

# IMF Working Paper

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## How Competitive Is Irish Manufacturing?

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## **IMF Working Paper**

European I Department

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Authorized for distribution by Sharmini Coorey

September 2002

#### **Abstract**

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Ireland has had significant competitiveness gains in the 1990s on the basis of the standard manufacturing unit labor cost-based measure of the real effective exchange rate. A handful of sectors mostly dominated by multinational companies have accounted for the bulk of value added in production. Their productivity gains have greatly contributed to Ireland's exceptional growth performance in the 1990s, which has earned it the nickname of "Celtic Tiger." However, these sectors represent a disproportionately smaller share of manufacturing employment, and competitiveness in employment-intensive sectors has been much weaker. This paper thus explores Irish competitiveness from the viewpoint of risks to employment.

JEL Classification Numbers: F14, F16, E24

Keywords: Ireland, competitiveness, unit labor costs, real exchange rate, employment

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<sup>1</sup> We would like to thank Sharmini Coorey and Mark Lutz for helpful suggestions.

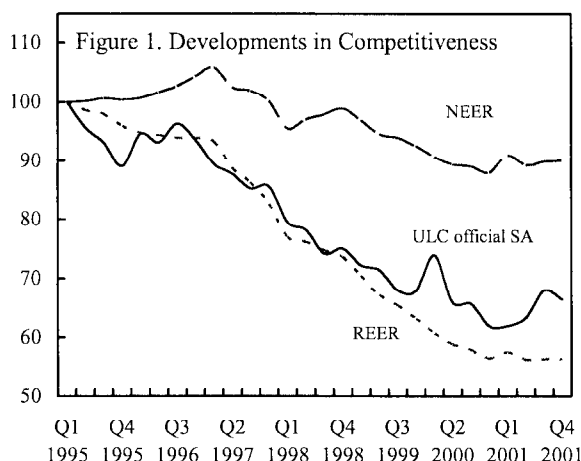
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## I. RECENT DEVELOPMENTS IN COMPETITIVENESS OF THE MANUFACTURING SECTOR

The Irish manufacturing sector has made sizable competitive gains in recent years. When the standard unit labor cost-based measure of the real effective exchange rate (REER) is used to gauge external competitiveness for manufacturing, Ireland's competitive position appears to have improved remarkably during the recent half decade (Figure 1).<sup>2</sup> The improvement has been mainly due to a persistent drop in Irish unit labor costs (ULCs) and, to a lesser extent, depreciation of the nominal effective exchange rate. The main contribution to falling ULCs has come from a surge in manufacturing productivity, which, until 2001, more than offset the impact arising from increases in hourly wages. The outstanding performance of Irish manufacturing has helped to keep the current account close to balance in recent years, despite substantial outflows of factor payments and large deficits in the services balance.



In 2001, production cuts and accelerating wage growth arrested the trend improvement in external competitiveness, but the level remains high. Although the annual average growth rate of manufacturing production still exceeded 10 percent in 2001, ULCs reversed their declining trend during the second half of the year. Production cuts in the second half of the year in response to slowing global demand and a surge in hourly wages led to rising ULCs, despite efforts of manufacturing firms to adjust to weaker demand by shedding labor. Both a cyclically-driven fall in the production of tradables as well as a permanent relocation of some high-tech producers from Ireland contributed to this deterioration. However, given past gains, the overall competitive position of the Irish manufacturing sector still remains strong. Moreover, the most recent data suggest that a rebound in manufacturing production in the first quarter of 2002 resulted in a significant drop in ULCs.<sup>3</sup>

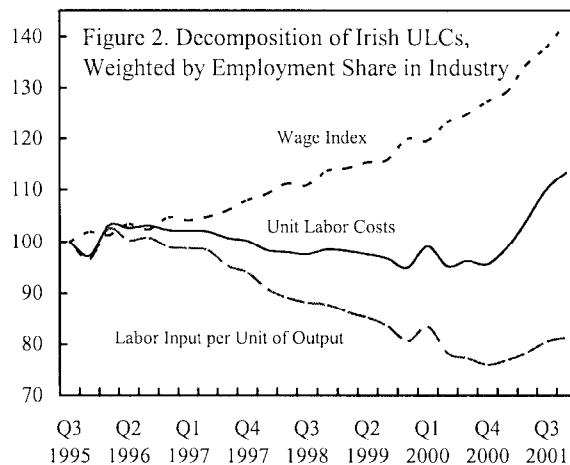
<sup>2</sup> Throughout this paper, a decline in a REER or NEER index denotes a depreciation or gain in competitiveness. See Appendix for data sources and variable definitions.

<sup>3</sup> The developments across sectors were, however, uneven and may be partly related to very strong productivity gains that are characteristic of cyclical turning points. Therefore, it could be premature to suggest that the Irish manufacturing productivity has returned to its earlier trend.

Gains in overall competitiveness mask large differences across manufacturing sectors, with important employment consequences. While the overall performance of the Irish manufacturing sector has been impressive, changes in competitiveness have varied significantly across the sectors. Moreover, the overall success has been accounted for mainly by the astonishing performance of a handful of sectors mostly dominated by multinational companies, whose gains in productivity often result from intangible foreign inputs of production, such as global investment in research, product development, and advertising. In addition, while these sectors account for the bulk of value added in production, they represent a disproportionately smaller share of total manufacturing employment. Therefore, it would be vital to gauge developments in competitiveness across different sectors to assess whether the current acceleration in wage inflation or a potential sustained appreciation of the euro could pose significant risks for manufacturing employment.

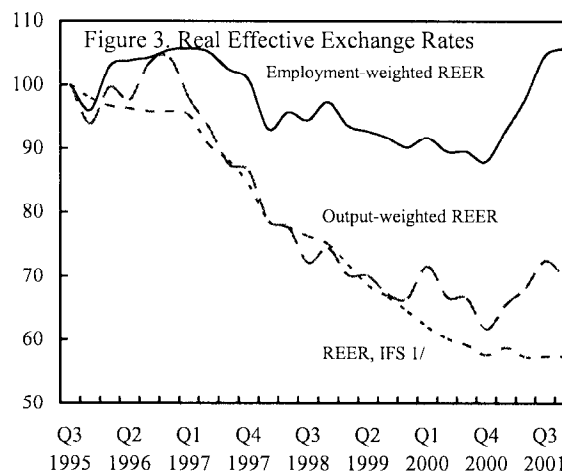
## II. ALTERNATIVE MEASURES FOR ASSESSING EXTERNAL COMPETITIVENESS

Developments in unit labor costs have been less impressive in employment-intensive sectors. An alternative way to gauge changes in unit labor costs and competitiveness is to weight the manufacturing sectors by their shares of total manufacturing employment, rather than by production volumes. This measure better assesses developments in the employment-intensive indigenous sectors as well as the risks to employment posed by the recent downturn and marked wage increases than the standard output-based measure, which is oriented to gauging current account risks. Such analysis suggests that past gains in competitiveness have been relatively limited, as Irish unit labor costs have been broadly stable from 1995–2000 (Figure 2). During this period, high production growth was offset by rapid wage increases. However, the combination of falling production and steep increases in labor costs during 2001 have had a drastic negative effect on unit labor costs although the output decline is in part cyclical, and hence, may be temporary.

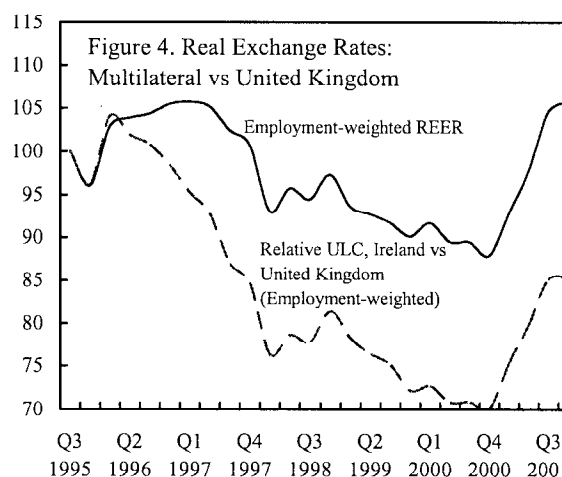


External competitiveness as measured by the employment-weighted REER has been much bleaker than suggested by the standard measure of the REER. The contrast between the two measures of the real effective exchange rate based on employment and output shares is striking (Figure 3). The REER based on weighting the industries by their shares in manufacturing output suggests that overall competitiveness continued to improve dramatically until 2001, in contrast to the broadly stable developments in the employment-weighted index. The more robust gains in competitiveness indicated by the output-based measure are largely explained by the very strong performance of a few industries that have accounted for the most of the recent growth in manufacturing and that are generally characterized by very high ratios of output per worker. Due to an increasing dominance of these “key” sectors, the two measures have been diverging since early 1997, with the production-weighted measure appearing more immune to rising wage costs.<sup>4</sup>

Ireland’s competitiveness has been particularly strong relative to the United Kingdom. Compared to the United Kingdom alone, Irish manufacturing has achieved sizeable competitiveness gains, even as measured with an employment-weighted index (Figure 4). Moreover, the United Kingdom is Ireland’s single largest



1/ Based on aggregate unit labor costs.  
Smoothed with HP filter.

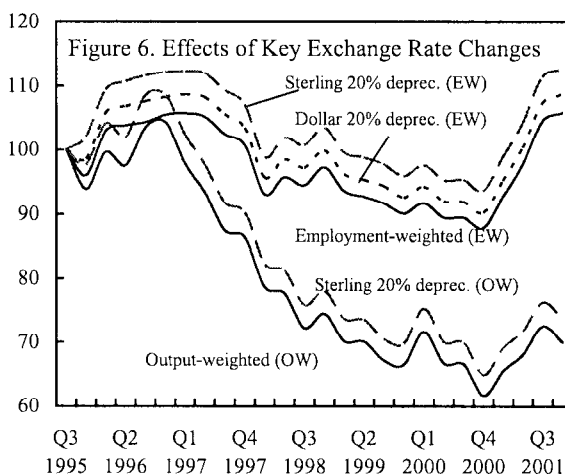
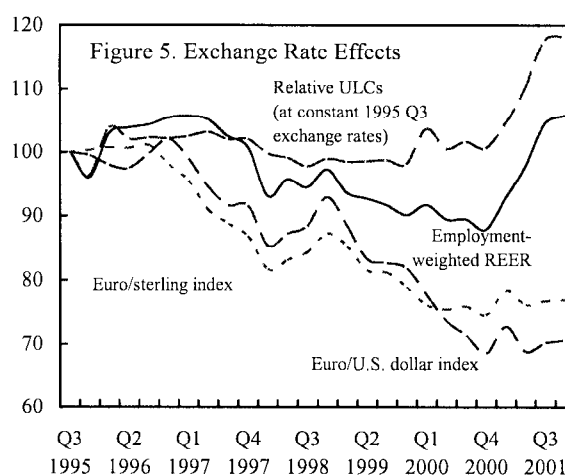


<sup>4</sup> The real effective exchange rate as reported in the IMF’s International Financial Statistics (IFS) matches the index of output-weighted REER relatively closely. However, the recent pick-up in the latter index goes largely unnoticed in the IFS index because it is smoothed using a Hodrick-Prescott (H-P) filter. There are tradeoffs between these measures. The filtering used in the IFS index smooths out cyclical swings in productivity to obtain a gauge of underlying trends. On the other hand, H-P filters suffer from well-known end-point problems. Moreover, it can be argued that the output-weighted index measures competitiveness more accurately than the IFS index, since it applies industry-specific partner-country trade weights, rather than partner weights based on aggregate export trade.

trading partner, with export shares varying from 14 percent to 84 percent in major industries. Therefore, competitiveness gains relative to the United Kingdom have also contributed to maintaining external competitiveness on an effective basis (i.e., compared with all trading partners).

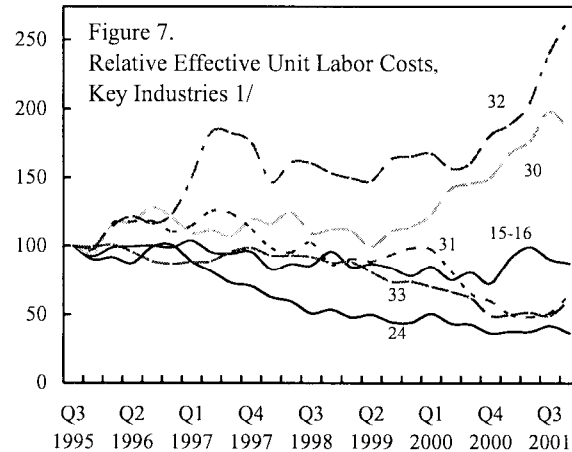
Most of the improvement in external competitiveness measured by the employment-weighted index was due to a weak exchange rate. Disaggregating the contributions of the effective nominal exchange rate and relative ULC components to the real effective exchange rate suggests that much of the past competitiveness gains of the employment-intensive manufacturing industries were related to the weakness of the nominal exchange rate rather than favorable developments in Irish ULCs relative to its trading partners (Figure 5). Indeed, relative unit labor costs at constant 1995:Q3 exchange rates have been broadly stable until 2001, after which they surged by over 15 percent, partly reflecting a cyclical decline in output. Appreciation of sterling and the US dollar in 1997 and 1999–2000, in particular, contributed to a decline in the REER.

Irish competitiveness is vulnerable to an appreciation of the euro, particularly against sterling. Historical simulations of exchange rate changes (assuming no response in ULCs) indicate that the employment-weighted index is more sensitive to a sharp depreciation of sterling than to the US dollar (Figure 6). Indeed, if sterling had depreciated by 20 percent relative to the Irish currency, there would have been an upward shift in the REER by 7 percent compared with a shift of only 3 percent for an equivalent depreciation of the US dollar. For the output-weighted index, a 20 percent depreciation of sterling would have led to an increase of the REER by around 5½ percent, and by 3½–4 percent for a similar depreciation of the US dollar. Losses in Irish competitiveness resulting from an appreciation of the euro in 2002 would come on top of the already rapid cyclical deterioration that took place in 2001. The level differences in the employment versus output-weighted REERs in 2001 suggest that employment-intensive firms and sectors would be particularly vulnerable to euro appreciation.



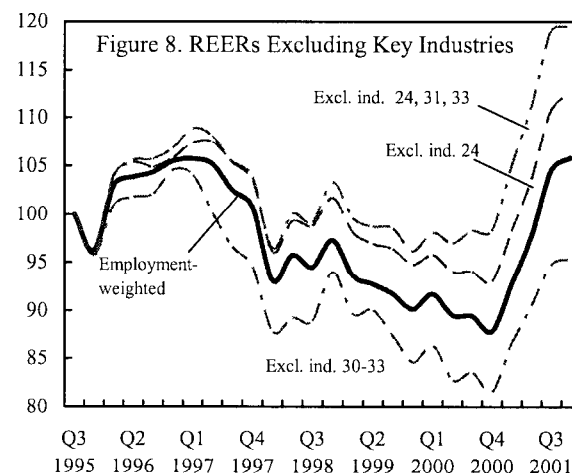


Competitiveness has varied considerably across Irish manufacturing industries. The chemical and pharmaceutical industries (NACE industry 24) registered the strongest competitiveness gains during the period 1995–2001 (Figure 7). This key sector accounted for more than half of manufacturing output in the first quarter of 2002, but only about 9 percent of the labor share of manufacturing. Within the electronics industries, there was also considerable divergence, with office machinery and communication equipment (NACE sectors 30 and 32, respectively) losing ground, and electrical machinery and communication equipment (NACE sectors 31 and 33, respectively) gaining ground over the half decade. The food, beverage, and tobacco industries (NACE sectors 15–16), which account for 18 percent of manufacturing employment, had relative unit labor costs that were fairly unchanged over the period.



- 1/ Industries 15-16: Food, beverages, and tobacco;  
 24: Chemicals and chemical products;  
 30: Office, accounting and computing machinery;  
 31: Electrical machinery and apparatus, nec;  
 32: Radio, TV, and communication equipment;  
 33: Medical, precision, optical and clocks instruments.

Excluding some of the key sectors from the employment-weighted index reveals that external competitiveness of the remaining manufacturing industries has deteriorated even more sharply. An employment-weighted index—although more useful than an output-weighted index for determining the likely employment consequences of a shock to Irish wages or exchange rates—still masks some important differences across sectors. The chemical industry and some electronics industries have had substantial gains. The profit margins in these industries may act as a cushion against shocks, although global production decisions must be considered in the context of the multinational firms' overall profits and demand conditions. Moreover, the extremely high level of value added per worker and the small share of labor costs to output suggest that these sectors may not be very sensitive to developments in wage costs. Thus, the employment risks of a shock are likely to be relatively minor. Thus, it is useful to examine developments in Irish competitiveness after excluding these key industries (Figure 8):



- Excluding the chemicals and pharmaceuticals industries (NACE 24), the remaining manufacturing industries suffered a major setback in their competitive position in 2001.
- The employment-weighted REER has deteriorated sharply excluding industries that have recorded the most impressive gains in productivity in recent years and could be considered “productivity outliers” (NACE 24, 31 and 33). This measure of the real effective exchange rate started to appreciate already in 2000 and leaped up by some 20 percent in 2001. The results are comparable to those that excluded the data for chemicals and pharmaceuticals industries, but the decline in competitiveness is even larger, reflecting the drastic production cuts in the worst performing Information and Communication Technology (ICT) industries (namely, NACE 30 and NACE 32).
- Competitiveness has actually been stronger excluding only the electronics industries (NACE 30–33). The exceptionally poor performance of the office, accounting and computing machinery industry (NACE 30) and the radio, TV and communication equipment industry (NACE 32) more than offset the gains of the electrical machinery and apparatus industry (NACE 31) and the medical, precision, optical, and clocks instruments industry (NACE 33). This poor performance is partly explained by recent production cuts. However, sectoral analysis of relative unit labor costs vis-à-vis trading partner countries reveals that the deterioration of the competitiveness in the production of NACE industries 30 and 32 was underway long before the current global slowdown.

### III. CONCLUSIONS

The stellar performance of the Irish manufacturing sector in recent years was partly interrupted in 2001. The main reasons for fairly limited gains in external competitiveness were the global economic slowdown, the bursting of the ICT bubble, and the rapid increases in Irish wage costs.

The multilateral REER calculated using weights based on relative employment shares—rather than output shares—suggests that gains in competitiveness were fairly limited during 1995–2000 and earlier gains were more than offset in 2001, partly due to cyclical production cuts. The analysis indicates that while some sectors remained extremely competitive, high wage growth and substantial sectoral productivity differentials have resulted in an increased dispersion of competitive positions across various industries. The strong gains in aggregate productivity—particularly in the chemicals and pharmaceuticals industry—have masked a significant deterioration of external competitiveness in sectors that account for the main part of the Irish manufacturing employment.

Irish manufacturing remains vulnerable to an appreciation of the euro. Using the employment-weighted measure for the real effective exchange rate reveals that the depreciation of the nominal effective exchange rate played an important role in generating

past competitiveness gains, as illustrated by the disaggregation of the REER index into nominal exchange rate and relative ULC components. The risk to competitiveness is most marked relative to the strength of sterling, given that the United Kingdom has been Ireland's largest trading partner and has contributed to maintaining Irish competitiveness over the last half decade.

### DATA SOURCES AND VARIABLE CONSTRUCTION

Unit labor costs in domestic currency for industry  $i$  in country  $c$  is calculated as:

$$ULC_i^c = \frac{\text{Earnings per hour}}{\left( \frac{\text{Output / Employment}}{\text{Hours worked per person}} \right)}$$

The relative unit labor costs between Ireland and country  $c$  in industry  $i$  are given by:

$$ULC_i^{Irl,c} = e^c * \frac{ULC_i^{Irl}}{ULC_i^c}$$

where  $e^c$  is the nominal exchange rate of country  $c$  relative to the Irish currency.

Effective unit labor costs in industry  $i$  are constructed by summing relative unit labor costs of Ireland over all its trading partners, where the weights,  $tw_i^c$ , are based on the shares of Irish exports in industry  $i$  that are destined to each country.

$$relative\ ULC_i^{Irl,all} = \sum_c tw_i^c * ULC_i^{Irl,c}$$

An aggregate index, corresponding to a real effective exchange rate (REER), is then constructed by summing over all industries, using weights,  $\omega_i$ , that can either depend on the employment share of each industry or the output share of each industry in total manufacturing.

$$REER = \sum_i \omega_i * relative\ ULC_i^{Irl,all}$$

The data frequency for all variables is quarterly.

The Central Statistical Office (CSO) of Ireland was the source of Irish data on production, employment, hours worked, and wages by NACE sector.

OECD was the source of partner country data on unit labor costs. In particular, data on production and employment was available from the OECD Structural Analysis (STAN) database by NACE industry for each country. Hours worked per employee in the business sector and hourly earnings of the manufacturing sector were taken from the OECD Analytical Database for each country on an aggregate basis. Missing observations, which were more frequent at the end of the sample, were supplemented by unit labor costs in domestic currency for the business sector, from the OECD Analytical Database. Nominal exchange rates were obtained from the IMF's International Financial Statistics.

Irish exports to each country by each industry were taken from the World Bank's World Integrated Trade Solutions, which contains trade statistics from the COMTRADE database made available by the United Nations Statistics Division. SITC industry classifications were matched by description to NACE industries to obtain sectoral direction of trade estimates. Export weights were based on averages over 1998–2000.

The CSO was the source of data on the employment share of each industry in total manufacturing in Ireland and 1995 value-added shares of each industry. The weights used to construct the output-weighted REERs were based on output shares at the beginning of 2002, which were obtained by accumulating 1995 value-added shares of each industry using production indices.

Final index calculations were seasonally adjusted using the Census X-11 method and rebased to 1995: q3 = 100.