers (serving, for example, airline and hotel reservation systems) to more sophisticated financial services. Even worries about the carcinogenic potential of a depleted ozone layer have meant that Ireland's cloudy and damp climate no longer seemed as much of a barrier to the booming tourism industry in which indoor (barroom) activities play a large part.

62. Krugman (1997).

These factors help explain why net emigration did not just stop, but was reversed.

It has been a lucky period, then, for Ireland, but one during which policymakers and the social partners, shaken into realism by earlier disasters, seized the opportunities that were on offer with greater prudence, realism, and restraint than before. In the fable, the hare did not win its race with the tortoise, and although much has been achieved, Ireland has not assumed economic leadership in any significant industrial sector. The exceptional growth spurt has come to an end, partly through a self-correction as well as because of the global economic slowdown, and it has left Ireland close to, but not yet at, the frontier in income per capita. What remains to be seen is whether the improved performance on a broad front can be maintained in more difficult times and with most of the potential for catch-up exhausted. Given the heightened expectations and the reemerging pressures on current spending, the task of demand management in the slowdown looks particularly challenging.

APPENDIX

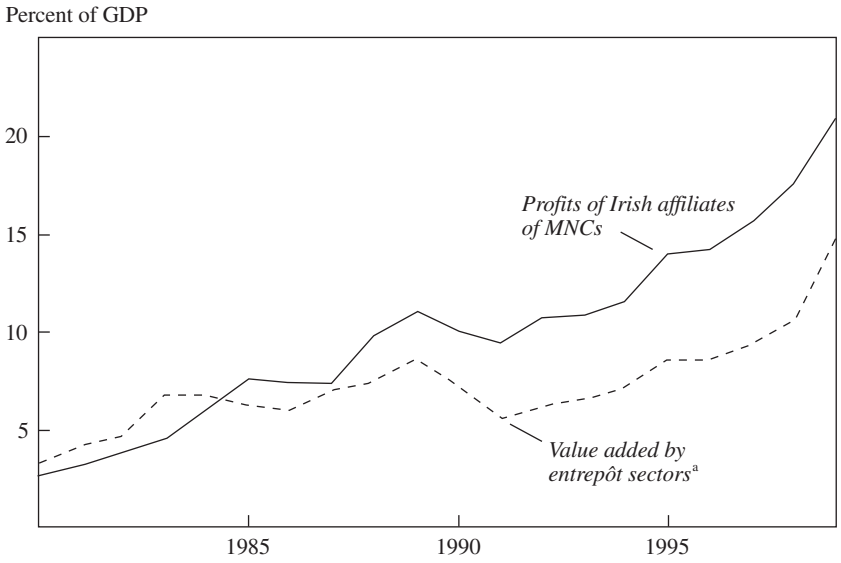
Calculating the "Entrepôt Economy"

FOUR SPECIFIC INDUSTRIES within Irish manufacturing display the unusual characteristics of the entrepôt economy:[63] "other foods" (dominated by cola concentrate manufacturers), pharmaceuticals and related basic chemicals, software reproduction, and computer components. These industries are important employers: together they employed about a fifth of the manufacturing work force, or 3 percent of the total work force, in 1999. But their contribution to industrial output (57 percent) and GDP (15 percent) is vastly disproportionate to their employment levels. Because the relative importance of these industries has been growing, excluding them reveals a very different story so far as output and productivity growth rates are concerned.

More subtly, we can make an adjustment to the output of these industries by excluding that part of their value added that seems to represent the

63. An entrepôt (from the French for "warehouse") economy is one in which large (relative to GDP) quantities of goods are imported and then reexported, often after minimal or no processing.

Figure A1. Alternative Measures of Ireland's Entrepôt Economy, 1980–99



Sources: Authors' calculations based on data from Central Statistics Office Ireland, *Census of Industrial Production* and *National Income and Expenditure*; Eurostat, *Panorama of European Business*, 2000; and ESRI database.

a. Other foods (primarily cola concentrates), pharmaceuticals and basic chemicals, software reproduction, and computer components.

return to intangible capital abroad, whether in the form of high profit remittances, royalties, or otherwise.[64] Table A1 illustrates this approach for 1999. We refer to the adjustment as a measure of entrepôt-type output or value added. The upper panel includes royalties and other non-industrial service inputs; these are excluded in the lower panel, which thus refers just to value added. Figure A1 plots estimated entrepôt value added for 1980–99, along with the total profits of MNCs, expressed as a share of GDP. (Ideally the price deflators would also be adjusted, but the information that would allow us to do so is not available.)

This also leads to very sizable changes in measures of the growth of output and productivity. Using the adjusted output figures brings GDP growth down by 2 percentage points—from 8.2 percent to 6.2 percent—

64. The method essentially assumes that, without transfer pricing, apparent productivity in these industries would be equal to the EU average for the same or related industries (Honohan, Maître, and Conroy, 1998). We also include the computer assembly industry, which has displayed similar characteristics, although more in previous years than recently.

Table A1. Estimated Scope of the Entrepôt Economy in Selected Manufacturing Industries, 1999

Units as indicated

Item	*NACE industry code and representative businesses*				
	15.85, 15.88, 15.89 (cola concentrates)[a]	*22.3 (software reproduction)*	*24.14, 24.4 (organic and basic chemicals)*	*30 (computers)*	*32.10 (electronic components)*
Data by local unit[b]					
Net output per worker (millions of Irish pounds)					
Ireland	1,015	728	848	169	230
EU average	90	64	163	104	104
Employment	2,333	6,131	13,015	19,923	8,457
Estimated entrepôt net output[c]					
Millions of Irish pounds	2,157	4,069	8,908	1,284	1,061
Percent of net output	91	91	81	38	55
Data by enterprise[b]					
Value added per worker[d] (millions of Irish pounds)					
Ireland	499	260	556	74	206
EU average	51	61	54	86	47
Employment	1,743	6,111	11,298	20,130	8,457
Estimated entrepôt value added[c]					
Millions of Irish pounds	781	1,216	5,849	n.a.	1,342
Percent of value added	90	76	81	n.a.	77
Memoranda					
Total output (GDP) = £59.7 billion					
Manufacturing output = £33.6 billion					
Total employment = 1.591 million					
Manufacturing employment = 0.248 million					

Sources: Authors' calculations based on data from Central Statistics Office Ireland, *Census of Industrial Production*, 1999; and Eurostat, *Panorama of European Business*, 2000.

a. Enterprise data are for sectors 15.88 and 15.89.

b. The *Census of Industrial Production* defines a "local unit" as "an enterprise or part thereof situated in a geographically identified place" (for example, a factory) and an "enterprise" as "the smallest combination of legal units that is an organisation producing goods or services which benefits from a certain degree of autonomy in decision making" (for example, a firm).

c. Calculated by multiplying per-worker averages of net output (value added) for the European Union by employment statistics for Ireland and then subtracting the results from the reported net output (value added) in Ireland.

d. Value added is less than net output mainly because the former excludes bought-in nonindustrial services such as royalty and license payments, which are sizable in these sectors.

during 1995–99. The growth rate of apparent labor productivity in manufacturing falls by almost 5 percentage points—from 8.6 percent to 3.8 percent; for GDP, apparent labor productivity falls by 2 percentage points—from 3.4 percent to 1.4 percent—in these years.[65] Crude though these adjustments are, they are likely to underestimate the effects, inasmuch as they ignore other manufacturing industries also affected, albeit to a lesser extent, and the offshore financial services industry.

65. A discontinuity in aggregate employment statistics in 1997–98 complicates the analysis.

Comments and Discussion

Olivier Blanchard: This paper is wise and informative and contains two important warnings:

—Beware of numbers, especially in a small economy with a large export-import sector, low taxation of profits, and transfer pricing.

—Beware of monocausal explanations. No single factor, whether it be the low taxation of foreign firms, the subsidies from the European Union, the increase in the level of education, or the expansionary effects of fiscal consolidation—to cite just some of the theories floating about in the literature—can account for the Irish boom.

But the paper goes too far in declaring that what is at work is a simple, run-of-the-mill catch-up story. The authors undersell their country's performance: perhaps proximity has bred excessive contempt. After reading their paper and digesting the evidence, I have three main reactions:

—From a greater distance, but still looking carefully at the numbers, the Irish economic performance of the last fifteen years does look quite miraculous, especially when one looks not only at productivity but also at employment.

—The proximate cause appears easy to identify, namely, wage moderation leading to lower costs, higher profits, and large increases in labor and capital.

—The very strong effects of this wage moderation suggest, however, unusual mechanisms at work. In an economy such as Ireland, which is open to trade, capital flows, and, most important, labor flows, wage explosions can kill, but wage moderation can work miracles. The latter is what has happened in Ireland over the last fifteen years. Let me develop each of these themes in turn.

Ireland's performance. The authors are obviously right to point out that the profits generated by foreign firms may reflect little else than creative transfer pricing in response to low profit tax rates in Ireland. The question is how much this affects the numbers for aggregate output and productivity growth. I believe the impression given by the paper is a bit misleading. The correction is far from negligible, but even after the correction the performance of output and of implied productivity remains impressive.

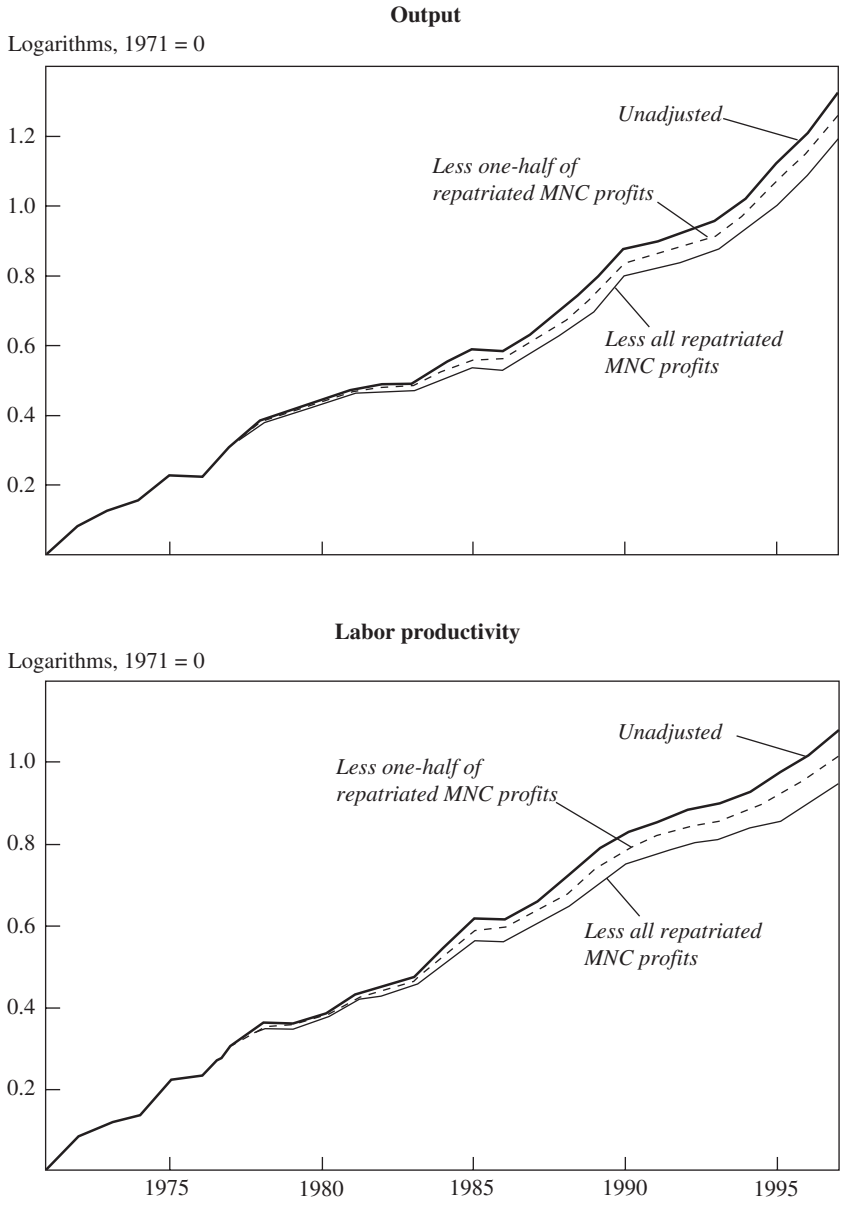
To explore the issue, I went back to the data set for the Irish business sector maintained by the OECD. (That database, unfortunately, has been discontinued, and therefore the series depicted in the figures below stop in 1997, missing some of the most impressive years of the Irish boom.) I considered three alternative series for output. The first is business sector GDP. The second is business sector GDP net of all profits repatriated by foreign firms; the implicit assumption is that these profits represent only transfer pricing, not value added. Because this correction may be too strong, I constructed a third series, business sector GDP minus half of the profits repatriated by foreign firms.

The upper panel of my figure 1 plots the logarithms of these three series from 1971 to 1997. Each series is normalized to zero in 1971, so that the scale gives the proportional increase in each series since 1971. The differences among the three series (13 percent between the highest and the lowest in 1997) are clearly visible, but they hardly change the general conclusion: output growth has been very rapid, especially since the mid-1980s.

The lower panel of figure 1 plots the logarithms of the three productivity series implied by each of the three measures of output. Again the visual impression is clear: the treatment of repatriated profits makes a difference, but in all three cases the productivity performance remains strong. This is especially apparent since the mid-1980s: productivity growth averages 4.2 percent annually from 1985 to 1997, for example, when unadjusted output is used, and a still-high 3.4 percent when output net of repatriated profits is used. (The difference between these numbers and those in the authors' figure 14 must derive in large part from the fact that I look only at the business sector here.)

Looking at productivity growth alone, however, misses the other part of the Irish miracle, namely, employment growth. Since 1985, employment has increased at an average annual rate of 2.7 percent, obviously a

Figure 1. Alternative Measures of Business Sector Output and Labor Productivity, 1971–97



Sources: Authors' calculations based on data from the OECD business sector database.

very high number. This has been achieved not only through a large decrease in unemployment, but also through an increase in labor force participation and through migration back to Ireland.

In short, even after this correction, the performance of both Irish productivity and Irish employment since the mid-1980s is very impressive. I do not know the rules by which miracles are officially defined, but this seems to come close.

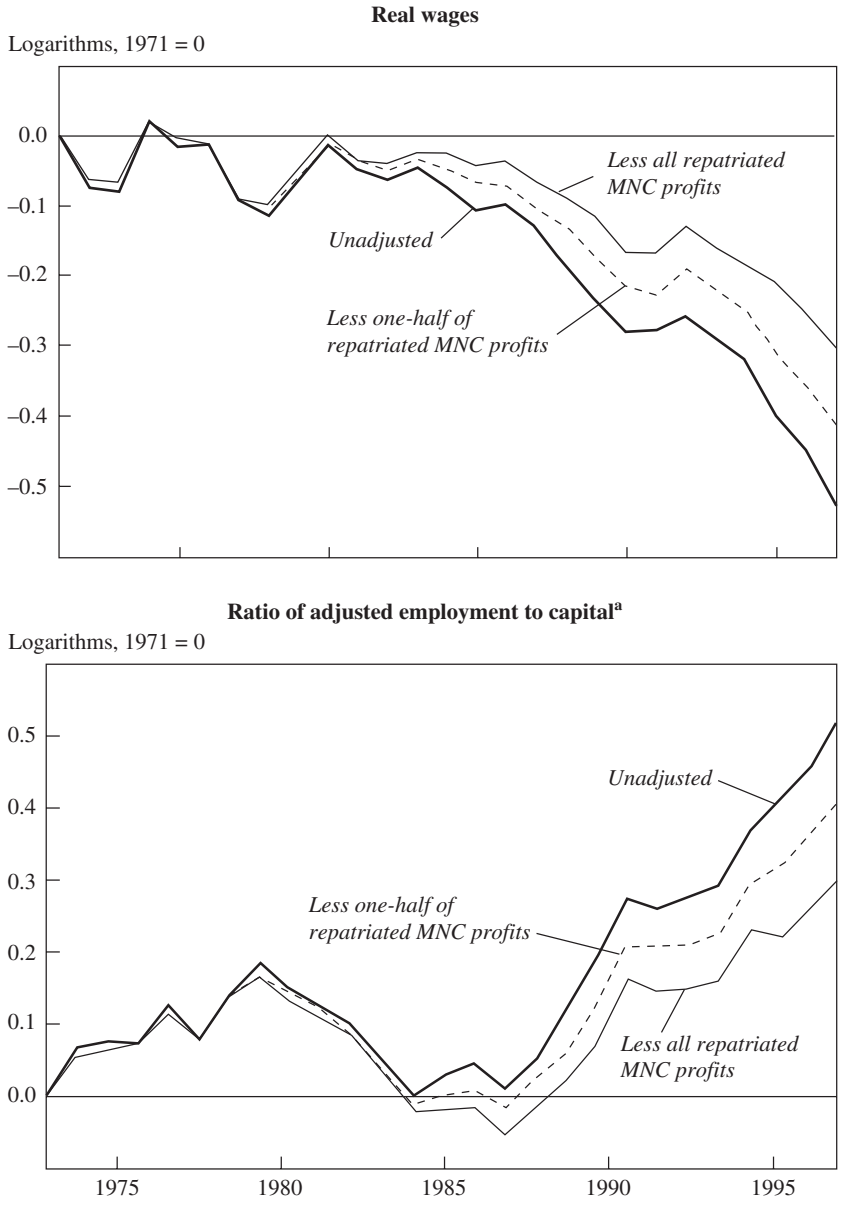
The trigger: wage moderation. In a comment two years ago, on a Brookings Paper by Jean-Paul Fitoussi and others on unemployment in Europe, I focused on two "miracle" countries: the Netherlands and Ireland.[1] In the case of Ireland, I argued that wage moderation, that is, wage growth below the rate consistent with technological progress, appeared to be the proximate source of the reduction in unemployment, both through higher profits and sustained capital accumulation, and through an increase in the ratio of employment to capital. In the light of the output measurement problems emphasized in this paper, I returned to my computations and looked at the implications of using the three measures of output described above. Figure 2 shows the results.

To achieve a balanced growth path with stable unemployment in an economy where technological progress is labor augmenting (the only form consistent with the existence of a balanced growth path), the real wage should grow at the rate of (Harrod-neutral) technological progress. With this motivation, the upper panel of figure 2 shows the change over time in the adjusted real wage, that is, the real wage divided by the constructed index of Harrod-neutral technological progress. The three lines correspond to the three different measures of technological progress implied by the three different measures of output discussed earlier. Once again the message is clear. Beginning in the early 1980s, the adjusted real wage starts declining. Which output series is used to construct the index of technological progress affects the extent of the decline, but not the overall trend: by 1997 the adjusted real wage is between 52 percent (using the unadjusted output measure) and 30 percent (using the fully adjusted output measure) below its 1980 level—a large decline in all three cases.

Standard production theory implies that a decrease in the adjusted real wage should have two effects. It should lead to an increase in the ratio of

1. Blanchard (2000); Fitoussi and others (2000).

Figure 2. Alternative Measures of Real Wages and Capital per Worker, 1971–97



Sources: Authors' calculations based on data from the OECD business sector database.
a. Employment is multiplied by an index of technological progress.

adjusted employment (employment multiplied by the index of technological progress) to capital, and it should lead (through higher profits) to sustained high investment.

The lower panel of figure 2 shows the changes over the same period in the ratio of adjusted employment to capital, again for the three series corresponding to the different definitions of output. The figure shows that firms have steadily increased the ratio of adjusted employment to capital since the mid-1980s: from 25 percent to 50 percent depending on the series. The effect on investment is also evident from the data: since 1987 the average annual rate of growth of fixed investment has been a high 8.7 percent (not shown).

However, identifying wage moderation as the proximate cause of the Irish boom is only the start of the story. It raises two questions. What led to this wage moderation? And why have the effects been so large?

I suspect the answers to both questions come largely from the openness of the Irish economy, with openness in goods markets, openness in capital markets, and openness in labor markets each playing a separate role. In such an economy, shocks, whether favorable or unfavorable, can have large effects not only on the level of output but on its growth rate as well. Put another way, an open economy may behave very much as predicted by the *AK* models—models that exhibit constant returns to accumulable factors—developed by growth theorists a decade or so ago. De facto constant returns may lead shocks to have long-lasting effects. In the context of Ireland, bad policies may not only decrease output but also kill long-term growth—the story up to the mid-1980s—and wage moderation may not only increase output but sustain faster growth as well. Let me develop this theme a bit further.

Openness in capital markets. In a closed economy, a decrease in wages leads to an increase in the profit rate. The extent to which capital increases in response depends on the slope of the supply of capital. The less elastic is supply, the smaller the effect on capital accumulation and on output.

In a small, open economy like Ireland, the world interest rate is given, and so the response of capital and output to wage moderation is larger. This relation and its empirical relevance for Ireland are well understood and are documented in the paper: much of Ireland's growth has been associated with foreign direct investment, attracted to Ireland by high profits and low taxation. The openness of capital markets, however, cannot sustain faster growth forever. As capital comes in, pressure on employment

drives up wages. The profit rate eventually returns to normal, and so does the growth rate.

Openness in labor markets. This is where the other dimensions of openness become relevant. One characteristic of Ireland, again shown clearly by the authors, is the importance of migration: emigration for much of Ireland's history, immigration back to Ireland more recently.

The evidence is clear that Ireland is, in effect, part of a larger labor market, that of the United Kingdom. Whether Irish workers work in Ireland or in Britain clearly depends on relative unemployment rates in the two countries (see the authors' figure 8) and, theory suggests, on relative wages in the two countries. (The latter is a more controversial point empirically in the case of Ireland, but one that I have to believe is relevant.)

This fact offers a potential key to explaining both wage moderation and its sustained effects on output in the last fifteen years. The authors attribute wage moderation to the successful use of collective bargaining. They may be right. But one of the factors behind the responsible behavior of unions must be the constraints imposed by labor mobility. One mechanical explanation for the decrease in adjusted real wages we saw earlier goes as follows: Arbitrage by workers choosing whether to stay in Britain or come back to Ireland has forced wages in Ireland to grow roughly at the same rate as in the United Kingdom. But because the rate of technological progress has been higher in Ireland than in the United Kingdom, this equalization of wage growth has led to a steady decrease in real wages relative to technological progress in Ireland, and thus to a decrease in the adjusted real wage. This explanation may be too mechanical, but I suspect that it captures an important cause of wage moderation in Ireland.

The same mechanism can explain why wage moderation has led to sustained rapid growth in Ireland. Assume that a country has access to a fully elastic supply of workers: in the case of Ireland, the pool of Irish working abroad but willing to come back home. Under these conditions, wage moderation will lead to sustained faster growth. Higher profits will lead to greater capital accumulation. The increase in capital will in turn lead to immigration, and thus to higher employment. The economy will in effect operate under constant returns. As in *AK* models, the lower the (adjusted) wage, the higher the profit rate, and the higher the rate of growth of output. This seems to capture much of what has happened in Ireland over the

last fifteen years. At some point immigration will presumably slow down. Until then, Ireland can sustain higher rates of growth of output, capital, and employment.[2]

Openness in goods markets. A third mechanism may also have been at work. A few years back, Jaume Ventura wrote a paper pointing out that standard trade models had a startling implication for growth: Factor price equalization implied that, as a country accumulated capital, it could avoid decreasing returns to capital by shifting steadily to the production and export of ever more capital-intensive goods. So, although the world economy might be well described by a standard growth model, individual countries, especially small ones, might look like *AK* economies, able to sustain rapid growth through a steady shift in the composition of their production toward capital-intensive goods.[3]

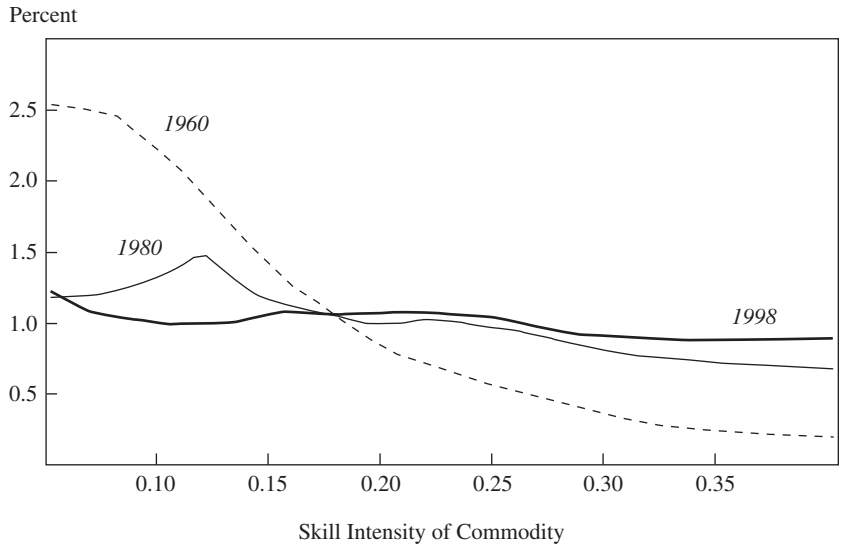
The paper was seen at the time as conceptually important, but its empirical relevance remained to be established. The Asian tigers appeared to be the most plausible examples of such a mechanism at play. I believe that Ireland may provide another example. This belief is based on work by John Romalis in his doctoral thesis at the Massachusetts Institute of Technology.[4] Romalis looked at trends in the capital and the skill content of trade for a number of countries over time. (The argument for skills is the same as for capital: as workers in a country become more educated, the country shifts to more-skill-intensive goods, and in doing so avoids decreasing returns to skill.) One of the countries he examined was Ireland. One of his figures, reproduced here as figure 3, gives the flavor of his results. It shows the Irish share of U.S. imports by skill intensity for three different dates. In the 1960s the largest share was that of low-skill-intensity goods, but over time the distribution has shifted in favor of higher-skill-intensity goods. This documents that changes in the trade structure have taken place in the direction suggested by the theory. It does not prove but does at least suggest that trade in goods may have helped Ireland fight decreasing returns to the accumulation of skills and capital. If so, then even in the absence of capital and labor mobility, we can think

2. This mechanism was at the center of the explanation for employment and wage dynamics across U.S. states that Lawrence Katz and I offered in a Brookings Paper in 1992 (Blanchard and Katz, 1992).

3. Ventura (1997).

4. An updated version is Romalis (2002).

Figure 3. Share of U.S. Imports from Ireland, by Skill Intensity, 1960, 1980, 1998



Sources: Romalis (2002).

of Ireland as having operated somewhat like an *AK* economy, with close to constant returns to capital. And in such an economy, once again, shocks can have sustained effects not only on the level of output but also on its long-term growth rate.

I have been looking at the effects of each of these three channels in isolation. In combination, they come close to implying indeterminacy. Only adjustment costs explain where the economy is today, and small shocks can lead to very large changes in output. In combination with exogenous technological progress, these channels can even lead to ever-increasing or ever-decreasing growth rates. I am far from understanding, either conceptually or empirically, what role each of these channels has played in the case of Ireland. But they appear to have the potential to explain why Ireland did so badly from the early 1970s to the mid-1980s and has done so well since—in other words, to explain the delayed catch-up that this paper has emphasized.

Barry Bosworth: The transformation and growth of the Irish economy in the last decade have been extraordinary—and all the more remarkable

given the ordinariness of its performance in earlier decades. Ireland ought to be a case study of tremendous interest to economists who would like to explain why some countries grow and others do not, and what countries should do to promote growth. It should also be of great interest to the rest of the EU countries, which are struggling to find ways to create jobs.

Patrick Honohan and Brendan Walsh have provided a rich discussion of the factors behind the Irish economic boom, but not a dramatic conclusion to the question of why. Instead they cite a mixture of many factors that coalesced in a somewhat unspecified fashion. Although the paper clearly documents the magnitude of the growth acceleration, I would like to use a growth accounting framework to highlight some of the points in the paper, particularly those that relate to the causes of the turnaround. Thus my table 1 reports annual rates of change in Irish business sector output and its division between employment gains and improvements in labor productivity for selected periods. The latter is further separated into the contribution of changes in capital per worker and in total factor productivity (TFP). In the authors' discussion of policy changes and economic growth, 1987 emerges as a reasonable dating of a regime change, both because of the timing of the fiscal correction and because of the adoption of a new form of centralized labor bargaining.

From 1960 to 1987 Ireland made very little progress, as measured by GDP per capita, toward convergence with the advanced economies—and private employment was stagnant over the period. The one surprise is the high rate of apparent growth in labor productivity and real wages, particularly before 1973.

The magnitude of the policy adjustments in the late 1980s might have been expected to have some transition costs, and there was a global recession in 1990–91. Thus I use 1992 to mark the beginning of the high-growth period. Output in the business sector grew at an average annual rate of almost 9 percent in 1992–2000, and employment increased even more dramatically. Here the surprise is that employment gains fully account for the acceleration of output growth; growth in labor productivity and real wages actually slowed relative to the 1961–87 period. Even more surprising, if one is interested in making some comparison with the experience of the East Asian economies, growth in capital barely kept up with growth in employment, and there is no observable contribution from increased capital per worker. Finally, the rate of real wage growth slowed well below the rate of change in TFP.

Table 1. Accounting for Growth in Ireland, 1961–2000

Percent a year, except where noted otherwise

Period	Business output	Employment	Labor productivity			Real manufacturing wage	GDP per capita[b] (percent of U.S. level)
			Total	Contribution of capital[a]	Contribution of TFP		
1961–73	4.7	–0.2	4.9	0.2	4.6	4.6	43
1973–87	3.8	–0.2	4.0	0.9	3.1	2.2	49
1987–92	6.0	1.7	4.2	0.2	4.0	2.6	55
1992–2000	8.7	5.4	3.2	–0.4	3.6	1.3	67
1995–2000	10.0	6.4	3.5	–0.4	3.8	1.4	72

Source: Author's calculations based on data from *OECD Statistical Compendium,* 2001.

a. Contribution to labor productivity from capital per worker.

b. Period average.

What should we make of this in trying to account for Ireland's boom? First, the paper suggests that the boom itself might be a statistical mirage. In an effort to minimize taxes, multinational corporations operating in Ireland may use distorted transfer prices to allocate a large proportion of their profits to Ireland, which has a low corporate tax rate. If so, the recorded measures of capital income earned in Ireland, and thus Irish GDP, would be overstated. As evidence, Honohan and Walsh cite some very high measures of value added per worker in industries dominated by MNCs: ten to twenty times higher than corresponding numbers in the rest of the European Union. They then construct two adjusted measures of GDP: the first excludes the repatriated profits of MNCs, and the second excludes "excess" reported profits in industries dominated by MNCs. As my table 2 shows, the adjustment sharply reduces estimated output growth over the 1990s. If the adjustment were carried through to the business sector, the estimated growth in labor productivity and TFP would be dramatically reduced, bringing it more in line with the performance of real wages.

The first adjustment is not particularly compelling, because it does not seem reasonable to exclude all of the MNCs' repatriated profits from GDP to correct for a proportionate overstatement. For their alternative estimate of excess "entrepôt" profits, the authors have only one year of data comparable to the corresponding EU data. They use these data to extend the alternative estimates back to 1980 on the basis of a fixed relationship of profits to productivity in total manufacturing. The specific industries involved in the excess profit calculation have grown tremendously over the last two decades, and the authors have direct observations on extremely high values for the ratio of value added to labor payments. As discussed below, I believe that this issue of transfer pricing is critical to some explanations of the Irish performance.

It is useful to group the potential explanations of Ireland's improved performance into three categories: innovation in the production process (supply), labor market reforms, and a demand-side stimulus. I think we can rule out the first explanation, which amounts to a large productivity innovation like that argued to have occurred in the United States after 1995. There is no acceleration in the growth of labor productivity or TFP; in fact, even without any adjustment for excess entrepôt profits, the data suggest some deceleration. It is immediately evident that the story for Ireland is much different from that for East Asia, another area of remarkable

Table 2. Alternative Measures of Real GDP Growth, 1985–2000
Percent a year

Period	*GDP*	*GDP less MNC profits*	*GDP less entrepôt profits*
1961–73	4.4		
1973–87	2.7	2.8	
1987–92	4.2	3.6	4.6
1992–2000	8.5	6.3	6.5
1995–2000	9.9	7.4	7.7

Source: Author's calculations based on data from *OECD Statistical Compendium,* 2001.

growth performance. Instead, the paper is trying to account for a dramatic rise in the *proportion of the working-age population that is employed,* encompassing both a substantial rise in the labor force participation rate and a decline in unemployment. Thus we are left with two broad alternative explanations for the improved performance: labor market reforms or a demand-side stimulus.

The notion of changes in the structure of the labor market is very appealing, if for no other reason than that Ireland has succeeded where the rest of Europe has failed: in creating jobs. The lack of labor market flexibility has also been highlighted in most discussions of Europe's economic performance. One aspect not discussed by the authors is that the OECD has rated Ireland as second only to the United Kingdom in having the least restrictive employment protection legislation in Europe. The only problem is that that seems to have always been true, and the changes in labor market institutions since 1985 seem to have been quite minor. It is hard to identify a major preexisting barrier to the employment of a population that was obviously willing to work, as evidenced by the large outward migration in search of jobs.

The authors stress the importance of the centralized bargaining agreements reached in the mid-1980s, and they point to a dramatic decline in industrial strife. They also mention a series of smaller tax and regulatory reforms that might add up to a regime change in labor markets, but the direct evidence is limited.

In previous work on the decline in unemployment in Ireland and the Netherlands, Olivier Blanchard stressed the shortfall of wage growth relative to that warranted by gains in TFP.[1] That result still holds in the offi-

1. Blanchard (2000).

cial data, but Honohan and Walsh would appear to reduce its relevance with their argument that GDP is inflated by excess entrepôt profits. Their adjustment to GDP would lower the warranted growth rate and eliminate the evidence of a shortfall of wage increases. If we accept the argument for adjusting output growth, Blanchard's explanation has less credence.

The authors also address this issue in their evaluation of whether a moderation of wage demands in Ireland has contributed to an improved competitive position. I have difficulty with their measure, however, because it is based on adjusting a measure of the real exchange rate for the trend observed over the 1975–87 period. The exchange rate actually changed very little over the 1990s, but they adjust the index upward by about 1 percent a year. Thus the adjustment is responsible for nearly all of the increase shown in their figure 5.

Yet there is no doubt that Ireland has had a tremendous export boom. Why did that occur if not because of an improved relative cost situation? Some have argued that the boom was a response to the move toward a single market in Europe, which made Ireland, with a well-educated, English-speaking work force on the edge of Europe, an attractive business location. However, the story does not fit the pattern of Ireland's export growth. As my table 3 shows, the share of exports going to the other EU countries including the United Kingdom has declined, and that going to continental Europe has remained roughly constant. Instead the most dramatic increase in exports has been to the United States. There has also been a large increase in imports from the rest of the world (principally Asia). Ireland looks like a middleman in a vastly expanded trade between Asia and the United States.

Equally noteworthy, the tradable goods sector represents a declining share of employment in Ireland. Thus it is difficult to point to exports as a primary demand-side influence. The breadth of the employment gains across a multitude of sectors is a striking feature of the 1990s.

This paper actually produces considerable evidence that much of the Irish export story may be transfer pricing. First, the abnormality in value added per worker in the five entrepôt sectors that the authors analyze is extreme. If one carries their adjustment through to the expenditure side of the national accounts, it eliminates any evidence of a net contribution of trade to GDP growth. Second, as already noted, the greatest growth in exports has been to the United States, not Europe, and this looks more consistent with the argument that U.S. firms are using Ireland for tax

Table 3. Geographical Composition of Irish Trade, 1985–2000
Percent

Year	United States	United Kingdom	Other EU countries	Rest of the world
Exports				
1985	9.5	33.2	36.2	21.1
1990	8.2	33.8	41.1	16.9
1995	8.4	25.6	46.7	19.3
2000	17.0	19.9	40.0	23.1
Imports				
1985	16.9	42.8	23.6	16.7
1990	14.4	42.6	24.2	18.7
1995	17.9	35.7	20.6	25.9
2000	16.2	33.4	22.5	27.9

Sources: Author's calculations based on data from IMF, *Direction of Trade Statistics,* various years.

purposes. Third, the growth of employment in the high-technology export industries only matches that in the economy as a whole, and the share of employment in manufacturing as a whole declined over the period.

Perhaps the authors are right that the turnaround in the Irish economy is the result of a coalescing of many factors, but such an explanation is not very satisfying if one is looking for lessons for other countries. On balance, I emerged from a reading of the paper believing that the most convincing explanation for the turnaround in the Irish economy is a series of changes in labor markets. That explanation is most compatible with the breadth of the employment gains, but it is difficult to identify the specific institutional changes.

General discussion: Susan Collins applauded the authors for exploring a range of factors that may have contributed to Ireland's virtuous circle rather than searching for some magic bullet. Because it is difficult to identify the role of individual factors with data from a single country, she suggested two ways to expand the analysis by looking at other countries' experience. One way would be to look at a sample of countries with similar initial economic characteristics but different take-off experiences; this could provide clues as to why some countries succeed and, in particular, what made Ireland different. On this basis, she conjectured that Ireland's close ties to the United States might have been a key factor in its success relative to other countries.

A second approach would be to look for similarities and differences between Ireland and other countries that have succeeded, such as South Korea. Collins listed increased competitiveness, sensible macroeconomic policies, and improvements in the dependency ratio as three factors that seemed important to growth in both Ireland and South Korea. But she also noted that the source of Ireland's capital financing was very different from South Korea's. Like other East Asian countries, South Korea reversed its current account deficit largely through a dramatic increase in private sector saving. Ireland has been much more dependent on external capital from multinational corporations and foreign direct investment. She suggested that the reasons for and the consequences of this difference would be worth examining.

Alan Blinder questioned the characterization of Ireland's growth as a return to a previously established, but interrupted, convergence with other European economies. He pointed out that if Irish GDP had simply continued to grow at the same rate after 1973, the year when convergence was allegedly interrupted, as it had between 1960 and 1973, GDP at the end of the 1990s would have been far below the level it actually reached. He argued that the rapid rise in output after 1992 was what needed explaining, and he listed three possible explanations: an export demand shock, a rise in private domestic investment, and a consumption demand shock generated by an increase in population.

Adam Posen was dubious of the prominence the authors assigned to fiscal policy as a factor in Ireland's growth experience. He found the data on fiscal changes unclear and noted that interest rates showed little evidence of the crowding-out mechanism through which important fiscal policy moves would be expected to affect output. He reasoned that the contentious nature of coalition government makes radical fiscal changes difficult, especially when, as was the case with Ireland, there are no fundamental changes in the structure of government or the budgetary process that could overcome the inertia.

Robert Shimer underscored the importance of labor supply and labor demand in the paper. He listed several pieces of evidence favoring labor supply as the likely primary driver of wages and employment: the maturing of a baby bulge, a large increase in women's labor force participation, and a decrease in marginal tax rates for the average worker. William Branson noted that the model proposed by Olivier Blanchard of growth generated by an elastic Irish labor supply, in which wage moderation

leads to a relative rise in the employment-to-capital ratio, would strongly differentiate Ireland from Southeast Asia, where labor immigration is tightly controlled. Branson noted that Singapore had deliberately pushed up wages in order to attract capital-intensive investment from abroad. He also suggested constructing a variable equal to the real wage times the probability of finding a job as a way to combine Blanchard's explanation, of labor supply reacting to changes in the real wage, with the authors' emphasis on labor being attracted by declining unemployment.

Benjamin Friedman remarked that the primary motivating fact for the paper—Ireland's jump from twenty-fourth to ninth place in the world income rankings—might be subject to correction if the effects of transfer pricing are taken into account. He also suggested that oil prices were a prime candidate to explain the medium-term swings in the Irish current account over 1973–2000, and he noted that these current account swings could impact productivity and unemployment through a number of mechanisms, producing the dynamic loop between internal and external balance shown in the authors' figure 2.

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