Assessing Ireland's Price and Wage Competitiveness

Philip R. Lane

Institute for International Integration Studies (IIIS)
and Economics Department, Trinity College Dublin and CEPR
July 2004

Executive Summary

In this report, we critically evaluate the recent evolution of the price and wage competitiveness of the Irish economy. There was a marked decline in competitiveness during 2002-2004, driven by appreciation of the euro against the dollar and an increase in domestic prices and wages relative to our major trading partners. Despite this reversal, we find that Ireland continues to maintain a remarkable economic profile, with continuing employment growth and very low unemployment indicating that the current level of competitiveness cannot be described as substantially overvalued.

However, it is also the case that Ireland is at an inflection point in terms of its growth profile: going forward, the external pressures on our competitive position are considerable. In addition to the potential threat from the accession countries and emerging Asia in terms of attracting FDI flows, there is a substantial probability that the dollar will weaken even further. Coupled with these risk factors is that the policy environment under EMU is radically different: overvaluation problems cannot be remedied through a policy of currency depreciation, since the value of the euro is determined independently of conditions in the Irish economy.

With respect to domestic factors, we have already witnessed a substantial decline in inflation, in response to the euro appreciation and the deceleration in the domestic non-tradables sector. Since appreciation in the external value of the euro disproportionately reduces Irish inflation relative to our eurozone partners, Ireland's status as among the most expensive consumer locations in Europe will be partly remedied through this channel. However, the goal of maximising purchasing power over the longer-run more heavily depends on the elimination of sectoral barriers to entry and the minimisation of trade, transportation and distribution costs.

In the absence of a major turnaround in the value of the euro, inflation is likely to remain relatively low (or at least comparable to our eurozone partners) over the medium term. The private sector has demonstrated considerable job-preserving flexibility in wage behaviour in recent years in terms of responding to sector-specific shocks. At an economy-wide level, the two biggest risks in terms of pay settlements are the extrapolation of the wage growth during recent years (which could be justified as a catch-up process) and a failure to incorporate contingencies in pay agreements that take into account the risk of major shifts in the external economic environment.

In terms of policy recommendations, we argue that the sustainable relative price and wage levels for Ireland are heavily dependent on policy choices concerning taxation, public spending and competition and regulatory policies. Maintaining low taxes on

capital and labour is undoubtedly beneficial to the business sector: however, despite these substantial advantages of fiscal restraint, a low-tax low-spend fiscal strategy is in fact not optimal in terms of maximising competitiveness. In particular, the provision of infrastructure such as an enhanced transport network increases economy-wide productivity levels. Importantly, an efficient set of international transportation links is vital in minimising trade costs – thereby facilitating increased competition and international price arbitrage. Public support of human capital accumulation is also productivity-enhancing. It should also be recognised that the development of public amenities is also important — migration choices are heavily influenced by "quality of life" considerations such as good-quality and accessible public amenities and public services. Pro-consumer competition and regulatory policies can do much to tackle costly barriers to entry and foster productivity growth.

Accordingly, striking the correct balance between fiscal moderation and the adequate provision of public goods is a central task in sustaining long-run competitiveness. A key issue here is reforming practices in public current and capital expenditure and procurement in order to maximise "value for money" in the public sector. Moreover, continuing reform of the tax system (e.g. a broadening of the tax base through the introduction of carbon and property taxes and the elimination of various tax relief schemes) also helps to ameliorate the conflict between low tax rates and high public spending.

1. Introduction

The term competitiveness is a notoriously slippery concept. For the purposes of this study, we define price and wage competitiveness to be a state in which medium-term full employment is achieved and the return on capital matches the global risk-adjusted cost of capital. By this definition, an economy is over-competitive if prices and wages are so low that the economy is in overheating territory and employment growth is only achievable via significant levels of net immigration; an economy is under-competitive, if the levels of prices and wages are suffficiently high to generate an increase in the current or future unemployment rate and/or capital dis-investment.[1] Clearly, the more productive is the labor force and the capital stock, the higher is the level of wages that is consistent with a state of "price and wage" competitiveness. Income growth in such a competitive economy is constrained only by the global technology frontier and the global business cycle, rather than the restriction imposed by operating in an "under-performance" zone.

Under what conditions can an overshooting of the equilibrium level of wages and prices occur? There are three potential sources of overshooting. First, it is plausible that equilibrium adjustment involves an intrinsic self-correcting cylical element during a phase of unexpectedly rapid output growth. Since not all factors or inputs can be elastically supplied, an upsurge in demand will be initially absorbed by an increase in the price of scarce goods and in the wage rates of workers possessing skills that are in high demand. In a competitive, free-entry environment, this type of overshooting is self-correcting since, over time, new suppliers will emerge and immigration, increased participation and retraining will expand the supply of workers possessing

---

[1] This phrasing allows for the possibility that the response of employment to shifts in wage levels may not be contemporaneous, with firms temporarily absorbing cost increases via lower margins but ultimately forced to adjust labour demand in the face of a persistent increase in wages.

high-return skills.

The second source of overshooting comes from the exercise of monopoly and monopsony power, especially in settings when prices and wages are set according to multi-period arrangements. Here, firms and workers must forecast the appropriate level of prices and wages on the basis of existing information about the future economic environment — if the forecasts prove to be excessively optimistic and the price and wage contracts are inflexible, this also leads to a loss of competitiveness. In this case, the capacity for automatic and rapid self-correction is limited, since monopoly and monopsony power provide some cushioning against the loss of competitiveness and the return to equilibrium involves difficult, pain-staking negotiations. The probability of excessive optimism in wage settlements is at its highest during a period of rapid economic growth, since there is a strong natural tendency to extrapolate future developments on the basis of recent performance. Forecasting errors are also more likely, the more uncertain is the external economic environment and the more open and specialised is the economy.

The third driver of overshooting dynamics is the interplay between a highly volatile asset price (the nominal exchange rate) and slow-moving product prices and wages. Since Dornbusch (1976), this has been heavily emphasised in the academic literature and, at the empirical level, nominal exchange rate volatility is the prime culprit in explaining real exchange rate misalignments. Of course, Ireland no longer has its own currency, as a founding member of the eurozone since 1999. If all its trade were with its eurozone partners, then volatility in the external value of the euro would have no impact on Ireland's trade-weighted real exchange rate. However, as is well known, Ireland is the eurozone member with the largest share of its trade with countries outside the eurozone. Accordingly, fluctuations in the value of the euro against other currencies (most importantly, the dollar and sterling) translates into volatility in the Irish real exchange rate.

A very important characteristic of this last source of exchange rate overshooting is that it may reasonably considered as outside the control of domestic agents and domestic economic policy: the external value of the euro is essentially unaffected by developments in the Irish economy. This increases the range of uncertainty in forecasting the appropriate path for prices and wages and places a heavier burden on the other arms of macroeconomic policy intervention (in particular, fiscal and incomes policies) to ensure misalignments are corrected.

For these reasons, it is important to assess the current state of price and wage competitiveness in Ireland, since several of these factors are relevant in thinking about the future prospects for the Irish economy.

The structure of the rest of this report is as follows. In section 2, I provide a conceptual framework for thinking about price and wage competitiveness for a small open economy. In section 3, I review recent price and wage developments in Ireland and assess the current competitiveness position via conjunctural analysis. I turn to more formal econometric analysis in section 4. In the context of these empirical results, section 5 discusses the role of economic policy in achieving competitiveness. Some conclusions are offered in section 6.

2. Conceptual Framework

In this section, we first look at the determination of prices and wages in the tradables sector. Next, we analyse price and wage formation in the non-tradables sector. An overall summary is then provided.

1. The Tradables Sector

The simplest model of price level determination for a small open economy is the case when there is a single good that is costlessly tradable. Pricing arbitrage then dictates that the "law of one price" must hold

$$P_t = \left(\frac{1}{S_t}\right) P_t^F \tag{1}$$

where P_t is the domestic price level, P_t^F is the externally-determined world price (denominated in foreign currency) and S_t is the nominal exchange rate.[2] In this case, the real exchange rate (the ratio of the domestic price level to the foreign price level, expressed in the same currency) RER_t is determined by "absolute purchasing power parity" (A-PPP) and never deviates from unity

$$RER_t = \frac{S_t P_t}{P_t^F} = 1 (A - PPP) \tag{2}$$

However, international price arbitrage is costly for a number of reasons. For simplicity, we aggregate these costs into a proportional term τ_t. Now the equation linking home and foreign prices is given by

$$P_t = \left(\frac{1}{S_t}\right) P_t^F (1 + \tau_t) \tag{3}$$

since the foreign good can only be imported into the domestic economy by paying this transaction cost. In this case, the real exchange rate is given by

$$RER_t = \frac{S_t P_t}{P_t^F} = 1 + \tau_t \tag{4}$$

If the transaction cost is a constant ($\tau_t = \tau$), then the real exchange rate is also constant — although home and foreign price levels are not equalised, their ratio does not change: this is the case of "relative purchasing power parity" (R-PPP)

$$RER_t = \frac{S_t P_t}{P_t^F} = 1 + \tau \ (R - PPP) \tag{5}$$

Recent evidence has demonstrated that the costs of international price arbitrage remain very substantial, even with the declines in tariffs and communication costs. For instance, Anderson and van Wincoop (2004) report that a comprehensive measure of average trade costs among rich countries is equivalent to setting $\tau = 1.7$ (170 percent), with trade costs for poor countries even higher. The 170 percent headline number breaks down into 55 percent local distribution costs and 74 percent international trade costs ($1.7 = 1.55 * 1.74 - 1$). It follows that these trading frictions can allow considerable differences in the retail price of the same good in different countries. The prominence of trading and distribution costs in determining final retail prices also underlines the importance of promoting efficiency in the trade and distribution sectors.

In reality, multiple tradable goods are produced, with a small open economy specialising in a small range of export varieties and importing a large number of goods that are not produced domestically. It follows that exportables should be cheap

---

[2]The nominal exchange rate is here defined as the number of foreign currency units per unit of domestic currency.

relative to imports in the home country, since there is a considerable saving in terms of transport and distribution costs. As Crucini et al (2001) show, average price levels among the major European countries are reasonably similar — however, the prices of individual goods vary considerably, according to whether an individual product is domestically produced or must be imported.

So far, we have discussed price determination under competitive conditions. If there exists market power (either in good production or in distribution), then the relation between domestic and foreign prices for a given product will also depend on the pricing behaviour of the firm. If a multinational firm is able to segment the home and foreign markets (for instance through a prohibition on "grey market" re-selling or restrictive warranties) then the domestic and foreign prices for the same good may diverge by a considerable amount. Of course, if the price differential is too great, there will be substitution towards other products, placing a limit on the scale of the price differentiation.

Due to these various factors, a realistic model for the aggregate price level of tradables in a small open economy is that

$$\left[P_{Tt} - \left(\frac{1}{S_t} \right) P_{Tt}^F \right] \leq z_t \tag{6}$$

where P_{Tt} is the domestic index of tradables prices, P_{Tt}^F is the world index of tradables prices and z_t is the size of the deviation that is consistent with limited price arbitrage in the presence of transactions costs and market power. This implies that the home price of tradables can fluctuate substantially against the world price of tradables, so long as the deviation does not exceed the trigger value z_t. An additional factor is that there is a time constraint on arbitrage activity – for instance, new suppliers and distribution channels cannot be instantaneously established. For this reason, the short-run value of the deviation limit z_t^{SR} will be significantly larger than the long-run value z_t^{LR}: the longer the price gap persists, the capacity for arbitrage improves.

Consistent with this framework, persistent deviations from the the law of one price and purchasing power parity are prominent in the data (see Taylor and Taylor 2004 for a recent survey). Moreover, adjustment to price gaps tends to be quite non-linear (i.e. only when gaps are "large enough" does adjustment occur). Moreover, the presence of transactions costs means that we should not expect to see price differentials to be totally eliminated, even in the long run — locations that have inefficient distribution sectors and inadequate transportation links will have naturally higher price levels.

As mentioned in the introduction, an important source of price level deviations is fluctuations in the nominal exchange rate. The notorious unpredictability of currency movements also acts to weaken arbitrage dynamics: for instance, if it is believed that the exchange rate will rapidly depreciate, the incentive to respond to a temporarily positive price gap is diminished.

If product markets are competitive, wage determination in the tradables sector is quite straight forward. Since firms are price-takers and are competitive, there is a unique wage (for a given technology and capital stock) that is consistent with staying in business

$$W_t = P_{Tt} * MPL_t \tag{7}$$

where W_t is the nominal wage and MPL_t is the marginal product of labour. If wages

were pushed above this level, the firm would make unsustainable losses and shut down. In this case, improvements in productivity or in export prices are the only routes by which wage growth can occur.

If, rather, there is some market power in product markets, an increase in the firm's price relative to overseas competitors does not lead to a zero level of demand. Rather, the price elasticity of demand in this case is finite, with the demand schedule of the form

$$Y_{Tt} = \left(\frac{S_t P_{Tt}}{P_{Tt}^F} \right)^{-\psi_t}$$

(8)

where ψ_t is the price elasticity of demand. Under these circumstances, a push by unions (if the markup is constant and unions are powerful) will lead to an increase in wages at the cost of a loss in employment. To see this, we can rewrite the output demand equation as

$$Y_{Tt} = \left(\frac{S_t \mu_t W_t}{\mu_t^F W_t^F} \right)^{-\psi_t}$$

(9)

where μ_t, μ_t^F are the home and foreign markups and W_t, W_t^F are the home and foreign wage levels. Unions that care about both wage and employment levels take this demand schedule into account in making wage claims. In this case, the capacity for wage growth under normal conditions is also reliant on improvements in productivity or in the level of export prices (for instance, due to a favourable shift in international tastes towards domestically-produced varieties).[3] In this context, it should be recognised that productivity growth at the aggregate level largely takes the form of industrial restructuring – moving out of low-skill sectors (e.g. textiles) into higher-skill sectors (e.g. software/pharmaceuticals). In turn, this is only feasible to the extent that the skill composition of the labour force allows such upgrading — it is well appreciated that a dramatic shift in the education profile of the Irish labour force has occurred, facilitated by favourable demographic factors.

However, the trade-off between wages and employment in the tradables sector will also be influenced by labour market conditions in the rest of the economy: an increase in labour demand from the government sector or other non-tradable sectors will tilt the balance towards wage increases in the tradables sector, since a decline in tradables employment can be absorbed via re-deployment elsewhere in the economy. Historically, the level of unemployment benefits would have played a similar role – however, this is less likely to be relevant in an environment in which wage levels in the tradables sector are far in excess of the level of welfare payments (i.e. the replacement ratio is low).

In addition, "wage-push" shocks in the tradables sector can also occur if there are shifts in union preferences over the wage-employment trade-off and/or the markup of prices over wages is variable. In this case, a push to increase labour's share in total tradables revenue may be attempted and can temporarily be achieved — however, a decline in profitability has dynamic costs, through dis-investment and a switch to labour-saving capital-intensive technologies. Blanchard (1997), for example, has emphasised this process as central to understanding the chronic increase in European

---

[3]Of course, it should be recognised that there can be considerable dispersion in the distribution of wage growth across types of workers. For instance, the skill premium has globally increased in recent decades, with the shift to skill-intensive production technologies.

unemployment in recent decades.

Indeed, taking a medium-run perspective, the level of relative wages influences decisions beyond the current level of employment. First, especially in situations when the installed capital base is large, firms will typically accept a temporary reduction in profits if wage costs rise – but will tend not to re-invest if the rise in relative wages persists and the level of operations will wind down over time. Second, new investment and locational decisions by multinational firms will be heavily influenced by expectations concerning relative wage levels. Of course, these decisions are influenced by an array of factors and labour costs will matter less, the less labour-intensive is the production technology.

2. The Non-tradables Sector

So far, our discussion has focused on the tradables sector. However, a large proportion of production and consumption activity takes place in the non-tradable sector: in particular, personal and business services have a high non-tradables component.[4] Moreover, these activities are more labour-intensive than the manufacturing sector, such that non-tradables command an even larger share of employment than in value-added. Finally, the traditional belief is that the scope for productivity improvement in these activities is more limited than in the manufacturing sector. However, some types of technological progress – most especially, the IT revolution – have the potential to deliver significant productivity gains in the services sector.[5] Non-tradables prices play a key role in the economy: not only do they matter for consumption, but the prices of non-tradable business services is influential in investment and location decisions and the aggregate cost of living also is central in the migration decisions of internationally-mobile labour.

The key to understanding price and wage determination in the non-tradables sector is to recognise that the non-tradables and tradables sectors are linked through a common labour market. While it is true that some wage dispersion (even for a specific occupation) can be sustained across the two sectors, excessively-low wages in one sector will lead to an exodus of labour. To a first approximation, then, it is useful to think of the level of wages being set in a unified labour market.

In fact, under a set of polar assumptions, wages and prices in the non-traded sector are entirely driven by developments in the traded sector. The "Balassa-Samuelson" hypothesis for a small, open economy assumes competitive markets, standard Cobb-Douglas production technologies and that labour is costlessly mobile between the two

---

[4]Of course, the distinction between tradables ad non-tradables is not hard-edged. Rather, the difference is better described in terms of some products having higher trade costs than others. If the trade cost is prohibitive, a particular economic activity will be entirely non-traded. However, if the trade cost falls by a sufficient amount (e.g. due to a fall in communications costs, via the interned), the share of trade in a previously non-tradable sector will grow. It should also be recognised that practically all retail prices have a significant non-tradables component, since distribution and retailing costs represent a considerable proportion of final product prices. See also Engel (2002) for an extended analysis, based on the latter observation.

[5]Indeed, the consensus now is that the main difference between the US and Europe in terms of recent productivity growth is in the services sector, with the US further along the path in re-structuring the retail sector to take advantage of IT-driven distribution and inventory management. This is commonly known as the "Walmart" phenomenon.

sectors and that capital is costlessly mobile at the international level. Since the country is a price-taker in the tradables sector, the price of tradables is externally determined. Moreover, the international mobility of capital means that the rate of return on capital is also externally fixed by world capital market conditions. This means that there is a unique wage that is consistent with positive production in the tradables sector – if productivity or export prices improve in the tradables sector, this wage level will also rise. Since there is a unified labour market, firms in the non-traded sector must also pay the same wage (and offer the same return on capital). If technology is less productive in the non-tradables sector, the rise in wages generated by favourable developments in the tradables sector can only be absorbed by increasing the price of non-tradables. Given this set of inter-relationships, the "Balassa-Samuelson" hypothesis is that productivity improvements in the tradables sector leads to an increase in the relative price of non-tradables.[6] If the productivity improvement is country-specific, this further implies a real exchange rate appreciation, since non-tradables prices in the domestic economy rise more quickly than in overseas economies under these conditions.

In formal terms, we can write this hypothesis as

$$RELPNT_t = \left(\frac{P_{Nt}}{P_{Tt}} \right) = f \left(\frac{PROD_{Tt}}{PROD_{Nt}} \right) \tag{10}$$

where $RELPNT_t$ is the relative price of non-tradables and $PROD_{Tt}, PROD_{Nt}$ are the (total factor) productivity levels in the two sectors. The aggregate price level is a weighted combination of prices in the tradables and non-tradables sectors

$$P_t = P_{Nt}^{\omega} P_{Tt}^{(1-\omega)} \tag{11}$$

$$P_t^F = P_{Nt}^{F\omega} P_{Tt}^{F(1-\omega)} \tag{12}$$

where ω is the relative weight placed on the non-tradables sector.[7] It follows that the ratio of home to foreign price levels when expressed in the same currency (i.e. the real exchange rate) is given by

$$RER_t = \frac{S_t P_t}{P_t^F} = \frac{\left(\frac{P_{Nt}}{P_{Tt}} \right)^{\omega} S_t P_{Tt}}{\left(\frac{P_{Nt}^F}{P_{Tt}^F} \right)^{\omega} P_{Tt}^F} = \frac{\left(\frac{P_{Nt}}{P_{Tt}} \right)^{\omega}}{\left(\frac{P_{Nt}^F}{P_{Tt}^F} \right)^{\omega}} \tag{13}$$

where, for simplicity, we have assumed the law of one price holds for tradables and a common basket of tradables across the two countries.[8] By this formulation, the real exchange rate is driven by the relative price of non-tradables in the domestic economy versus the foreign economy – if the domestic tradables sector increases in productivity relative to the foreign tradables sector (and any productivity improvement in the non-tradables sector is less than proportional), then the equilibrium real exchange rate appreciates. It should also be emphasised that a terms of trade improvement (a rise in the ratio of export prices to import prices) can generate similar responses in the relative price of non-tradables. Importantly (especially in the Irish case), a reduction in the effective tax rate on capital also has a similar impact to a productivity improvement in the tradables sector: again, capital flows into the economy, raising

---

[6]The original contributions are Balassa (1964) and Samuelson (1964).

[7]This could differ between the home and foreign economies but we assume identical weights for notational simplicity.

[8]We can easily add a term to reflect differences in the relative price of tradables across countries, as was analysed earlier in this section.

labour demand and pushing up economy-wide wage levels. Finally, the Balassa-Samuelson model also underlines the "win-win" return to productivity gains in the non-tradables sector, which at the same time both enable wage growth but also a decline in the price level.

Although the Balassa-Samuelson model is very powerful, several adjustments are required in order to have a comprehensive understanding of price and wage determination in the non-traded sector. First, the model does not take account of fixed, immobile factors/inputs. Most obviously, land/property is not internationally mobile – even if the tradables sector does not have a marginal positive demand for land, the increase in wages will also feed into property prices through a positive demand effect. Second, the aggregate supply of labour is not fixed — an increase in wages will call forth an increase in the participation rate and in immigration, such that the short-run wage impact of a productivity shock will exceed the long-run impact. Similarly, the aggregate supply of housing is not fixed – an increase in demand will engender increased construction activity, with the long-run price impact again less than the short-run price impact. More generally, we would expect to see equilibrium overshooting in response to an unexpected productivity shock – the short-run intersectoral mobility of labour is also less than its long-run mobility, especially in cases in which re-training or new skills are required to move into high-return occupations.[9] Similarly, the supply response from capital will also be greater in the long-run than in the short-run: in the short-run, installed capital in the non-tradables sector can earn 'super-normal' returns by taking advantage of high demand to increase mark-ups.

Moreover, workers in some sectors have sufficient bargaining power to set wages above the competitive level, by restricting the ability of other workers to enter the sector and under-bid for job opportunities. In this case, as mentioned earlier, aggregate wages and prices will be influenced by shifts in labour demand and wage-push shocks in these "privileged" sectors. A prominent example is the highly-unionised public sector – wage increases in that sector that exceed private sector benchmarks and that are not matched by proportionate productivity gains imply an increase in the prices of publicly-provided goods in the aggregate price index. Moreover, an increase in public sector employment (especially in a full-employment environment) acts to reduce the supply of labour to the business sector, leading to a contraction of output and/or an increase in wages and prices (where the firm has pricing power).[10]

In particular, it is now better appreciated that the domestic retail price of even an imported good is strongly influenced by the cost of local inputs, such as wages and distribution costs.[11] In this way, local prices can diverge from international prices due

---

[9]Ortega (2003) shows that fluctuations in the relative price of non-tradables in EMU member countries is partly explained by short-run divergence in wage growth and in markups between the tradable and non-tradable sectors.

[10]These are the impact effects of an increase in government employment. To the extent that publicly-provided goods and services raise long-term productivity, the private sector will gain through this other channel via improved infrastructure and enhanced human capital. Moreover, a society may rationally choose a larger public sector over higher private-sector output, depending on its preferences between publicly-provided goods and services versus private alternatives.

[11]For surveys, see James Anderson and Eric van Wincoop, "Trade Costs," Journal of Economics Literature, forthcoming; and Charles Engel, "The Responsiveness of

to shifts in: (i) exchange rates; (ii) importer distribution margins; (iii) wholesale distribution margins; and (iv) retail distribution margins. In (ii)-(iv), rising margins can be driven by cost increases but also by shifts in markups. During a boom period, it is likely that both elements contribute to rising prices. Moreover, it is natural that due to supply inflexibilities the initial growth in costs and markups may overshoot the long-run sustainable level: as profit margins rise, competitive forces should lead to the entry of new suppliers and new workers into overheated sectors, driving down costs and markups. A critical policy question is whether there are barriers to entry in any of these stages in the distribution process that may prevent the rapid convergence of prices and wages to the sustainable long-run equilibrium level.

3. The Impact of EMU

How has EMU altered the processes underlying price and wage formation in Ireland? First, by definition, nominal currency fluctuations against our eurozone partners have been eliminated. However, nominal currency fluctuations still represent an important source of real exchange rate volatility for Ireland, since a large proportion of our trade is with non-eurozone partner countries. Moreover, since Irish economic conditions have zero impact on the external value of the euro, the nominal exchange rate is no longer available as an adjustment tool that can be manipulated to correct real exchange rate misalignments. Indeed, shifts in the external value of the euro (in particular, against the dollar and sterling) lead to differential inflation rates between Ireland and the rest of the eurozone, in view of our disproportionately high exposure to extra-eurozone trade (Honohan and Lane 2003).

Second, the loss of an independent monetary policy means that local aggregate demand pressures cannot be stabilised through an interest rate response — ECB interests rates are adjusted only on the basis of area-wide macroeconomic developments. In fact, a non-responsive nominal interest rate means that real interest rates move in a procyclical fashion, aggravating the initial demand disturbance. To see this, consider the case of a local demand boom — especially in the short-run, this places upward pressure on prices and wages. Since the nominal interest rate is fixed at the European level, an increase in domestic inflation corresponds to a reduction in the real (inflation-adjusted) interest rate — which, in turn, generates further demand pressures. Symmetrically, a negative local demand shock would not be relieved by a cut in the nominal interest rate — with declining inflation feeding into a rising real interest rate, adding to the deflationary environment. This procyclical real interest rate pattern implies that the amplitude of the local business cycle will grow under EMU, with larger booms but also deeper recessions and increased volatility in intra-eurozone inflation differentials.[12]

Consumer Prices to Exchange Rates: A Synthesis of Some New Open-Economy Macro Models," The Manchester School, 2002.

[12]It might be argued that counter-cyclical domestic fiscal policy can act as a substitute for an independent monetary policy. However, employing fiscal policy for cyclical demand management is a notoriously difficult problem. Moreover, it diverts fiscal policy from its longer-run objectives (such as infrastructure provision, encouraging economic growth). The political feasibility of running the required large surpluses during boom times is quite debatable, whereas the capacity to run large deficits during recessions is constrained by the Growth and Stablity Pact. For a small open economy, the scale of fiscal intervention that would required to stabilise the cycle would also be

Third, a related point is that domestic "cost-push" shocks (e.g. a move by unions to raise the labour share in total revenues) cannot be counteracted by interest rate policy. Rather, the adjustment to cost-push shocks will take the form of real exchange rate appreciation, with a delayed impact on employment and other activity indicators to the extent that the response elasticity to real appreciation is muted in the short-run but grows larger with the duration of the shock.

Fourth, the national inflation rate inside a currency union is not simply a measure of increase in the local cost of living: differential inflation rates among eurozone member countries are a central component in shifts in relative competitiveness levels. For this reason, pay negotiations should not focus solely on the implications of a given inflation rate for the purchasing power of a given nominal wage — rather, there are circumstances under which wages may need to fall even in nominal terms in order to restore competitiveness, even if the local inflation rate is positive — firms making locational decisions compare the euro-value of wage levels, rather than their local purchasing power.

Fifth, it has been argued that a single currency acts to reduce trade and arbitrage costs, with a corresponding reduction in the scale of sustainable price gaps for tradables goods. However, while there is substantial evidence that trade volumes among eurozone countries have markedly increased since 1999, it seems that much of the price convergence in Europe took place in the early 1990s, as a result of the reforms associated with the Single European Act (Engel and Rogers 2004). The speed of price convergence and the arbitrage response to shocks will also depend on sectoral market structures, in terms of barriers to entry and other features that allow segmentation of the European market along national lines.[13]

Sixth, the creation of the euro has likely altered the short-run "pass-through" of the exchange rate to domestic prices. In particular, some firms from outside the eurozone may now follow "euro pricing policies", with prices denominated in euro rather than in the producer's currency. In this case, a depreciation of the euro does not immediately translate into an increase in import prices, since the importer absorbs the currency fluctuation. This has relevance for Ireland, since a high volume of consumer goods are imported from the UK – if some firms have switched from setting prices in sterling to setting in prices in euro, the short-run impact of euro-sterling fluctuations on the domestic price level will be attenuated.

Finally, it should be recognised that EMU has plausibly generated a much more stable European-wide macroeconomic environment. In particular, area-wide aggregate inflation and nominal interest rates are much more predictable than would be the case for a small open economy attempting to set an independent monetary policy and possibly vulnerable to speculative attack during periods of economic weakness. This stability greatly reduces the scope for costly forecasting errors in setting prices and wages, especially to the extent that the local business cycle is harmonised with the area-wide business cycle. However, the stability gains are smaller when there is a divergence in business cycle conditions – as has largely been the Irish experience in recent years.[14]

---

very large, in view of the importance of external factors in determining the overall level of economic activity.

[13]See also Andres et al (2003).

[14]However, an important exception is that eurozone experienced a significant common shock since 2001 — the global economic slowdown – that affected Ireland and the rest of the eurozone in similar fashion. The ECB response in reducing interest

4. Overall Summary

Our discussion in this section has highlighted several themes. First, there can be both short-run and long-run gaps between the prices of identical tradables goods across borders. However, the size of these gaps will be reduced to the extent that technological improvements and economic policies act to reduce transactions costs and other barriers to arbitrage. Second, both wages and the relative price of non-tradables is powerfully influenced by productivity dynamics in the tradables sector, as predicted by the Balassa-Samuelson hypothesis. However, the evolution of wages and non-tradables prices is also influenced by the exertion of market power by unions (wage-push shocks) and by the level of labour demand and pay deals in the government sector.

A recurrent theme is that there are powerful intrinsic forces that predict price and wage overshooting in response to unexpected shocks — supply responses are more inelastic in the short-run than in the long-run, such that demand surges translate into higher prices rather than higher output. Similarly, wage-push shocks are more likely to be absorbed in the short-run with a limited loss in employment — but at the cost of longer-run disinvestment and out-migration of capital.

Finally, EMU has altered wage and price dynamics in a number of fundamental ways. The nominal exchange rate is no longer available as an adjustment tool to correct real exchange rate misalignments. With respect to demand pressures, the short-run impact on prices and wages has been amplified by the absence of countervailing interest rate policy. Adjustment to cost-push shocks is also likely to be a slower process under these conditions, with a correspondingly larger cost in terms of lost output and employment.

3. Recent Price and Wage Developments

Figure 1 charts a variety of real exchange rate indices over 1995.1 to 2004.1, based on the following deflators: consumption (RERPC); GDP (RERPGDP); exports (RERPX); unit labour costs (RERULC); and unit labour costs in manufacturing (RERULCM). These series are drawn from the European Commission's Competitiveness database and are based on "double-export" weights vis-à-vis the IC24 group of countries (i.e. the 24 major industrial countries). With the exception of RERULCM, all of these series displays a similar time pattern — relatively little action during 1995-1997; a substantial gain in competitiveness during 1997-2000 (accelerating during 1999-2000); a substantial reversal during 2001-2002; and stabilisation during 2003 and the first quarter of 2004. The real exchange rate index based on unit labour costs in manufacturing (RERULCM) displays a sharp trend depreciation, with only a marginal reversal since 2002 — this pattern reflects the very high recorded growth in manufacturing productivity in recent years. Table 1 shows the data for the period since the onset of EMU: the 1998.4 to 2000.4 period saw a major improvement in competitiveness (despite relatively high inflation relative to our eurozone partners) that lines up with the sharp euro depreciation during that period, whereas the loss in competitiveness over 2000.4 to 2004.1 has been quite marked. Figure 2 shows the corresponding pattern for Ireland's trade-weighted nominal exchange rate: nominal exchange rate volatility is the dominant source of fluctuations in Ireland's competitiveness position.

---

rates was broadly appropriate for the entire eurozone.

Table 2 reproduces the data presented in the May 2004 *ECB Monthly Bulletin* that decomposes the changes in national competitiveness indicators for eurozone members over 2002.1 to 2004.1. As is clear from the table, Ireland has experienced a much larger loss in competitiveness than other eurozone countries. This is partly due to a 3.5 percent loss in competitiveness vis-à-vis intra-eurozone trade partners but this is relatively small relative to the 24.7 percent decline vis-à-vis non-eurozone trade partners. Table 3 shows the trade shares with respect to our major trading partners. As is well known, the UK is disproportionately important to Ireland as a source of imports. Another notable feature is that China is still a relatively small trading partner. Table 4 shows the distribution of imports across capital goods, consumption and intermediates: consumption only accounts for one-quarter of imports — at least on impact, exchange rate fluctuations have a bigger impact on business investment and sourcing decisions than in the more-visible consumption sector.

In what follows, I focus on the real exchange rate index based on GDP deflators as the most appropriate measure of price competitiveness.[15] While the RERPC index is widely used, this is better suited to comparing the cost of living across countries rather than relative production costs. For Ireland, any output-based deflator is subject to the criticism that measured output growth in some multinational-dominated sectors is unbelievably high – however, the broadly-based GDP deflator is less affected by this problem than are the ULC-based indices.

To set the context, Figure 3 charts the RERPGDP series over 1980.1 to 2004.1. The disinflation process during 1981-1986 was associated with sharp real appreciation (and a considerable slump in the level of economic activity). The 1986 devaluation was followed by a prolonged phase of real depreciation that supported the economic recovery during that period. After the disruption of the 1992-1993 currency crisis episode, there was a clear but gradual trend real appreciation in the run-up to EMU. As already noted, the first two years of EMU saw a sharp real depreciation that has been followed by a large reversal over the last two years.

We turn now to recent wage developments. Table 5 shows sectoral and aggregate earnings growth over 1998.1 to 2003.3: the aggregate nominal increase in earnings has been quite substantial at a cumulative 42 percent. However, there is considerable sectoral dispersion, ranging from 29 percent earnings growth in the transport/communications sector to 57 percent in the construction sector. Table 6 compares nominal wage growth across the eurozone over 1998-2003: at a cumulative 37.1 percent, nominal compensation per employee has grown much faster in Ireland than in some other eurozone countries (wage growth in Germany was only 8.7 percent over this period). While some of the differential wage growth can be attributed to variation in hours worked and the shifting composition of the Irish labour force towards higher-skilled occupations, a large proportion must reflect an increase in the relative wage of a "like-for-like" worker in Ireland relative to other eurozone countries. However, this plausibly includes a substantial catch-up component in view of the social partnership strategy of wage suppression during the 1990s.

How have fluctuations in competitiveness fed into the labour market? Figure 4 shows the evolution of the unemployment and participation rates over 1980.1 to 2004.1. The remarkable improvement in the labour market during the 1990s has been broadly maintained: however, there has been a slight upturn in the unemployment rate and little recent expansion in the participation rate over the last two years. Figure 5 shows that there is a fairly strong cyclical link between employment growth and the level of

---

[15]See also Harberger (2004).

competitiveness, especially in terms of the twin deterioration in the real exchange rate and in employment growth since 2001. That said, the labour market does exhibit impressive sectoral flexibility: Figure 6 shows a positive correlation between sectoral employment growth and sectoral wage growth — sectoral wage growth was slowest in those sectors experiencing job losses. Another perspective is provided by examining the labour income share, which is commonly used as a proxy for the level of marginal costs facing firms: although the trend has been firmly downwards (in part, however, distorted by some multinational-dominated sectors), its rose slightly during 2003.

Another widely-employed warning signal in assessing competitiveness is the shift in the current account balance. Table 7 shows recent data for Ireland — although the deficit is low in absolute terms, the recent deterioration has been quite marked, with a two percentage point increase in the ratio of the current account to GNP between 2000 and 2003. Again, this is consistent with the overall profile of a decline in competitiveness during recent years.

Much recent debate has highlighted the threat to Ireland from the accession group of countries in relation to EU markets and FDI locational decisions. While the entry of these countries into the EU certainly represents a fundamental reconfiguration of the European economic landscape, these countries are also experiencing rapid real wage growth. Table 8 shows the growth in wages relative to GDP deflators in the major accession countries and in Ireland, which is a proxy for the relative cost of labour within countries. Since 1995, the relative cost of labour has increased much more quickly in the accession countries than in Ireland, albeit from a very low base in most cases. Table 9 documents the real appreciation for each countries vis-à-vis EU trading partners over 1998.4-2004.1. Again, a number of the accession countries have experienced much larger real appreciations than Ireland — although there are important exceptions, mostly notably Poland. Turning to the competition for FDI inflows, Figure 8 does not reveal any shift from Ireland towards the accession countries in recent years.[16] Indeed, the dominant feature of the graph is Ireland's success since the mid-1990s in securing a disproportionate fraction of European FDI inflows.

Finally, in addition to price and wage indicators, the relative cost of housing represents an important dimension of competitiveness, in view of its central role in migration and locational decisions. Figure 9 shows the ratio of Irish house prices to UK and US house prices (converted to a common currency) — these housing-based real exchange rates (H-RER) show general trend growth in relative housing costs in Ireland. Moreover, driven by the fall in the dollar against the euro, the cost of housing in Ireland relative to the US has sharply increased since 2001, which acts as a deterrent to potential migration flows from the US to Ireland.

In summary, the descriptive and conjunctural analysis in this section delivers a number of important lessons. One general feature is that loss in competitiveness since 2001 has been quite substantial. However, this has to be interpreted in the context of an artificial state of super-competitiveness during 1999-2001 which was produced by the sharp depreciation in the external value of the euro. In addition, rapid compensation growth in recent years in part represents a catching-up phase in the wake of prolonged wage suppression during the 1990s as part of the social partnership process. The fall in competitiveness has been associated with a visible deterioration in

---

[16]2003 data for FDI inflows from the US show that both Ireland and the accession group saw a decline in their share in total US FDI inflows into Europe.

the private-sector labour market — however, this should not be exaggerated, in view of the continuing low unemployment rate and high participation rate. However, the muted reaction so far may in part be the result of firms willing to absorb a temporary decline in profit margins: if the decline in competitiveness persists, a lagged response in terms of output and employment may occur.

A second key characteristic is that, in terms of driving factors, variation in the external value of the euro has been the single biggest contributor to the high volatility in Ireland's competitive position in recent years. As will be discussed later in this report, formulating adjustment strategies to cope with this risk factor is a high priority, especially since direct manipulation of the euro's value is not a policy option for Ireland.

4. Econometric Analysis

In this section, I first develop a model for the equilibrium long-run real exchange rate for Ireland. I then turn to assessing the current level of competitiveness in a forward-looking context.

1. The Equilibrium Long-Run Real Exchange Rate

Modelling the equilibrium real exchange rate for Ireland presents a range of difficulties. At a basic level, a long span of data does not exist for a useful multilateral real exchange rate series for Ireland – in any event, structural change in the Irish economy means that employing data from the distant past is potentially misleading. This data limitation means that our quantitative model must place a heavy weight on parsimony.

The most important restriction on our empirical analysis is that it is not feasible to accurately measure total factor productivity for Ireland, since the multinational manufacturing sector heavily distorts the aggregate productivity data — the very high value-added per worker in that sector is attributable to a combination of highly-productive intangible inputs (such as intellectual property owned by the parent company) and tax-driven transfer pricing activities.[17] For this reason, we do not attempt to implement a standard equilibrium real exchange rate model, such as developed by the International Monetary Fund and also maintained by private investment banks.[18] Rather, we select a model which employs output per capita as its general productivity proxy: an economy with a relatively higher output per capita is held to be more productive and can sustain a higher level of prices and wages. For Ireland, our measure is in fact GNP per capita. The distorting accounting of the multinational sector means that this more closely reflects true value added per capita – the divergence between GDP and GNP is mostly attributable to the multinational profit outflow, which is overstated for two reasons: (a) the impact of transfer pricing; and (b) some of the recorded profits in that sector are better described as payments to intangible inputs rather than the direct return to capital investment.[19] We also note

---

[17]See Cassidy (2004) for a discussion of recent Irish productivity trends — however, his analysis is also limited by these data problems.

[18]See Isard et al (2002), Goldman Sachs (1998).

[19]The cumulative current account imbalance for Ireland over the last several decades is in fact close to zero, such that it is difficult to atttribute the GNP-GDP gap to a large net foreign liability position. The recently-released data on Ireland's net foreign asset position shows suspiciously large volatility and are hard to reconcile with both

that, in addition to acting as a productivity proxy, output/income per capita also influences the equilibrium real exchange rate to the extent that expenditure patterns are non-homothetic: as incomes rise, the pattern of expenditure shifts towards personal services, which have a higher non-tradable component and accordingly prices that are more responsive to demand pressures.

The equation for the equilibrium real exchange rate also includes two other driving variables. One is the terms of trade (the ratio of the export price index to the import price index): for a given level of output per capita, an improvement in the terms of trade boosts the purchasing power of real incomes, adding to pressure on the prices of non-tradables. The other is the ratio of government to total employment: especially in tight labour market and holding fixed the level of output per capita, an expansion in government employment corresponds to a withdrawal of labour from the private labour market, adding to labour scarcity and potentially driving up wages and prices. Of course, a similar mechanism applies if public sector wages jump ahead of market norms – however, the data on public sector wages are subject to a number of corrections and are not sufficiently up to date to include in our model.[20] This mechanism is documented by Alesina and Perotti (1997) and Lane and Perotti (2003) for a broad sample of OECD countries and some index of the fiscal position is typically employed in large-scale real exchange rate empirical models.

In formal terms, we model the long-run equilibrium real exchange rate for Ireland with the following equation

$$\log(RER_t) = \alpha + \beta_1 \log(RELPCQ_t) + \beta_2 \log(TT_t) + \beta_3 GEMPRATIO_t + \varepsilon_t \tag{14}$$

where RER_t is the real exchange rate index, $RELPCQ_t$ is real output per capita in Ireland relative to a weighted average of relative output per capita in our major trading partners, TT_t is the terms of trade, $GEMPRATIO_t$ is the ratio of government to total employment and ε_t is a residual term.[21] According to this model, the real exchange rate is at its long-run equilibrium when the deviation term $\varepsilon_t = 0$ and each of the driving variables ($RELPCQ_t, TT_t, GEMPRATIO_t$) is also at its long-run equilibrium value.

This is formally known as a cointegration equation, since it describes a stationary linear relation among a set of variables that are each individually trending. As a prelude to reporting the econometric results, Figures 10-13 plot the real exchange rate plus each of the regressors over 1981-2003. The time series behaviour of the real exchange rate was discussed earlier in the report. With respect to relative output per capita ($RELPCQ$) in Figure 11, 1986-2000 saw Ireland rapidly move up the world income distribution ladder. Importantly, Ireland's relative position has essentially stagnated during 2001-2003, such that the recent real appreciation cannot be

---

the current account flow data and the level of profit outflows. See Lane (2003a) for a more extended discussion of this point.

[20]Among the required corrections are that the skill profiles of public and private sector labour forces sharply differ. In addition, wages would ideally need to be adjusted for the differences in pension provision and in job security between the two sectors. See also the recent paper by Boyle at al (2004) that analyses the gap between public and private sector wages, but only up to the year 2000.

[21]Based on trade patterns, the country weights employed to calculate the $RELPCQ$ index were Germany (0.18), France (0.12), Italy (0.06), Netherlands (0.06), Japan (0.07), Spain (0.04), UK (0.25) and USA (0.22).

explained in a simple fashion as the counterpart to contemporaneously strong relative output growth.

The evolution of the terms of trade is plotted in Figure 12. Relative to the large gyrations in the 1980s, recent fluctuations in the terms of trade have been relatively minor. Moreover, the terms of trade slightly declined in cumulative terms during 2001-2003 — which in itself would call for real depreciation, rather than real appreciation. Finally, the *GEMPRATIO* variable is shown in Figure 13.

Table 10 shows the technical results that each of these variables possesses a unit root (i.e. are individually non-stationary) but that the linear combination of these variables is stationary (i.e. cointegration exists).[22] Table 11 reports the estimated coefficients for equation [14]: as predicted by economic theory, each of the variables enters with a positive sign. In addition, *RELPCQ* and *TT* are highly significant in statistical terms.

The former variable has an estimated coefficient of 0.41: a 10 percent permanent increase in the Ireland's output per capita relative to our trading partners is associated with a 4.1 percent real appreciation. This relatively modest elasticity powerfully suggests that much of the recent appreciation cannot be attributed to trend factors but rather reflects the temporary impact of the large swing in the nominal external value of the euro.

The estimated coefficient for the terms of trade is 1.46: a 10 percent improvement in the terms of trade is associated with a 14.6 percent real appreciation. This is consistent with the hypothesis that the terms of trade is not just operating via the contribution of the export sector to the aggregate GDP deflator but also through a wealth effect that influences the relative demand for other goods. Finally, the (statistically insignificant) point estimate for the *GEMPRATIO* variable is also quite modest: a relatively-sizeable two percentage point increase in the ratio of government to private employment is associated with a real appreciation of just 1.74 percent.

We next turn to evaluating the overall performance of the model. Since we do not have full knowledge of the appropriate long-run values for these driving variables, we fit the estimated equation to the actual values for these variables. The outcome is shown in Figure 14. The time plot shows that the model does a very good job in matching the long-run trend in the Irish real exchange rate. Moreover, if we focus on the most recent years, the model indicates that the Irish real exchange rate was undervalued during 1999-2001 (consistent with the euro depreciation during those years) — but that a degree of overvaluation had occurred by 2003. This characterisation accords with the conventional wisdom that volatility in the external value of the euro is the single biggest driver of cyclical fluctuations in the Irish competitive position. Although such simple numerical exercises carry a health warning, the model indicates that the Irish real exchange rate was 8.1 percent above its long-run equilibrium value in 2003.[23]

---

[22]Moreover, the analysis shows that there is only a single cointegrating vector among these variables. In addition, cointegration does not exist if the *GEMPRATIO* variable is excluded from the equation (even though its point estimate is not individually significant in the regression estimation). Finally, the unit root test actually suggest that the *RELPCQ* series is explosive (on account of Ireland's extraordinarily rapid progress in the world income distribution during the 1990s). However, we treat its growth rate as stationary, since general economic theory rules out an explosive path for relative output growth.

[23]This assumes that each of the regressors took their permanent value during 2003. However, since the trend component of each series is quite large, this may be a fairly

2. Future Prospects

As has been discussed in the previous subsection and also earlier in this report, it is clear that Ireland has experienced a sizeable decline in competitiveness since 2002. However, an offsetting factor is that the real exchange rate was plausibly "super-competitive" in the preceding years (especially during 1999-2001), such that the increase in relative wages and relative price levels mostly reflects an appropriate adjustment towards a more sustainable long-run output and employment growth rate. However, there are a number of considerations that may give rise to concern about the current level of competitiveness.

The biggest single external risk is that the recent dollar weakness could persist or even deepen into a yet larger dollar depreciation. In particular, reducing the US current account deficit from its present level of 5 percent of GDP to a more sustainable 2-3 percent level may require a further 30 percent decline in the trade-weighted value of the dollar. Although there are some prospects that this can be partly be accomplished through a revaluation of the major Asian currencies (in particular, revaluation of the Chinese currency), there remains a strong likelihood that the dollar-euro rate could further depreciate, even beyond the 1.50 mark. This would be associated with major shifts in the magnitude and direction of international capital flows (including FDI flows), disruption in international financial markets and a short-run relative contraction in US economic activity.

With respect to the UK, its external imbalance is not sufficiently large to suggest a motive for a fundamental shift in the euro-sterling rate. However, especially in view of their joint importance in the global financial system, reversals in US financial markets would likely lead to a weakening of sterling in tandem with dollar depreciation. Holding fixed this consideration, the euro-sterling bilateral rate will likely evolve according to relative business cycle conditions in the UK relative to the eurozone. In that regard, an asymmetric risk factor between the two monetary blocs is the possibility of a major house price crash in the UK, which would lead to an easing of UK interest rates and sterling depreciation. For Ireland, this scenario would also probably involve a knock-on decline in Irish house prices, leading to a double-whammy of a decline in external competitiveness plus a significant negative shock to domestic demand. Moreover, Ireland would not be rescued an interest rate decline under this scenario, since the scale of house price increases has not been of a similar order at the aggregate eurozone level.[24]

Turning to domestic factors, the scope for sustainable wage growth crucially depends on external developments — if, contrary to the scenarios just outlined, the external value of euro turns out to be self-correcting, then any recent overvaluation will be eliminated without requiring major adjustments to domestic wage levels. However, a sustained appreciation in the external value of euro would lead to a progressive deterioration in domestic activity levels and a downward correction in wage levels would be necessary in order to avoid a sharp fall in domestic private-sector employment. In a setting of low eurozone average inflation, such adjustment may actually require nominal wage cuts — the scenario of temporary price and wage deflation in Ireland is discussed in more detail by Lane (2003c). A positive feature, as was discussed earlier in the report, is that the vaunted flexibility of the Irish private-

---

innocuous assumption.

[24]However, other peripheral eurozone members (most notably, Spain and Portugal) have also experienced a considerable boom in the property market.

sector labour market makes Ireland well placed (relative to some of our eurozone partners) to cope with such adjustment challenges.

Finally, referring back to the conceptual framework described earlier in the report, some proportion of any overvaluation should be self-correcting through the gradual operation of international price arbitrage forces, new entry into business lines that have been enjoying super-normal profitability and occupational shifts in the labour force towards high-premium sectors. Indeed, consistent with the analysis in Honohan and Lane (2003) and Lane (2003c), deflationary forces in Ireland were quite marked during 2003. However, these forces operate at a gradual pace and should not be expected to quickly eliminate sizeable price gaps. Moreover, the long-run equilibrium relative price and wage levels for Ireland are heavily dependent on policy choices concerning competition and regulatory policies, infrastructural provision, the level of indirect taxation and the share of public employment in total employment.

5. Policy Issues

In this section, I first analyse the role of fiscal policy in maintaining competitiveness. Next, I turn to the role of public microeconomic policies. Finally, I discuss incomes policies and social partnership. Throughout, the focus is on establishing principles for competitiveness-enhancing policy processes.

1. Fiscal Policy

In the absence of an independent monetary policy, national fiscal policies potentially play a role in cyclical stabilisation. This is a potentially useful role in order to avoid the short-run overshooting dynamics in prices and wages that may require a costly subsequent adjustment phase in terms of lost output and employment. In the case of a temporary downturn in external or domestic demand, a counter-cyclical expansionary fiscal policy could obviate the need for a major real depreciation. However, the government's freedom of action may be constrained by the Growth and Stability Pact (GSP): especially in the event of a large negative shock, the 3% deficit limit may prove to be a binding constraint.[25] In this regard, it is useful to keep in mind that the swing in the US fiscal balance since 2000 has amounted to 6.1% of GDP (from a surplus of 2.4% in 2000 to a deficit in 2003 of 3.7%) and the scale of the fiscal stimulus required to boost aggregate demand is inversely related to the size of the economy: a similarly-effective policy in Ireland would require an even larger swing in the fiscal position. That said, the capacity for fiscal policy to act aggressively during a downturn is greatly facilitated by maintaining a low average public debt ratio, since any temporary deficit increase under those conditions would not lead to sustainability concerns or a rise in the country risk premium.

On the other side, the appropriate fiscal response to a temporary demand boom is to accumulate large surpluses. However, the political feasibility of this route is quite debatable — the stockpiling of large surpluses generates electoral pressures to cut taxes and/or increase public spending (Talvi and Vegh 2004). Indeed, Lane (2003d) shows that fiscal policy across OECD countries is more procyclical, the more volatile is the business cycle and the more 'populist' is the political system. That said, although such considerations place a quantitative limit to the extent to which fiscal policy can act counter-cyclically, it remains an important priority for national fiscal

---

[25]Although the GSP does permit larger deficits in the event of a major recession, this is not too helpfil if the goal is to avoid a recession in the first place!

authorities not to add to temporary boom conditions through actively-procyclical fiscal initiatives.

Another technical problem in demand management for a small open economy is that identifying the cyclical component in output movements is a non-trivial problem, especially if capital and labour are internationally mobile. Under these circumstances, the "production function" approach to calculating the sustainable level of output is subject to large errors, since the stocks of available capital and labour can shift quickly, through international factor flows. Moreover, the aggregate level of productivity is plausibly more subject to shocks in an open economy setting, since the locus of comparative advantage for a specialised economy may shift in response to external shocks. For instance, if an economy is heavily dependent on one or two industries, sector-specific technology shocks in those sectors and/or the emergence of alternative production locations for those firms will have macroeconomic implications. For such reasons, a successful decomposition of a shift in the level of activity between cyclical and trend factors is a highly challenging exercise. Indeed, the larger message is that policy formulation needs to recognise the high degree of uncertainty involved in any such decomposition.

Beyond this demand management role, fiscal policy also affects price and wage formation through a number of other channels. First, as has been extensively discussed earlier in this report, the aggregate levels of labour demand and pay settlements in the public sector has a knock-on impact on prices and wages in the business sector, especially in a full-employment environment.

Second, income tax policies influence the supply of labour – in this respect, for instance, tax individualisation would have helped to moderate wage growth, by increasing the participation rate. More generally, as emphasised by Alesina and Perotti (1997) and Lane and Perotti (2003), the labour tax wedge (i.e. the gap between the wage received by the employee and the cost to the employer) is an important determinant of overall labour costs, as is the replacement ratio (the ratio of unemployment benefit to wages). The general reduction in the labour tax burden in Ireland in recent years (even if stalled in the last two years) again has acted to moderate wage growth and the relatively low level of the labour tax wedge (especially compared to the major Continental European countries) represents a major competitive advantage for Ireland.

As was also discussed earlier in this report, a low tax rate on internationally-mobile capital has a broadly similar impact to an increase in tradables-sector productivity. As such, the Irish strategy of establishing a low corporation tax rate has facilitated wage growth by attracting high value-added activities to the Irish tradables sector. In symmetric fashion, a reversal in this strategy would require a real depreciation, involving a fall in wages and in the relative price of non-tradables, plus an associated decline in property prices.

The level of indirect taxation also obviously influences price and wage formation. While a hike in indirect taxes has an direct effect on the consumer price level, it also operates indirectly through its impact on pay claims. However, as assessment of the optimal level of indirect taxes cannot be taken in isolation, since any reduction in indirect tax revenues must be offset by competitiveness-reducing increases in direct taxation and/or some combination of rising public debt and contraction in public expenditure.

Despite these substantial advantages of fiscal restraint, a low-tax low-spend fiscal strategy is in fact not optimal in terms of maximising competitiveness. In particular, the provision of infrastructure such as an enhanced transport network increases

economy-wide productivity levels. Importantly, an efficient set of international transportation links is vital in minimising trade costs – thereby facilitating increased competition and international price arbitrage. Public support of human capital accumulation is also productivity-enhancing. It should also be recognised that the development of public amenities is also important — migration choices are heavily influenced by "quality of life" considerations such as good-quality and accessible public amenities and public services (Glaeser et al 2000, Rappaport 2004). Of course, especially during periods of rapid economic growth, there are some timing issues involved in determining the appropriate speed of infrastructural investment — if the level of public investment jumps too quickly, efficiency may be lost and the costs of acquiring scarce factors will increase at a convex rate. As highlighted by Lane (2003e), this problem was evident in Ireland in recent years, with the ramping up of public investment associated with a 92 percent increase in the construction price deflator during 1996-2002 (the EU average was just 28 percent during the same period).

Accordingly, striking the correct balance between fiscal moderation and the adequate provision of public goods is a central task in sustaining long-run competitiveness. A key issue here is reforming practices in public current and capital expenditure and procurement in order to maximise "value for money" in public sector: as is reviewed by Lane (2003b), the recent OECD (2003) report specifies a number of important public sector reforms in this respect. Moreover, continuing reform of the tax system (e.g. a broadening of the tax base through the introduction of carbon and property taxes and the elimination of various tax relief schemes) also helps to ameliorate the conflict between low tax rates and high public spending. Finally, of course, it remains a legitimate political choice to shift the balance between private and public spending, if the electorate chooses a higher volume of publicly-provided goods and services, even if this is at the cost of slower overall output growth – the level of competitiveness is the not only criterion in formulating fiscal policy.

2. Public Microeconomic Policies

A critical policy question is whether there are barriers to entry in any of these stages in the distribution process that not only serve to increase the long-run price level but also slow down the pace of adjustment to temporary price deviations. In this context, microeconomic policy initiatives are potentially helpful in reducing the overall price level and enhancing the effectiveness of international price arbitrage in limiting price gaps. As recently surveyed by Walsh (2004), it is widely accepted that policy reforms have contributed to a high degree of flexibility in the private-sector labour market in Ireland, which has facilitated the rapid structural change in Irish industry. With respect to product markets, the pro-consumer sentiment embodied in the newly-released *Better Regulation* White Paper is encouraging in this regard, as is the promise of a vigorous competition policy. Indeed, the *Sustaining Progress: Social Partnership Agreement 2003-2005* document recognises a broad array of microeconomic initiatives that would act to reduce the price level and reduce barriers to international price arbitrage.[26] The level of competition in the import and distribution sectors may also be worth examining, in view of the key roles played by these sectors in determining the overall level of retail prices. Related to this point,

---

[26]Cassidy (2004) also details other reforms — such as improving efficiency in the financial sector – that may foster faster productivity growth.

better information on the scale of trade and distribution costs for Irish industry would be very helpful. In addition to these "market structure" policies, public microeconomic policies are undoubtedly important in determining the overall level of productivity growth in the economy. Policies on R&D, innovation and encouraging entrepreneurial activity all have the potential to deliver faster incomes growth — although, each specific policy of course must pass rigorous cost-benefit analysis.[27]

Returning to the labour market, a critical issue is the establishment of a comprehensive immigration policy. While all EU citizens now have the right to work in the Irish labour market, a strategy for dealing with non-EU immigrants remains to be fully developed. Here, there are conflicting policy objectives — a reduction in the barriers to immigration engenders wage moderation for affected occupations and allows faster economic growth. However, existing residents potentially suffer two types of costs – for those in direct competition with the immigrants, income growth is potentially negatively affected.[28] Second, especially in the short-run, a surge in immigration places upward pressure on property prices and adds to congestion in the consumption of public services and infrastructure.

Finally, although trade policy is determined at a European level, much can be done through microeconomic policies to drive down the cost of international trade that is central to the competitiveness of a small economy. On the trade policy front, Ireland is more involved in extra-European trade than most other EU members: our position on WTO negotiations should in part be informed by the implications of EU trade policy for Irish competitiveness and the domestic price level. To take one example, a reduction in European agricultural protectionism promises to reduce food prices, which remain a very substantial component of the aggregate consumer price level. Moreover, in addition to reducing formal trade barriers, trade facilitation initiatives are again also potentially important in minimizing deviations between domestic and international prices for tradables.

3. Incomes Policy and Social Partnership

With respect to incomes policy, it is commonly agreed that social partnership was central in correcting the lack of competitiveness in the late 1980s: can it perform the same function now, in view of the radical change in the structure of the labour market? In particular, a central concern is that economy-wide wage discipline is difficult to achieve in a full-employment environment and that a shift in the fiscal position means that income tax reductions can no longer be used as a carrot for wage moderation.

However, the potential for an economy-wide pay agreement to act as an alternative adjustment mechanism remains seductive, especially with the loss of an independent exchange rate policy under EMU. Of course, any such agreement must contain sufficient flexibility to allow for variation in sectoral circumstances, with the economy-wide common component being determined on the basis of macroeconomic considerations. The success and durability of the social partnership system since 1987 means that Ireland has the opportunity to develop such an adjustment mechanism that

---

[27]Of course, some pro-competitive reforms may paradoxically place upward pressure on prices in the short-run – for instance, if consumer subsidies must be eliminated in order to attract new entrants into a sector.

[28]Of course, consumers of the services produced by immigrants enjoy the benefits of lower prices.

offers substantial potential advantages over an uncoordinated, staggered less-centralised wage setting system. Moreover, the social partnership institutional framework is a potentially valuable resource the event of a large negative economic shock, in that an "emergency" reform package may be more easily negotiated through consensus rather than via a conflict-based war of attrition among competing interest groups.[29]

However, the absence of an independent exchange rate policy means that a useful social partnership agreement should have two key characteristics. First, fixed nominal wage increases over a multi-year horizon is not likely to be compatible with macroeconomic flexibility, in that it does not facilitate rapid adjustment to shifts in the domestic or external economic environment. Of course, there is a general reluctance to condition pay awards on indicators that are potentially open to manipulation or that are endogenous to the level of domestic wages. However, it is quite feasible to identify key external indicators that could be employed as "truly exogenous" variables that might proxy for major shifts in the external environment. One indicator could be a weighted index of economic growth in our major trading partners. For Ireland, an obvious indicator is the external value of the euro vis-a-vis the dollar and sterling, since there is broad agreement that fluctuations in these bilateral rates are the dominant external sources of shifts in the Irish competitive position. While it is true that the renegotiation of agreements is an alternative to such indexing schemes, such renegotiation is potentially arduous and lacks the "automatic stabiliser" characteristic of an indexing scheme. Although the previous social partnership agreement was re-opened in 2000 in response to unexpectedly-high CPI inflation, it is debatable whether such agility could be so easily achieved in the event of a reduction in relative wages being required.

Second, as was discussed earlier in this section, macroeconomic stabilization is also enhanced by a flexible fiscal policy that counter-cyclically responds to aggregate demand shocks. This implies that the fiscal commitments specified in a social partnership agreement must necessarily be conditional on the prevailing macroeconomic environment, rather than rigidly determining the aggregate fiscal position. However, on the fiscal front, it should also be appreciated that a centralised bargaining system can also limit the loss of competitiveness emanating from various types of tax increases.[30] To the extent that these tax increases are accepted as required to improve public services, union representatives may agree to internalise these benefits rather than seeking full compensation through offsetting wage growth (see also Alesina and Perotti 1997).

With respect to the non-pay dimension, social partnership may also be potentially useful in establishing a consensus behind the delivery of pro-consumer policy reforms. However, an alternative scenario is that a desire for consensus enables individual groups to block widely-beneficial reforms that adversely affect particular sectoral interests. As such, the challenge for the various actors involved in the social partnership process is to demonstrate that it is a progressive force, rather than acting

---

[29]It should be recognised that flexibility could also be attained by shifting towards a radically-decentralised labour market. This would require unions to seek firm-by-firm pay settlements. In the public sector, under decentralisation, pay agreements would also have to vary by a much wider margin by occupation and by region.

[30]The same argument also applies in the context of some microeconomic reforms that promise to deliver long-run consumer benefits but that may raise prices in the near term.

as an obstacle to structural change.

6. Conclusions

In this report, we have critically evaluated the recent evolution of the price and wage competitiveness of the Irish economy. Overall, Ireland continues to maintain a remarkable economic profile, with continuing employment growth and very low unemployment indicating that the current level of competitiveness cannot be described as substantially overvalued.

However, it is also the case that Ireland is at an inflection point in terms of its growth profile: going forward, the external pressures on our competitive position are considerable. In addition to the potential threat from the accession countries in terms of attracting FDI flows, there is a strong likelihood that the dollar will weaken even further, possibly accompanied by a prolonged slowdown in the pace of US economic growth. With respect to our other main trading partner, the risk of a housing crash in the UK carries special resonance, since it is likely that this would also trigger a revision in expectations concerning the domestic housing market.

With respect to domestic factors, we have already witnessed a substantial decline in inflation, in response to the euro appreciation and the deceleration in the domestic non-tradables sector. Since appreciation in the external value of the euro disproportionately reduces Irish inflation relative to our eurozone partners, Ireland's status as among the most expensive consumer locations in Europe will be partly remedied through this channel. However, the goal of maximising purchasing power over the longer-run more heavily depends on the elimination of sectoral barriers to entry and the minimisation of trade, transportation and distribution costs.

In the absence of a major turnaround in the value of the euro, inflation is likely to remain relatively low (or at least comparable to our eurozone partners) over the medium term. The private sector has demonstrated considerable job-preserving flexibility in wage behaviour in recent years in terms of responding to sector-specific shocks. At an economy-wide level, the two biggest risks in terms of pay settlements are the extrapolation of the wage growth during recent years (which could be justified as a catch-up process) and a failure to incorporate contingencies in pay agreements that take into account the risk of major shifts in the external economic environment. However, especially in a full-employment environment, general competitiveness is also adversely affected by excessive employment or wage growth in the public sector: there is a trade-off between private and public sector levels of activity that should be incorporated into the calculus over the appropriate fiscal strategy.

References

[1]   Alesina, Alberto and Roberto Perotti (1997), "The Welfare State and Competitivenesss," *American Economic Review*, 87, 921-939.
[2]   Anderson, James and Eric van Wincoop (2004), "Trade Costs," *Journal of Economic Literature*, forthcoming.
[3]   Andres, Javier, Eva Ortega and Javier Valles (2003), "Market Structure and Inflation Differentials in the European Monetary Union," *Documento de Trabajo No. 0301*, Bank of Spain.
[4]   Balassa, Bela (1964), "The Purchasing Power Parity Doctrine: A Reappraisal," Journal of Political Economy, 72, 584-596.
[5]   Blanchard, Olivier (1997), "The Medium-Run," *Brookings Papers on Economic*

Activity,.

[6] Boyle, Gerry, Rory McElligott and Jim O'Leary (2004), "Public-Private Wage Differentials in Ireland, 1994-2000," *mimeo*, NUI-Maynooth.

[7] Casey, Barra (2004), "An Economy-Wide Perspective on Earnings Data in Ireland," *ESRI Quarterly Economic Bulletin*, Spring.

[8] Cassidy, Mark (2004), "Productivity in Ireland: Trends and Issues," *Central Bank Quarterly Bulletin*, Spring.

[9] Crucini, Mario, Chris Telmer and Marios Zachariadis (2001), "Understanding European Real Exchange Rates," *mimeo*, Vanderbilt University

[10] Dornbusch, Rudiger (1976), "Exchange Rate Dynamics," *Journal of Political Economy*.

[11] Engel, Charles (2002), "The Responsiveness of Consumer Prices to Exchange Rates: A Synthesis of Some New Open-Economy Macro Models,"The Manchester School.

[12] Engel, Charles and John Rogers (2004), "European Product Market Integration after the Euro," *Economic Policy*, forthcoming.

[13] Fitzgerald, John (2004), "Lessons from 20 Years of Cohesion," *mimeo*, Economic and Social Research Institute.

[14] Harberger, Arnold (2004), "The Real Exchange Rate: Issues of Concept and Measurement," *mimeo*, UCLA.

[15] Honohan, Patrick and Philip R. Lane (2003), "Divergent Inflation Rates under EMU," *Economic Policy*, 37, .

[16] Honohan, Patrick and Brendan Walsh (2002), "Catching Up With the Leaders: The Irish Hare," *Brookings Papers on Economic Activity*, 2002(1), 1-77 .

[17] Lane, Philip R. (2000), "Disinflation, Switching Nominal Anchors and Twin Crises: The Irish Experience," *Journal of Policy Reform*, 3, 301-326.

[18] Lane, Philip R. (2003a), "Financial Globalisation and the Irish Economy," *ESRI Quarterly Economic Commentary*, Spring, XXX.

[19] Lane, Philip R. (2003b), "Assessing Ireland's Fiscal Strategy: Recent Experiments and Future Plans," in T. Callan, D. McCoy, A. Doris (eds) *Budget Perspectives 2004*, Economic and Social Research Institute: Dublin, XXX.

[20] Lane, Philip R. (2003c), "Ireland and the Deflation Debate," *Irish Banking Review*, Winter.

[21] Lane, Philip R. (2003d), "Fiscal Cyclicality in the OECD," *Journal of Public Economics*, 87, 2661-2675.

[22] Lane, Philip R. and Gian Maria Milesi-Ferretti (2002a), "External Wealth, the Trade Balance and the Real Exchange Rate," *European Economic Review*, 46, 1049-1071.

[23] Lane, Philip R. and Gian Maria Milesi-Ferretti (2002b), "Long-Run Determinants of the Irish Real Exchange Rate," *Applied Economics*, 34, 549-553.

[24] Lane, Philip R. and Gian Maria Milesi-Ferretti (2004), "The Transfer Problem Revisited: Net Foreign Assets and Long-Run Real Exchange Rates," *Review of Economics and Statistics*, forthcoming.

[25] Lane, Philip R. and Roberto Perotti (2003), "On the Importance of the Composition of Fiscal Policy: Evidence from Different Exchange Rate Regimes," *Journal of Public Economics*, 87, 2253–2279.

[26] Morshed, AKM Mahbub and Steven Turnovsky (2004), "Sectoral Adjustment Costs and Real Exchange Rate Dynamics in a Two-Sector Dependent Economy," *Journal of International Economics*, 63, 147-177.

[27] OECD (2003), Economic Survey: Ireland, Paris: OECD.

[28]   Obstfeld, Maurice and Kenneth Rogoff (2001), "The Six Major Puzzles in International Macroeconomics," *NBER Macroeconomics Annual*, 15.

[29] Ortega, Eva (2003), "Persistent Inflation Differentials in Europe," *Documento de Trabajo No. 0305*, Bank of Spain.

[30] Rappaport, Jordan (2004), "Moving to Nice Weather," *mimeo*, Federal Reserve Bank of Kansas City.

[31]   Samuelson, Paul (1964), "Theoretical Notes on Trade Problems," *Review of Economics and Statistics*, 46, 145-164.

[32]   Talvi, Ernesto and Carlos Vegh (2004), "Tax Base Volatility and Fiscal Cyclicality," *Journal of Development Economics*, forthcoming.

[33] Taylor, Alan and Mark Taylor (2004), "The Purchasing Power Parity Debate," *Journal of Economic Perspectives*, forthcoming.

[34]   Walsh, Brendan (2004), "The Transformation of the Irish Labour Market," *mimeo*, University College Dublin.

Table 1. Real Exchange Rate Movements, 1998.4-2004.1

	1998.4 -2000.4	2000.4 2004.1
RERPC	-0.08	0.24
RERPGDP	-0.07	0.21
RERPX	-0.07	0.12
RERULC	-0.11	0.21
RERULCM	-0.19	-0.04

Source: Author's calculations, based on data from European Commission's Competitiveness database. All measured vis-à-vis the IC24 group. RERPC, RERPGDP, RERPX, RERULC, RERULCM are respectively based on the deflators: CPI; GDP; Exports; ULC; ULC (manu.).

Table 2. Changes in Eurozone Competitiveness, 2002.Q1 - 2004.Q1

	Total	Intra-euro	Extra-euro	Euro. Trade
[Euro Real EER]	-	-	21.3	
Belgium	5.9	-1	19.5	64.4
Germany	7.3	-2.2	19	53.2
Greece	8.3	2.7	23	69.6
Spain	8.5	2.1	24.5	68.9
France	8.8	0.6	22.9	60.9
Ireland	16.2	3.5	24.7	38.8
Italy	9.7	1.5	23.7	61
Luxembourg	7.1	2.5	25.4	78
Netherlands	8.6	0.8	21.3	60.1
Austria	4.6	0	18.5	74.4
Portugal	6.7	2	20.6	73.8
Finland	7.3	-1.2	15.2	46.6

A negative (positive) number signifies an increase (decrease) in price competitiveness. Intra-euro and Extra-euro refer to the changes in competitiveness vis-à-vis eurozone and non-eurozone trading partners. Total gives the overall change in national competitiveness indicators. Euro. Trade is the share of intra-eurozone trade in a country's total trade. Source: Derived from ECB Monthly Bulletin, May 2004.

Table 3. Geographical Trade Shares, 2003-2004

	Imports	Exports
Total EU-15	56.9	60.4
UK	30.4	17.9
France	4.1	6.0
Germany	8.0	7.7
NON-EU	43.1	39.6
China	4.6	0.6
Japan	4.2	2.5
USA	14.1	21.0
Total	100.0	100.0

Author's calculations, based on CSO data.

Table 4. End Uses for Imports, 1973-2003

	Capital Goods	Consumption	Intermediates
1980	13.80	25.39	60.55
1981	13.83	26.46	59.50
1982	13.84	26.22	59.74
1983	12.73	25.46	61.64
1984	12.17	23.54	64.18
1985	11.93	24.58	63.17
1986	12.21	27.09	60.51
1987	12.44	26.40	60.69
1988	12.11	27.21	59.91
1989	13.45	25.96	59.95
1990	13.43	26.98	59.00
1991	11.98	28.19	59.20
1992	10.79	28.18	60.46
1993	9.34	23.56	59.91
1994	9.86	22.56	60.82
1995	9.97	20.36	63.49
1996	10.67	21.32	62.19
1997	11.67	21.43	61.95
1998	13.03	20.84	61.12
1999	14.69	21.18	59.15
2000	14.43	20.54	60.91
2001	13.13	21.69	61.50
2002	12.74	22.94	60.70
2003	12.01	26.32	57.67

Source: Author's calculations, based on CSO data.

Table 5. Sectoral Earnings Data, 1998.1-2003.3

	1998.1 -2003.3
Hi-Tech	0.33
Other Manuf.	0.47
Construction	0.57
Distribution	0.55
Trans and Comm.	0.29
Hotels;Restaurants	0.39
Other Market Services	0.35
Non-Market Services	0.35
Aggregate	0.42

Source: Author's calculations, based on data from Casey (2004).

Table 6. Eurozone Nominal Wage Growth, 1998-2003

Austria	11.0
Belgium	16.5
France	13.6
Germany	8.7
Italy	15.0
Luxembourg	19.2
Netherlands	25.1
Finland	16.9
Greece	37.0
Ireland	37.1
Portugal	27.1
Spain	19.5

Growth in nominal compensation per employee, 1988-2003. Source: Author's calculations based on data from AMECO database.

Table 7. Current Account to GNP ratio

Year	CA/GNP
1998	0.92
1999	0.29
2000	-0.43
2001	-0.78
2002	-0.92
2003	-2.42

Author's calculations, based on CSO data.

Table 8. Real Wages: Ireland and the Accession Countries, 1995-2003

	Ireland	Czech	Slovak	Estonia	Latvia	Hungary	Lithuania	Slovenia	Poland
1995	100	100	100	100	100	100	100	100	100
1996	101.4	107.0	101.4	100.7	109.6	99.2	109.8	100.1	108.1
1997	101.6	106.2	110.5	108.3	115.2	101.1	121.4	103.1	114.4
1998	100.5	104.3	114.9	114.0	116.6	102.3	135.0	104.5	118.7
1999	101.8	108.2	116.5	125.3	119.1	99.0	144.4	107.9	125.6
2000	105.6	113.9	120.8	128.9	121.7	104.4	139.9	117.5	127.6
2001	109.5	115.0	122.1	131.7	126.2	111.3	144.4	120.1	138.8
2002	109.3	119.3	131.6	135.0	129.8	118.4	147.4	122.8	143.3
2003	113.1	124.5	132.4	144.7	134.7	126.1	154.1	124.2	146.8

Author's calculations, based on real compensation per employee (GDP deflator) series from AMECO database.

Table 9. Real Appreciation vis-à-vis the EU, 1998.4 to 2004.1

	RER:APP
Ireland	8.3
Slovakia	27.7
Estonia	13.5
Latvia	6.5
Hungary	33.7
Lithuania	23.4
Slovenia	-0.7
Poland	-9.7

RER:APP is cumulative real appreciation of each country's real exchange rate (GDP deflators) vis-à-vis the EU over 1998.4 to 2004.1. Source: Author's calculations, based on data from European Commission's Competitiveness Database.

Table 10. Unit Root and Cointegration Tests

	Unit Root (Dickey-Fuller)
Log(RER)	-0.74
Log(PCQDIFF)	1.31
Log(TT)	-1.19
GEMPRATIO	-0.97
	Cointegration (Johansen)
Eigenvalue	0.802
Trace	59.51***
Max-Eigen	34.02***

Source: Author's calculations, based on CSO data. *** denotes significance at the 1 percent level.

Table 11. Estimated Cointegration Equation

Constant	4.53
	(39.2)***
Log(PCQDIFF)	0.41
	(3.05)***
Log(TT)	1.46
	(6.84)***
GEMPRATIO	0.87
	(0.88)
Adj. R^2	0.64

Source: Author's calculations, based on CSO data. *** denotes significance at the 1 percent level.
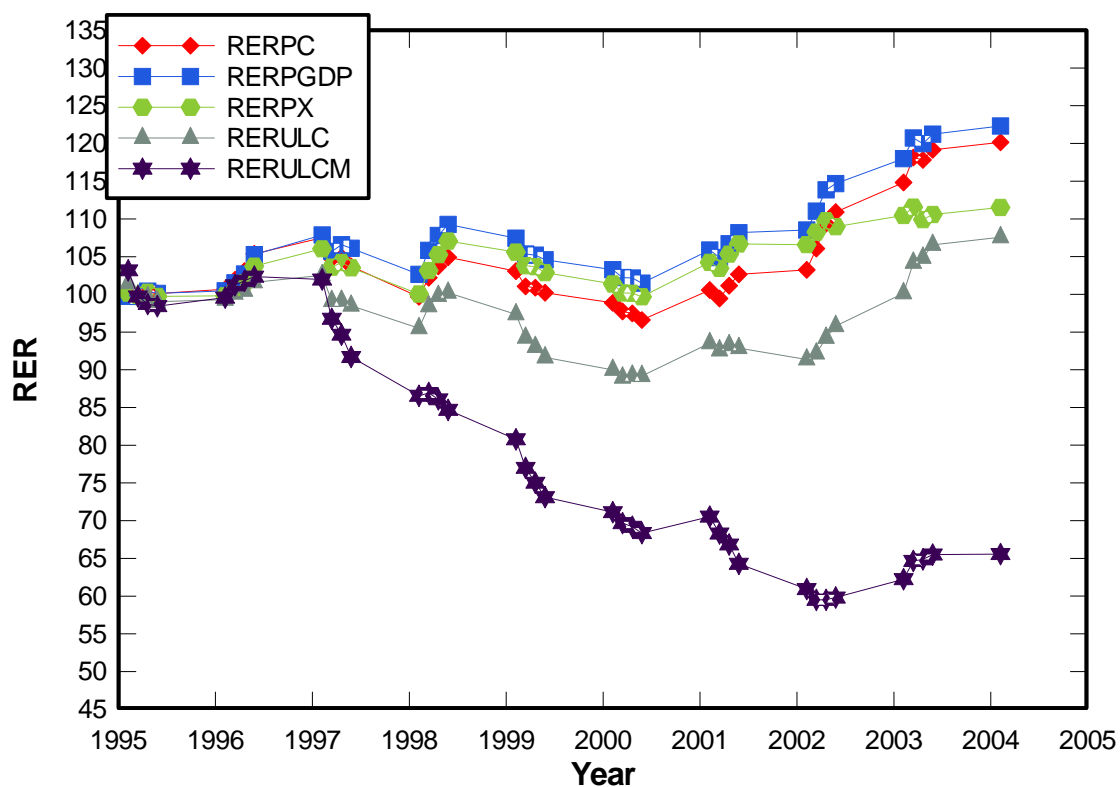
Figure 1. Real Exchange Rate Indices, 1995.1-2004.1. Source: Author's calculations, based on data from European Commission's Competitiveness Database. All measured vis-à-vis IC24 group. RERPC, RERPGDP, RERPX, RERULC, RERULCM are\ respectively based on the deflators: CPI; GDP; Exports; ULC; ULC (manu.).
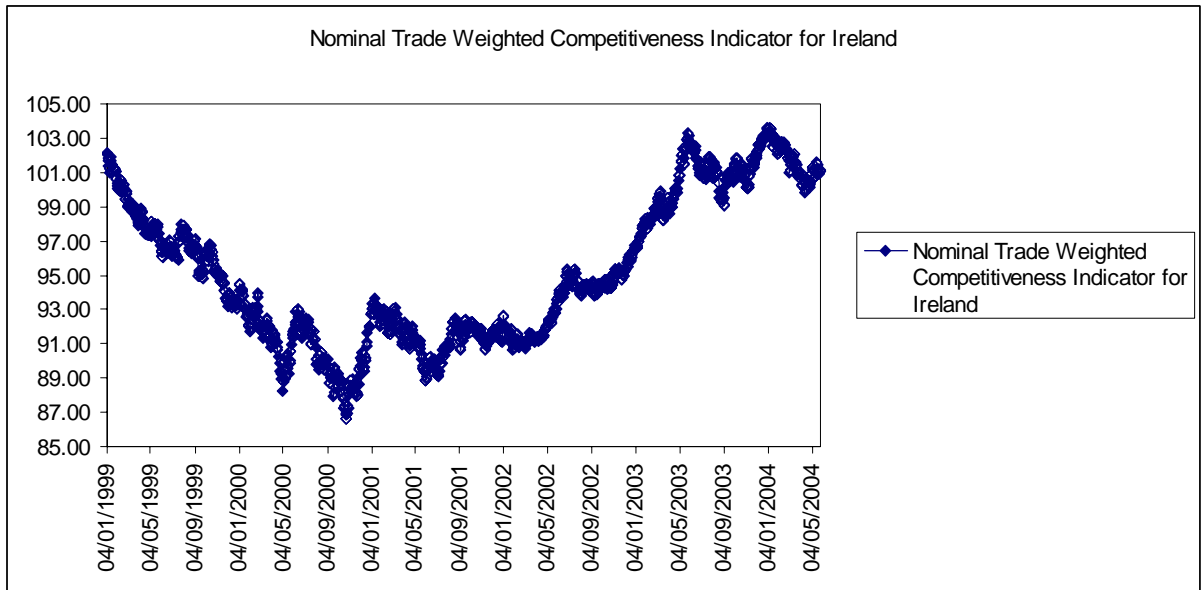
Figure 2. Nominal Trade-Weighted Competitiveness Index, 1999-2004. Source:
Central Bank of Ireland.
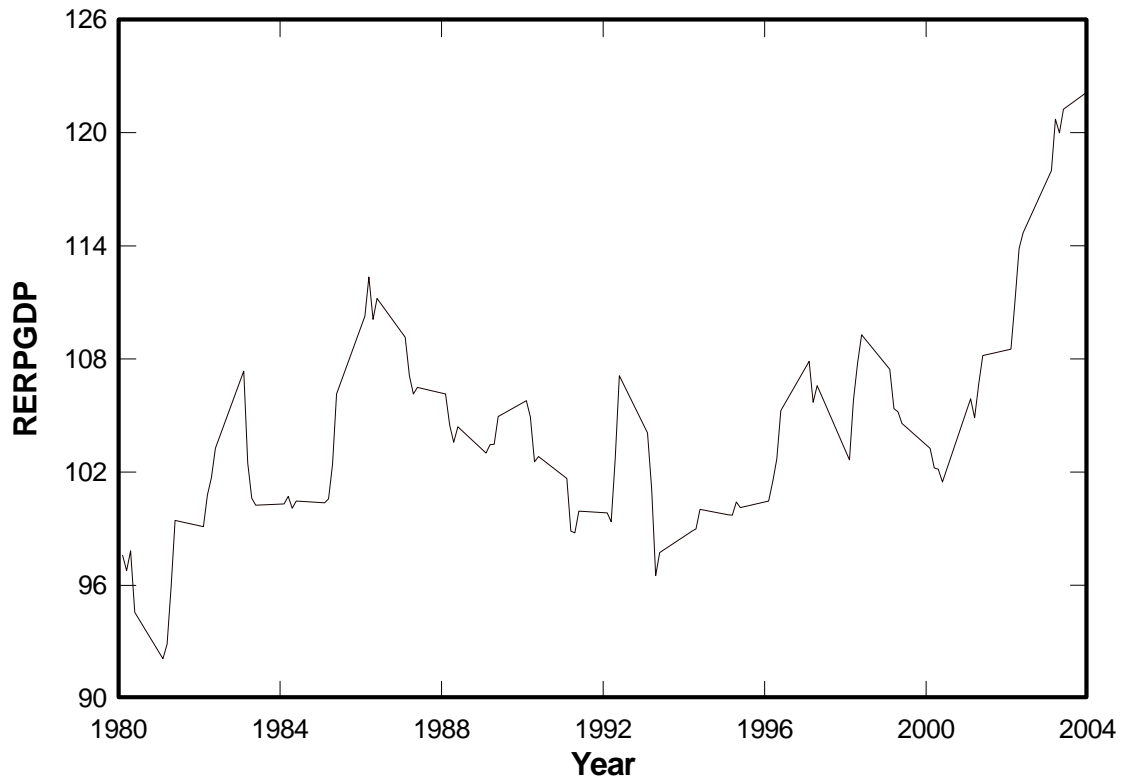
Figure 3. Real Exchange Rate, 1980.1 to 2004.1. Source: Author's calculations, based on data from European Commission's Competitiveness database. RER based on GDP deflators.
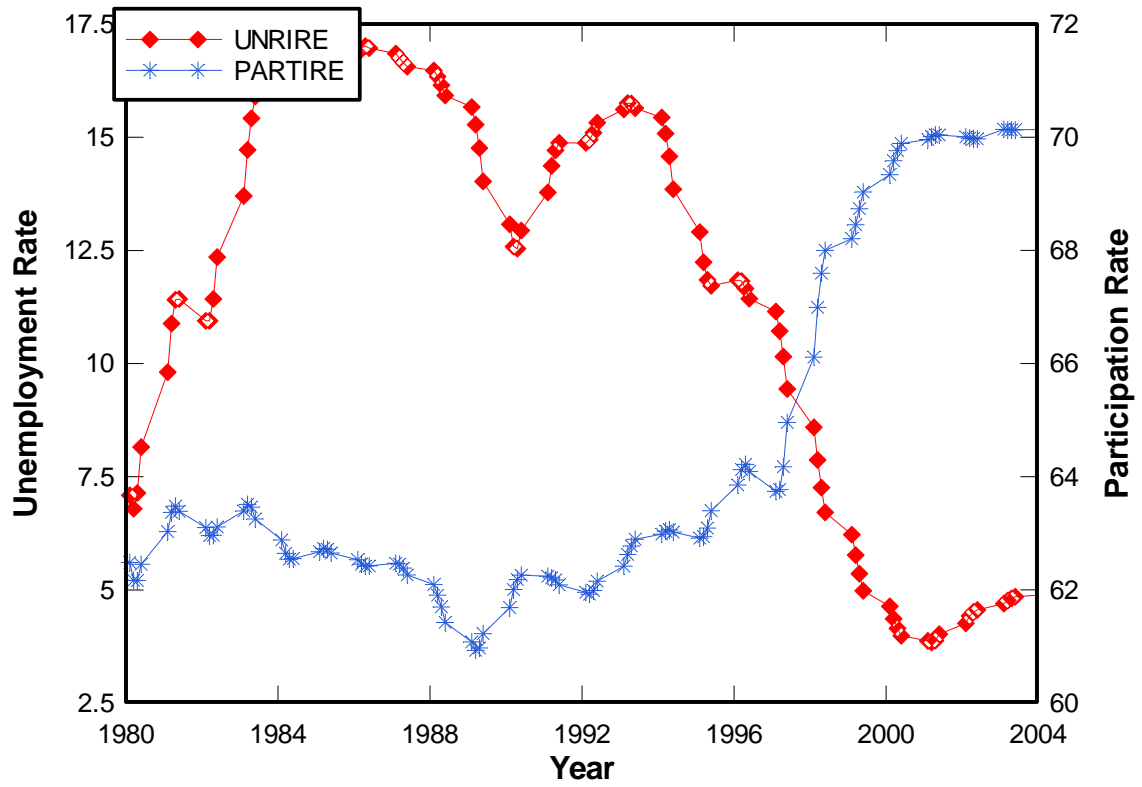
Figure 4. Labour Market Conditions, 1980.1-2004.1. Left-Axis: Unemployment Rate. Right-Axis: Participation Rate. Source: OECD Economic Outlook database.
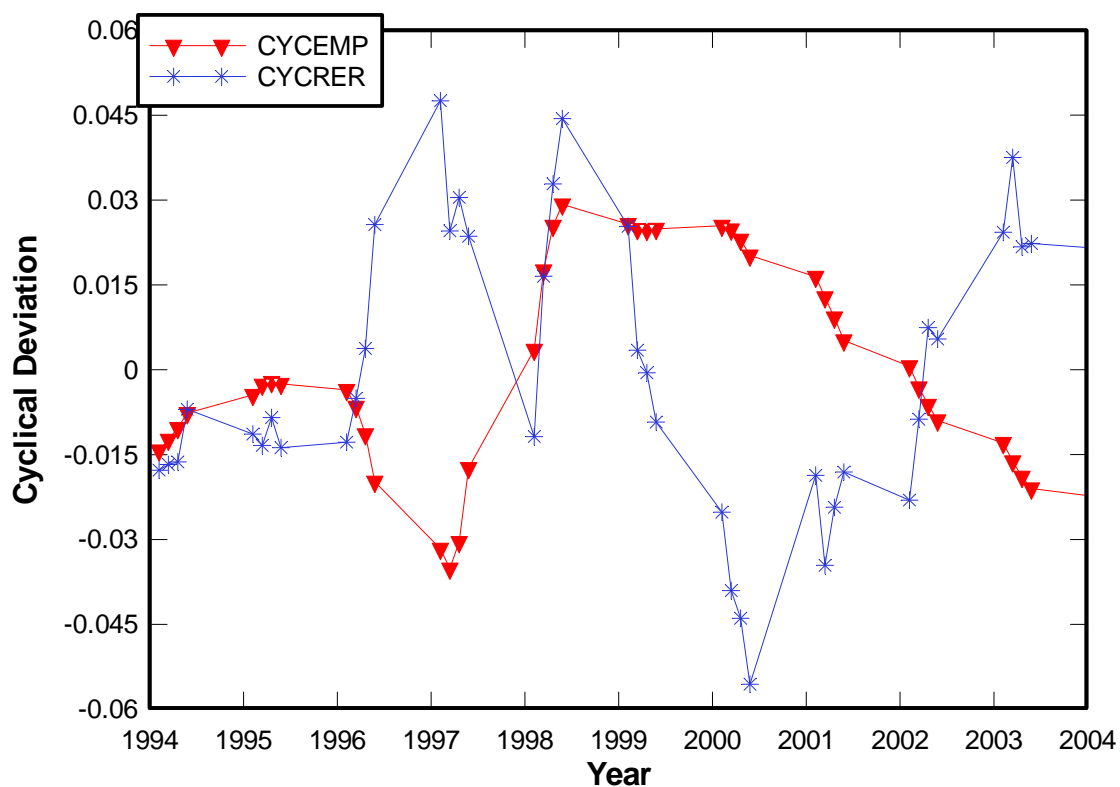
Figure 5. Cycles in Employment and the Real Exchange Rate, 1994.1-2004.1.
HPF-filtered data, with filter applied to 1980.1-2004.1. Correlation between
the two series is -0.42. Source: Author's calculations. RER is based on GDP
deflators. Employment is total business-sector employment, taken from OECD
Economic Outlook Database.
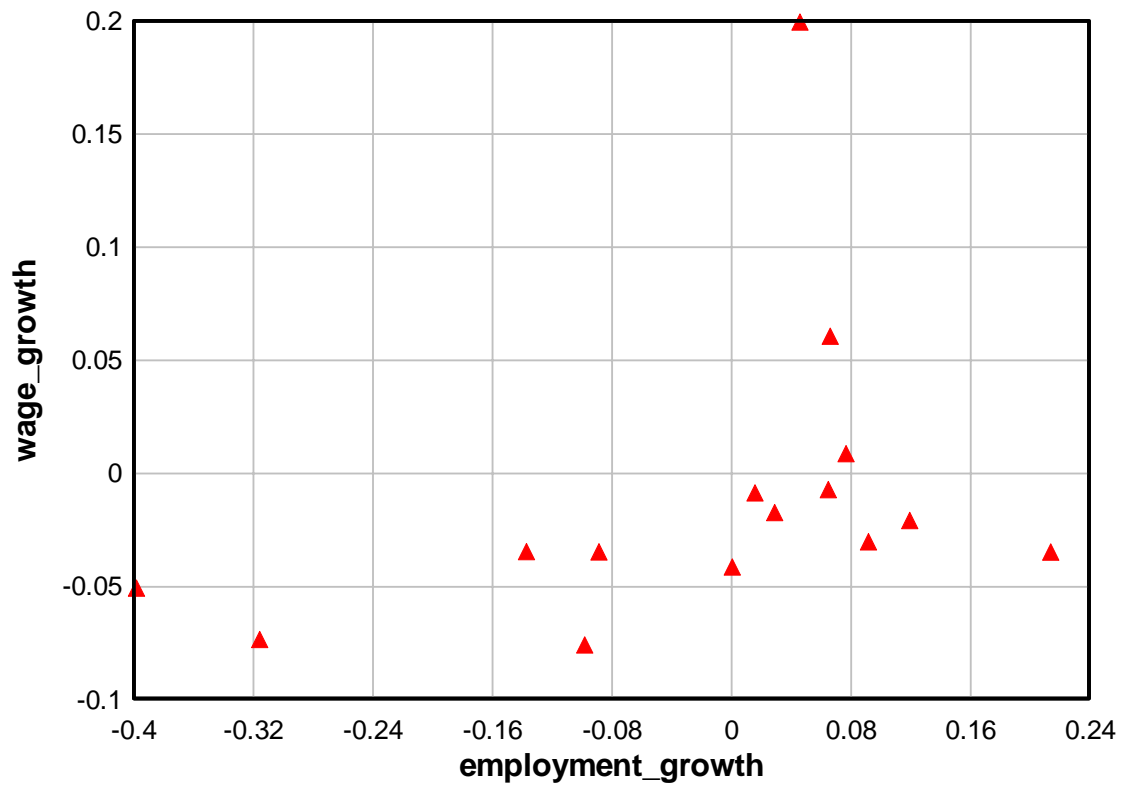
Figure 6. Scatter of Sectoral Wage Growth on Sectoral Employment Growth, 2000.Q4 to 2003.Q4. Source: Author's calculations, based on CSO data.
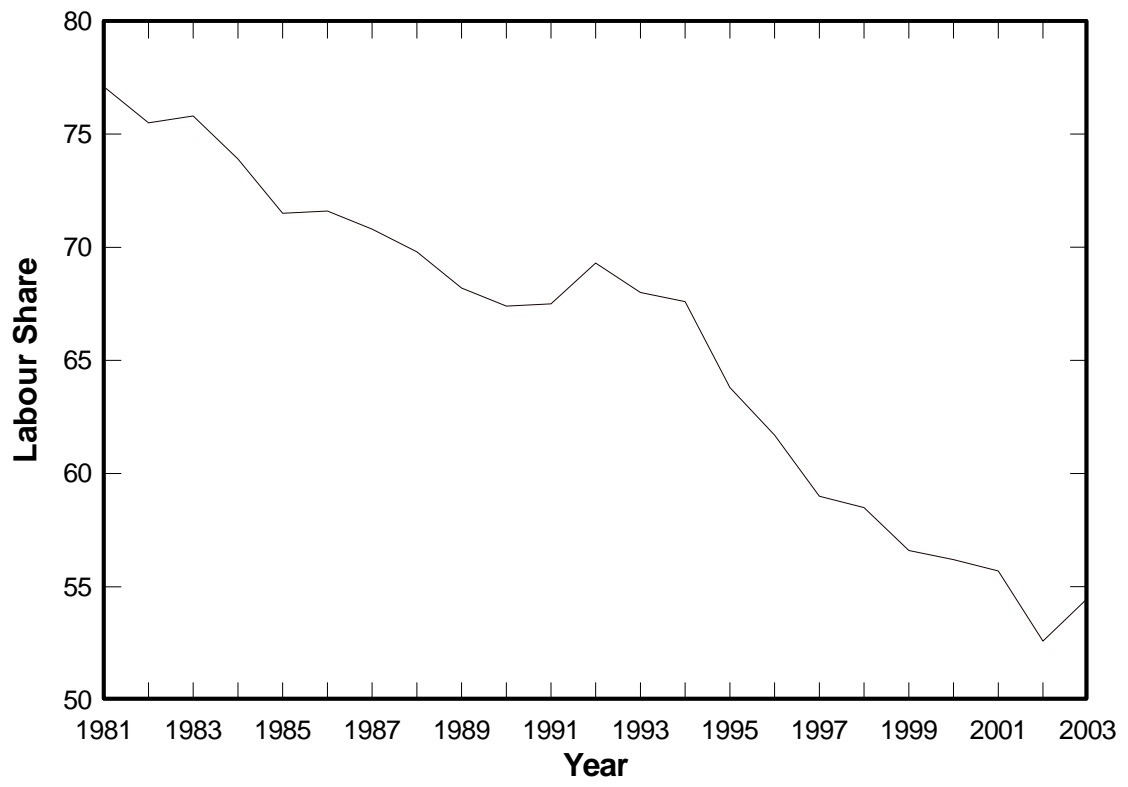
Figure 7. Labour Share, 1981-2003. Source: Author's calculations, based on data from EU Economy Review 2003.
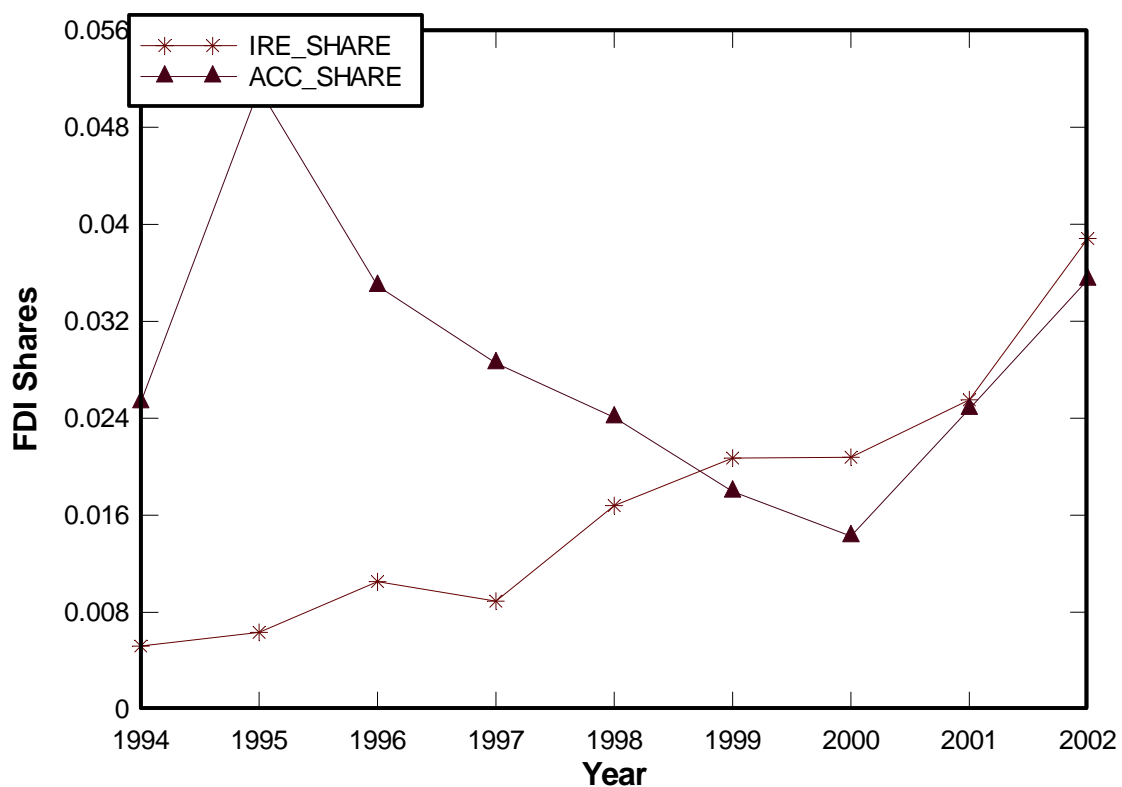
Figure 8. OECD FDI Shares: Ireland and the Accession Countries,
1994-2002. Source: OECD FDI database. FDI inflows to accession countries
measured as the sum of inflows to the Czech Republic, Hungary, Poland and
the Slovak Republic.
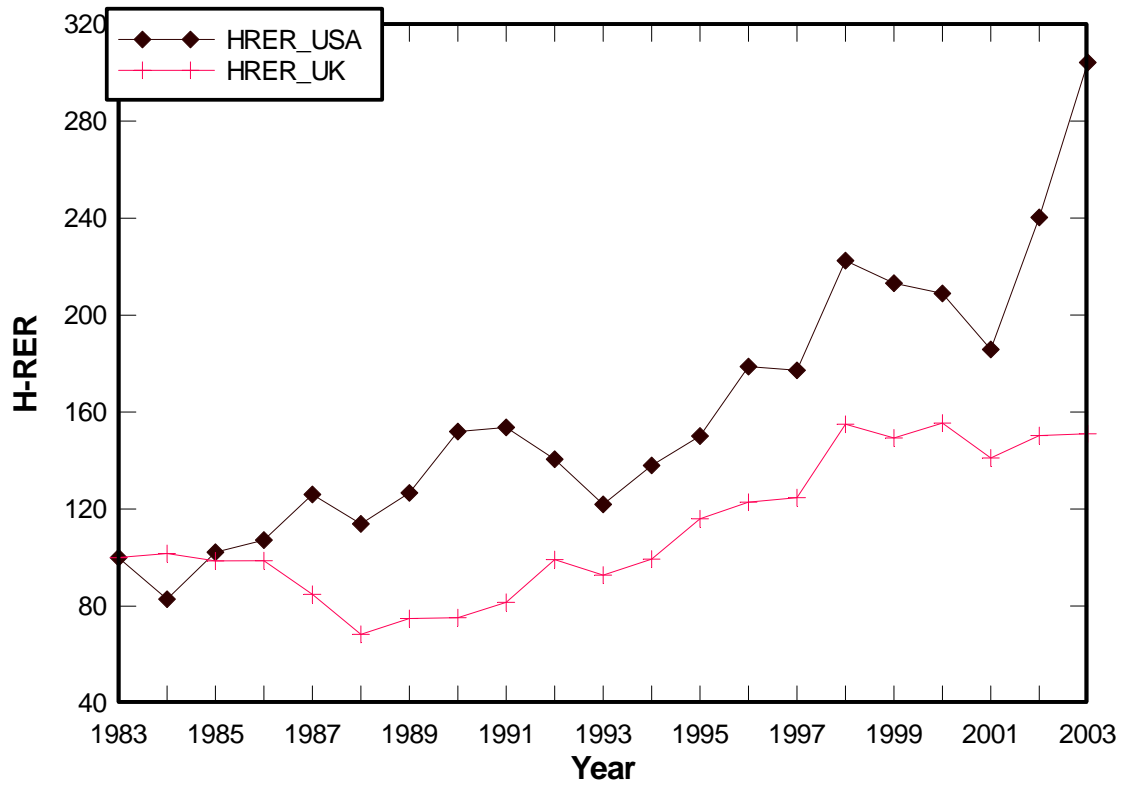
Figure 9. Relative Housing Prices, 1983-2003. Source: Author's calculations.
HRER is ratio of real housing prices in Ireland versus USA and UK, expressed
in a common currency. Housing price index data from ESRI/Irish Permanent
(Ireland), HBOS (UK) and OFHEO (USA).
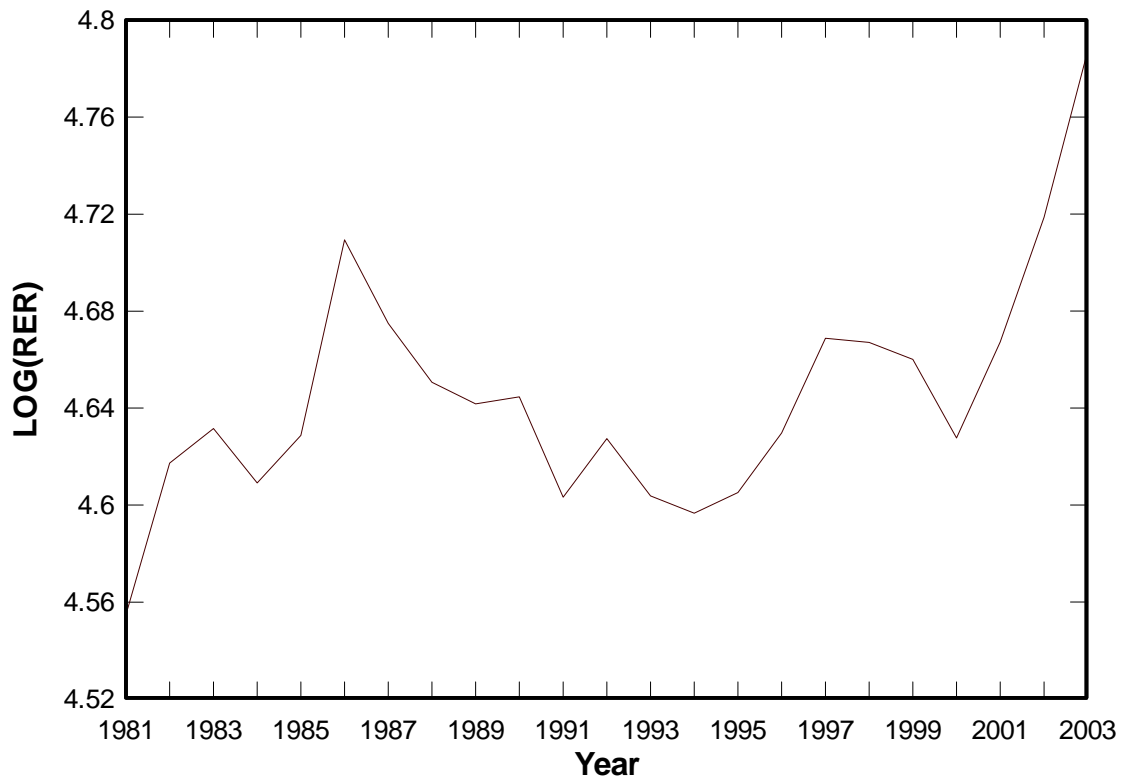
Figure 10. Relative output per capita, 1981-2003. Source: Author's calculations, based on data from OECD Economic Outlook. "Rest of world" represented by Ireland's largest trading partners.
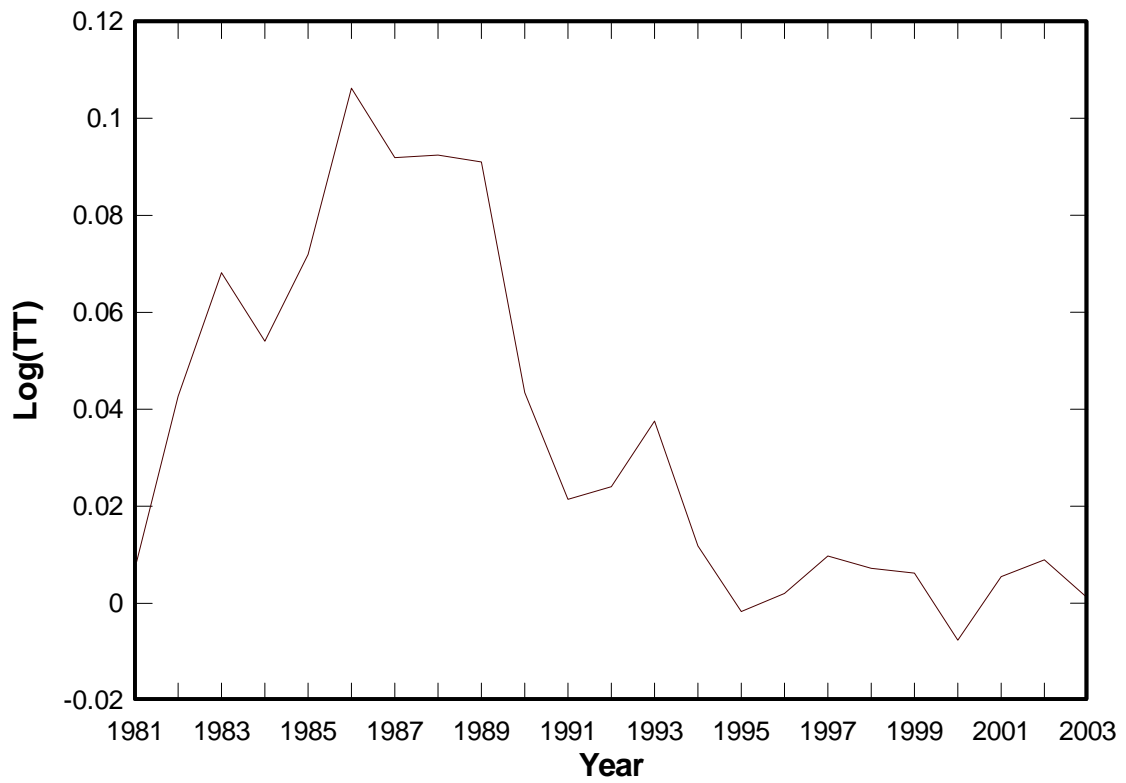
Figure 11. Terms of Trade, 1981-2003. Source: Author's calculations, based
on data from OECD Economic Outlook database. Terms of trade defined as ratio
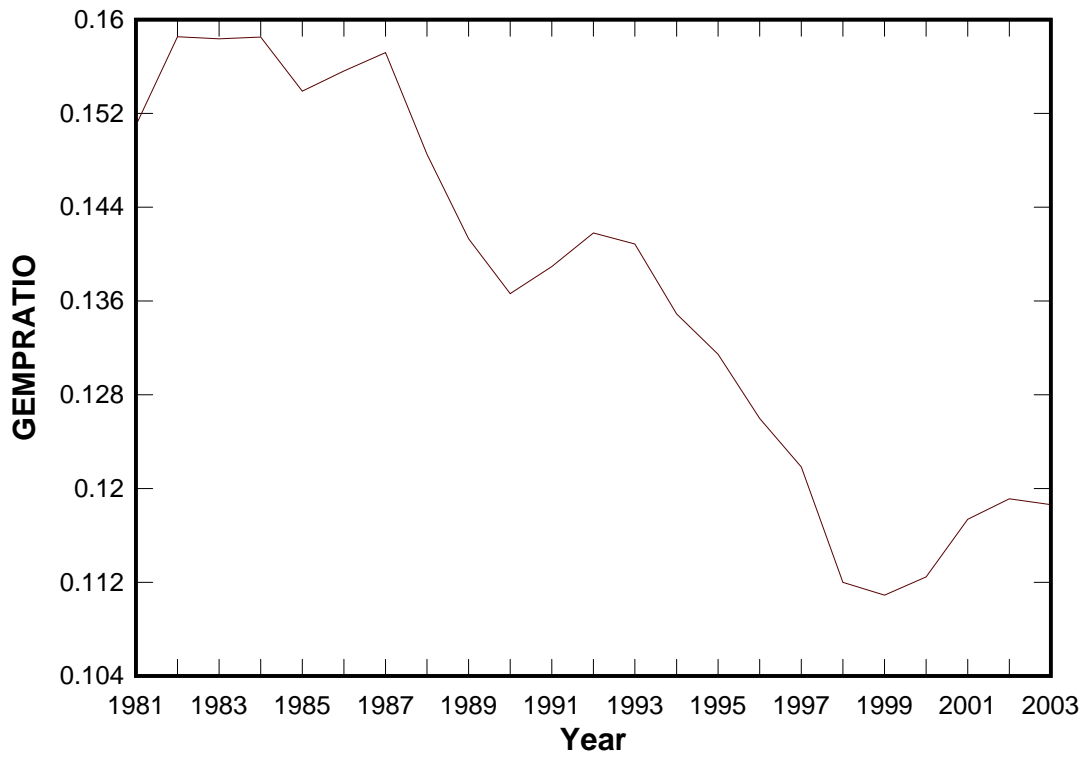of export unit prices to import unit prices.

Figure 12. Ratio of government to total employment, 1981-2003. Source: Author's calculations, based on data from OECD Economic Outlook database.
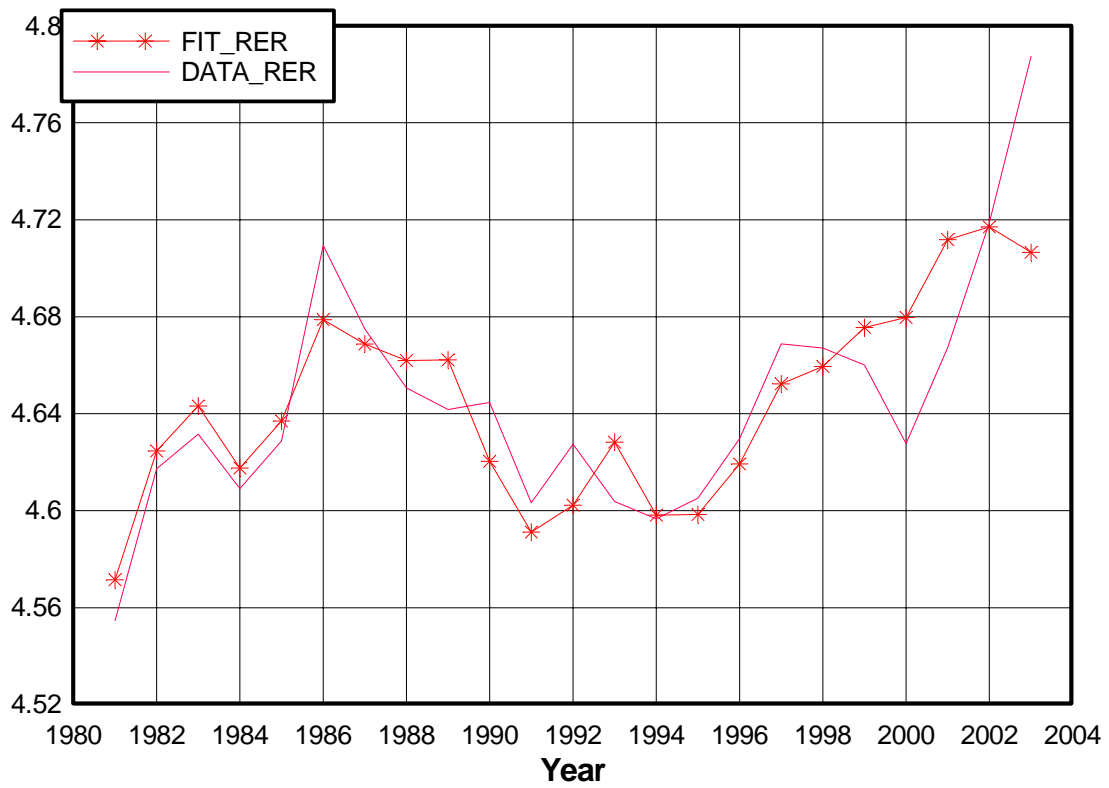
Figure 13. Plot of Fitted and Actual Real Exchange Rate, 1981-2003. Source: Author's calculations, based on model described in text.