European Union Regional Aid and Irish Economic Development

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Regional aid does not guarantee a real convergence of living standards in the recipient region. This is obvious from the experience of the Italian Mezzogiorno, to a lesser extent from the experience of Greece, and perhaps to some extent from the experience of Spain. Regional aid is likely to be of greatest benefit when the other requirements for real convergence are satisfied.

From this point of view the Irish and Portuguese experiences are of particular interest. These countries have followed very different industrial strategies. Ireland's has been based substantially on a policy of attracting inward FDI in high-tech manufacturing sectors, while Portugal has experienced substantial real convergence on average EU incomes with a manufacturing sector that remains dominated by indigenous low-tech industry; Figure 1. (Finland represents another interesting case, of a geographically peripheral though not historically poor country, which has prospered through indigenous high-tech industry).

Figure 1 here

I will have something to say later on why I think the Portuguese and Spanish experiences differ. Mostly however I will be concerned with the Irish experience.

The period of substantially increased EU regional aid overlapped with the Irish boom, which saw unemployment fall from a high of 17 percent in the late 1980s to around 4 percent today, numbers at work increase spectacularly (by more than 50 percent), and average incomes rise from less than 65 percent of the EU average, a level around which they had hovered over the whole period since 1960, to reach parity by the decade's end.[1]

To some extent the boom can be seen as an episode of "delayed convergence", simply making up ground that had been lost by decades of poor economic management. The failure of the 1950s was to eschew free trade as the rest of Western Europe shed its protectionist policies. The underperformance of the 1960s and 70s was a consequence of the failure to increase pupil and student numbers in line with the rest of Western Europe.

[1] I use GNP rather than GDP in this calculation to exclude the profits of foreign companies located in Ireland. GDP per head is substantially higher.

The 1980s were lost as the country struggled with problems bequeathed by a period of undisciplined fiscal policy.

What explains the timing and rapidity of the boom however? Both were undoubtedly influenced by the country's strong FDI-orientation. The amount of foreign direct investment flows both within Europe and emanating from outside exploded in the late 1980s, because of the Single Market and the extent of investment funds made available by the long US boom. Ireland's share of these flows also increased considerably. At the same time, in the late 1980s, the country's fiscal crisis, with which it had struggled for almost a decade, was finally resolved. And then of course there was the substantial increase in the level of EU structural funding (SF), following reform and reorganisation in 1988; SF receipts per annum over the course of the 1990s were more than double the levels prevailing in the latter half of the 1980s.[2]

Indeed SF expenditures have been substantial throughout the EU periphery. Community support accounted for almost 15 percent of total investment in Greece in the 1994-99 period, for around 14 percent in Portugal, 10 percent in Ireland and 7 percent in Spain.

Analysis undertaken so far (by the present author amongst others!) suggests however that the *direct effects* of these EU regional aid programmes would have been modest. In the Irish case it is estimated that they would have contributed a maximum of about half of one percentage point per annum to the GDP growth rate of the 1990s, whereas the boom saw Irish average real growth exceeding that of the EU15 by around 6 percent per annum.[3]

Notice my use of the term "direct effects". By these I mean the increased demand associated with EU transfers *plus* the supply-side effects associated with an improved stock of human capital and physical infrastructure, evaluated on the assumption that the response of Irish output is in line with estimates emerging from the international empirical literature

In the present paper I want to focus on something different, i.e. on what we might call the indirect *effects* that can arise via interactions between SF expenditures and other concurrent developments in the economy. I will begin by asking what the SF were needed for and what they were spent on. Then I discuss their interaction with three other developments that were taking place: the resolution of the fiscal crisis, the emergence of a greater degree of labour-market flexibility, and the coming to fruition of the FDI-oriented development strategy. Finally I will comment on the implications for the candidate countries of Central and Eastern Europe.

[2] I use the term Structural Funds rather loosely to include the Community Support Framework (CSF), the Cohesion Fund and Community Initiatives. In the 1994-99 period the CSF comprised over 75 percent of the total allocated to Ireland.

[3] As the OECD (1999, footnote 32) points out however, even this apparently modest effect nevertheless represents quite a respectable internal rate of return, of 6 to 7 percent per annum, on the funds invested.

1. Strategic Target Areas for Structural Funds Spending

Unfavourable Initial Conditions in the Cohesion Economies

Ireland had a number of characteristics that made it attractive as an export platform for foreign (primarily US) multinational companies. EU membership of course was crucial.[4] The country also represented an English-language environment, which may have been particularly important for US companies. Of major importance was the fact that Ireland has long had the lowest rate of corporation tax of any EU member-state.

Ireland would have shared with the other EU cohesion states a number of unfavourable characteristics however, which included relatively low levels of human capital, relatively poor physical infrastructure, and a poor record in research and development. I now briefly discuss these unfavourable characteristics.

Educational Attainment

Table 1 provides some illustrative statistics in regard to the educational attainment of the population, showing that all the Cohesion countries remain behind the OECD average in this respect.

Table 1: educational attainment of the population aged 25-64 (1998); country percentages expressed as a fraction of OECD mean

	% that has attained at least upper secondary	% that has attained at least tertiary B (diploma level)	% that has attained at least tertiary A (degree level)
Ireland/OECD	0.84	1.00	0.79
Greece/OECD	0.72	0.76	0.79
Spain/OECD	0.54	0.95	1.00
Portugal/OECD	0.33	0.43	0.50

Source: OECD (2000) Education at a Glance
Note: "At least tertiary B" includes "at least tertiary A".

Physical Infrastructure and Peripherality

The cohesion economies also lagged behind in terms of physical infrastructure. Indeed the EU Commission report *One Market, One Money* (1990) reported that firms in peripheral regions identified infrastructural deficiencies in the areas of education and training, transport and communications, and the supply and cost of energy as more

[4] Before EU accession in 1973 Ireland's FDI inflows came from Europe rather than the US, were market seeking rather than export oriented, and were relatively low-tech, characteristics which describe most CEE-bound FDI inflows today; Barry (2002c). By the mid-1980s all these characteristics had been reversed.

important impediments to their development than geographical aspects of peripherality such as the proximity of suppliers and customers. The available data on the stock of infrastructure in peripheral regions provides supporting evidence. Table 2 below, adapted from Biehl (1986), reports relative infrastructural levels for an aggregate of transportation, telecommunications, energy and education, showing that the periphery countries had a substantial infrastructural deficit relative to the core EU countries in the mid-1980s.

Table 2: Relative infrastructural levels in the cohesion countries as a proportion of the EU average, 1985-86.

Ireland	67.1
Greece	56
Spain	74.3
Portugal	38.7

Source: Biehl (1986)

Poor transportation infrastructure also impacts on "economic distance from purchasing power", which is how peripherality is usually defined.

Enterprise Competitiveness: The R&D Environment

Research and Development activity indicators provide one piece of evidence which can be used to graph the level of development of firms and businesses in a region. One suspects that countries lower down in these rankings are also deficient in other areas of industrial and business development. Table 3 illustrates the position in regard to R&D over the course of the 1980s.

Table 3: Business Enterprise Expenditure on R&D (BERD) as a percentage of domestic product of industry, relative to the EU average

	1981	**1989**
Ireland/EU	0.29	0.35
Greece/EU	0.07	0.06
Spain/EU	0.14	0.29
Portugal/EU	0.07	0.12

Source: OECD (2001) Science, Technology and Industry Scoreboard

These three indicators therefore serve to illustrate some of the structural weaknesses of the cohesion economies before the emergence of the substantial Structural Funds programmes.

Allocation of Structural Funds Expenditures

Having identified these three general areas of weakness, it comes as little surprise that these were the areas that attracted the bulk of Structural Funds expenditures, as shown in Table 4.

Table 4: Allocation of Structural Funds in Ireland

	Allocation of total Structural Funds 1994-99 (%)
Physical infrastructure	36.3
Human resources	28.4
Production/investment aid to the private sector	25.8
Income support	9.5

Source: as in Barry, Bradley and Hannan (2001).

The logic of the SF programmes may therefore be seen to entail expenditures in areas in which there are strong microfoundations for public intervention *and* in which the cohesion countries were found to be deficient.

2. Indirect Effects of Structural Funding: Interactions with Other Developments in the Economy

Analysis of the impact of the SF has found them to have quite moderate effects. I suggest here however that their interaction with other concurrent developments in the Irish economy may have meant that they were particularly beneficial in that case.

Fiscal Consolidation

Successive Irish governments struggled throughout the 1980s to overcome the debt crisis which had resulted from inappropriate pro-cyclical fiscal expansion at the end of the previous decade. The attempt to close the deficit via high taxation proved unsuccessful, due to the fact that it was by necessity pro-cyclical (in a contractionary direction), while workers responded to the tax hikes by raising wage demands.

A new approach was tried in the late 1980s, when government expenditure, and in particular capital expenditure, was reined in as an alternative to increasing taxes still further. Barry and Devereux (1995) argue that this consolidation proved successful firstly because it was counter-cyclical, and secondly because it was supported by the development of the "social partnership approach" which promoted wage moderation via the promise of future reductions in income taxes.

The timing of the increase in Structural Fund aid in 1989 was fortuitous in allowing the reinstatement of infrastructural projects which had been postponed as part of the necessary fiscal contraction. The infrastructural deficiencies which would otherwise have resulted would have made it more difficult to attract the levels of FDI achieved since then.

The Structural Funds programmes would also have facilitated the social partnership agreements by relaxing the government budget constraint, both directly (to the extent to which the principle of additionality can be side-stepped) and indirectly through the tax revenues associated with the increased FDI inflows that subsequently emerged.[5]

Labour Market Developments

The social partnership agreements begun in 1987 brought substantial competitiveness gains and unprecedented industrial peace; Barry (2000).

This brings me to an interesting point that has not been fully appreciated in the literature on the impact of the SF to date.[6] This concerns the effect of the labour-market environment on the macroeconomic impacts of SF expenditures. To set the scene, consider the unemployment experience of three of the Cohesion countries – Portugal, Ireland and Spain – relative to the EU15 over the era from the Delors1 CSF onwards; Figure 2.

Figure 2 here

Portugal, we see, remains at low levels of unemployment throughout, Spanish unemployment remains high, and Ireland's tumbles from very high to very low. A stark characterisation of these different situations then would be to see the Portuguese labour market as extremely flexible, with the country remaining close to full employment throughout the period; Ireland's labour market might be characterised by wage rigidity, so that unemployment falls as labour-demand expands, while Spain's might be characterised as an extreme insider-outsider model, where labour-market insiders reap all the benefits of an increase in labour demand for themselves, so that it is all dissipated in the form of higher wages rather than greater employment.

[5] It would nevertheless be incorrect to conclude that the SF generated the Irish boom through facilitating income tax reductions. As mentioned earlier, corporation tax is the the most important tax relevant to the country's ability to attract FDI. This has actually increased over time, from the zero rating on profits stemming from manufacturing exports that was introduced in the late 1950s.

[6] The literature I am referring to includes econometric work and calibration studies such as those of ESRI (1997) and Barry et al (2001) which use the HERMIN model, the Commission's work using the Quest model (Volume 2 of the Second Report on Economic and Social Cohesion, 2001), and various papers by Gaspar and Pereira.

Let us consider the effects of SF expenditures in this context. The impact of all these spending programmes can be categorised in terms of demand (short run) and supply (longer run) effects. The Keynesian short-run effects will be strongest where there is labour-market slack (i.e. Ireland and Spain rather than Portugal), and where demand can influence this slack (i.e. Ireland rather than Spain). Thus the short-run effects can be expected to be much larger in Ireland than in Spain or Portugal.

As to the longer-run supply-side effects, let us think of them in terms of a model with three productive factors: labour, private capital and public capital. If the increase in public capital is the same in each case, the impact on Spain will be less than in either the Portuguese or Irish cases; in the case of Ireland because an increase in public capital draws more labour as well as further private capital into employment, and in the case of Portugal because with flexible labour markets there will be a higher level of employment and a higher stock of private capital relative to the initial stock of infrastructure, so the marginal product of public capital will be higher.[7]

In this scenario, the impact of SF expenditures will be substantially higher in Portugal and Ireland than in Spain. Though this will provide only a small part of the explanation, it is consistent with their respective convergence experiences over the period!

FDI Inflows

As mentioned earlier, Ireland's FDI-oriented strategy came to full fruition over the course of the 1990s. It is unlikely that as much FDI could have been attracted to the economy had the extra SF-financed infrastructure not been in place.[8]

Besides the level of FDI inflows drawn to the economy, the SF would also have impacted on the type of FDI that Ireland was able to attract. Over recent decades foreign industry in Ireland has become increasingly high-tech, as Figure 3 illustrates, and this could only have come about in conjunction with the increasing human capital stock of the labour force.[9]

Consistent with this, the R&D-orientation of both indigenous and foreign industry has been rising, as seen in Table 6, though the overall growth in the R&D orientation of the economy is primarily due to the operations of the foreign-owned sector, which carries out 64 percent of business-related R&D expenditures (BERD) in Irish industry.

[7] These results are from Barry (2002d).
[8] As it was, the boom created tremendous congestion and this itself would have led to its ultimate dissipation; Barry (2002a), Dascher (2000).
[9] The categorisation of high, medium and low-tech industries is from OECD (1994)

3. Progress in terms of Strategic Target Areas

I have argued that Ireland may have gained greater benefits from the availability of the Structural Funds than the other cohesion economies did, because of how the effects of SF spending may have interacted with other concurrent developments in the economy. Let us now see how this is reflected in the various peripherality indicators employed earlier.

Educational Attainment

By the end of the 1990s, with the aid of the Structural Funds, the relative position of the EU periphery had improved. In the case of educational attainment this can be seen by focusing on the attainment of younger members of the population, as these would have been of pupil and student age at the time of the Structural Funds disbursement. These data are presented in Table 5.

Table 5: educational attainment of the population aged 25-34 (1998); country percentages expressed as a fraction of OECD mean

	% that has attained at least upper secondary	% that has attained at least tertiary B (diploma level)	% that has attained at least tertiary A (degree level)
Ireland/OECD	0.93	1.16	1.00
Greece/OECD	0.92	0.88	0.94
Spain/OECD	0.74	1.28	1.31
Portugal/OECD	0.40	0.44	0.5

Source: OECD (2000) Education at a Glance
Note: "At least tertiary B" includes "at least tertiary A".

Comparing these numbers with those for the whole population given in Table 1 above we see that in each case the periphery has converged on the OECD average in terms of educational attainment.[10]

To focus on Ireland in particular, we see that while the country continues to lag behind the OECD mean in terms of the population that has attained at least upper secondary education, it has converged on the OECD average in terms of those attaining at least a university degree or equivalent, and has actually gone ahead in terms of those attaining a diploma or equivalent.

This extra Irish throughput in tertiary education, furthermore, is largely concentrated in the scientific area. Thus 1995 data from UNESCO (1998) reveals that 40 percent of Irish tertiary graduates are in the fields of natural sciences, agriculture and engineering,

[10] SF expenditures impact on these indicators directly. Thus apprenticeship prorgrammes impact on the numbers attaining at least upper secondary education, diploma courses impact on those attaining tertiary level B and conversion courses are included in tertiary level A.

compared to an EU average of only 28 percent. Scientific degrees and diplomas are in strong demand within foreign-owned industry in Ireland and, to this extent, Ireland's overall strategy can be seen to have influenced the setting of development priorities within the human capital domain.

Physical Infrastructure and Peripherality

While SF-supported improvements in transport infrastructure have been very substantial, it is not clear whether these have allowed the periphery to converge along this dimension. The European Commission (2001, volume 1, page 132) itself suggests that "while investment in peripheral regions has improved accessibility, it has been accompanied by similar investment in neighbouring regions and more central ones, which can counteract any relative gain". It goes on to caution that "the overall effect of such investment depends on what other measures are taken to stimulate economic activity in the regions concerned", which concurs with the point made above about the interaction with Ireland's FDI-oriented industrial strategy.

Industrial Competitiveness

I used R&D indicators earlier as an illustrative measure of industrial competitiveness. Again we see, in Table 6, that Ireland has continued to converge on core EU countries along this dimension, though the other periphery countries have not.

Table 6: Business Enterprise Expenditure on R&D (BERD) as a percentage of domestic product of industry, relative to the EU average

	1991	**1997**
Ireland/EU	0.50	0.87
Greece/EU	0.13	0.13
Spain/EU	0.38	0.33
Portugal/EU	0.13	0.13

Source: OECD (2001) Science, Technology and Industry Scoreboard

Weakness in the Research and Development area is still pervasive within indigenous industry however.

4. Where do the CEE Countries stand in terms of the Strategic Target Areas?

The CEECs lag behind the rest of Europe in many of the same areas that the Cohesion Funds were instituted to address. Some brief details on this are provided below.

Educational Attainment

While the Czech Republic and Hungary are both ahead of the OECD in terms of the proportion of the younger population with secondary education, both they and Poland are well behind in terms of third-level degrees and diplomas.

Table 7: educational attainment of the population aged 25-34 (1998); country percentages expressed as a fraction of OECD mean

	% that has attained at least upper secondary	% that has attained at least tertiary B (diploma level)	% that has attained at least tertiary A (degree level)
Czech Republic	1.28	0.4	0.63
Hungary	1.07	0.56	0.88
Poland	0.86	0.48	0.75
Memo: Irl/OECD	0.93	1.16	1.00

Source: OECD (2000) Education at a Glance
Note: "At least tertiary B" includes "at least tertiary A".

Some further comparisons are possible with the aid of 1995 data from UNESCO (1998); Table 8. These paint a slightly different picture from that emerging from the OECD. They show, for example, that the expected number of years of formal schooling for each EU country is higher than that for any CEEC, which is not what a comparison of the OECD data for Portugal and Poland would suggest. The UNESCO source contains data for each of the CEE economies however, allowing one see how they are ranked relative to each other.

These show that the CEE countries are behind even the EU Cohesion countries (with the possible exception of Portugal) in terms of educational attainment.

Midelfart-Knarvik et al. (2000, page 2) suggest that educational standards may be becoming increasingly important, finding that

> "The location of R&D-intensive industries has become increasingly responsive to countries' endowments of researchers, with these industries moving into researcher-abundant locations. The location of non-manual-labour intensive industries was and remains sensitive to the proportion of countries' labour forces with secondary and higher education".

Table 8: Education Indicators, 1995

	Expected years of formal schooling	Net enrolment ratio - secondary	Gross enrolment ratio - tertiary
EU10	**15.2**	**92**	**47.8**
Ireland	**13.6**	**85**	**37**
Greece	**13.8**	**84**	**38.1**
Spain	**15.5**	**94**	**46.1**
Portugal	**14.3**	**78**	**34**
Czech Rep.	13.1	88	20.8
Hungary	12.5	73	19.1
Poland	13.1	83	27.4
Estonia	12.5	77	38.1
Slovenia	n.a.	n.a.	31.9
Slovakia	n.a.	n.a.	20.2
Latvia	11.4	78	25.7
Lithuania	n.a.	n.a.	28.2
Romania	11.4	73	18.3
Bulgaria	12.1	75	39.4

Source: UNESCO (1998) World Education Report.

Notes: Net enrolment ratio refers to percentage of population of age group corresponding to that level of education enrolled; gross enrolment ratio refers to total enrolment divided by population of age group officially corresponding to that level of education; EU10 refers to EU15 less Luxembourg and the Cohesion 4 (Greece, Spain, Portugal and Ireland).

Infrastructure and Peripherality

Transport infrastructure plays an important role in calculations of centrality or "closeness to purchasing power". Schürmann and Talaat (2000) provide a recent ranking of EU and CEE countries in this regard. Their index is based on a measure of travel costs between points within the overall region weighted by the purchasing power that each point represents.

The most peripheral regions at present (according to Figure 4.2 in their paper, page 44) are the Baltic states, Northern Sweden and Finland, and Bulgaria and Romania. Hungary, Slovenia, the Czech and Slovak Republics and the southwest corner of Poland are no more peripheral than Ireland, Spain or Portugal, and less peripheral than Greece.

Interestingly, these authors also present a projection for the year 2016 based on the assumption of EU accession (with its associated reduction in border delays) and the implementation of the huge TINA transport infrastructure plans for Central and Eastern Europe (along with the TEN programme for EU incumbents). In this scenario (which they plot in Figure 4.14, page 61 of their paper), some regions in Poland, the Czech Republic, Slovakia, Hungary, Eastern Germany and Portugal move ahead of Ireland, with Greece left even further behind.

The R&D Environment in Central and Eastern Europe
The Czech Republic and Slovakia lie between Ireland and Spain in the R&D rankings, while Hungary enters at a surprisingly low 20% of the EU average. This indicates that there is still a substantial amount of ground to be made up along this dimension.

Table 9: Business Enterprise Expenditure on R&D (BERD) as a percentage of domestic product of industry, relative to the EU average

	1991	**1997-99**
Czech Republic/EU	1.06	0.67
Hungary/EU	0.31	0.2
Poland/EU	/	0.27
Slovakia/EU	1.06	0.6
Ireland/EU	**0.50**	**0.87**
Greece/EU	**0.13**	**0.13**
Spain/EU	**0.38**	**0.33**
Portugal/EU	**0.13**	**0.13**

Source: OECD (2001) Science, Technology and Industry Scoreboard

Concluding Comments
We see that the countries of Central and Eastern Europe share many of the unfavourable characteristics of the EU cohesion economies. These include relatively low levels of human capital and research and development, alongside economic peripherality. These are the kinds of disadvantages that EU regional aid sets out to redress.

We have seen that the cohesion countries have converged in terms of some of these structural characteristics at least. I have argued that a benign macroeconomic environment is also important however, specifically in terms of labour-market flexibility. The tri-partite Social Partnership agreements instituted in 1987 in Ireland facilitated industrial peace and a return to labour-market equilibrium. Without some such steps to promote labour-market equilibrium it is doubtful that the boom of the 1990s, and the macro effects of the SF themselves, would have been as strong. I showed specifically that an insider-dominated labour market can reduce substantially the macroeconomic benefits of SF spending. Labour-market rigidities will also hinder the possibilities of real convergence more directly; Barry et al. (2000); Daveri and Tabellini (2000).

The paper also illustrated how the SF programmes interacted strongly and positively with Ireland's FDI-oriented strategy to generate very rapid convergence when the circumstances were auspicious; i.e. during the era of the Single Market and the sustained US boom. Ireland adopted a low rate of corporation tax and fostered other characteristics favourable to the attraction of FDI. With the aid of SF expenditures educational attainment improved considerably, facilitating the shift into high-tech (though largely foreign-owned) industry. This in turn, along with targeted SF-funded aids to industry,

raised the level of competitiveness of the Irish business sector. The economy would have run into infrastructural constraints much sooner, which would have impinged on its ability to attract FDI, had the SF-funded infrastructural programmes not been in place.

Portugal's relatively successful convergence performance of recent years shows however that a reliance on FDI is not the only path to development for EU periphery economies. Again what appears to have been crucial in the Portuguese case, relative to Spain at least, is the degree of labour-market flexibility that the economy exhibits. This point has been made in a number of papers, including Barry (2002b), Bover et al. (2000) and Daveri and Tabellini (2000). Thus Portuguese convergence has been impressive, even though, consistent with its relatively low human-capital stock, the economy has specialised in low-tech production.

This discussion suggests that there is no one route to economic development for the CEE economies. Some, such as Hungary and Estonia, appear to be following the Irish development model, using low corporate-tax rates to attract export-oriented FDI. Others such as the Czech Republic, though it has done well so far in attracting pre-accession FDI, has not adopted the low corporation-tax strategy and may have a different development model in mind. The Portuguese experience suggests that this will not necessarily hinder real convergence possibilities, (particularly since indigenous Czech industry appears to account for a substantial proportion of Czech BERD), though our simulations of a model of the Czech transition suggest that care must be taken to ensure labour-market flexibility.

A further consequence of the SF, emphasised elsewhere in this volume, is, as FitzGerald (1998) states, that

> "the need to satisfy the donor countries, through the EU Commission, that their money is well spent has resulted in the introduction of a set of evaluation procedures which has helped change the way the administration approaches public expenditure. In the past the only question, once money had been voted by parliament, was whether it had been spent in accordance with regulations. Now there is increasing interest in assessing how effective the expenditure has been."

The introduction of more rigorous controls on the probity with which public funds are spent, as well as a more careful evaluation of the programmes on which they are spent, may prove to be even more crucial in the case of the CEE economies than was the case in Ireland and the other cohesion economies.

As to regional developments in Ireland, the strength of the boom ensured that all regions of the economy expanded, though the expansion in the Greater Dublin area was much more substantial than elsewhere. By the end of the 1990s this region exhibited higher wages, lower unemployment and greater labour-force participation than elsewhere in the economy, as well as greater congestion of course.

Once the economy reached full employment at the end of the 1990s regional considerations came more to the fore in the deliberations of the industrial development

agencies. Their recently updated Project Appraisal system places greater emphasis than heretofore on industrial dispersion across the regions; Barry et al. (2002).

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Figure 1: The Convergence Experiences of Ireland, Spain and Portugal

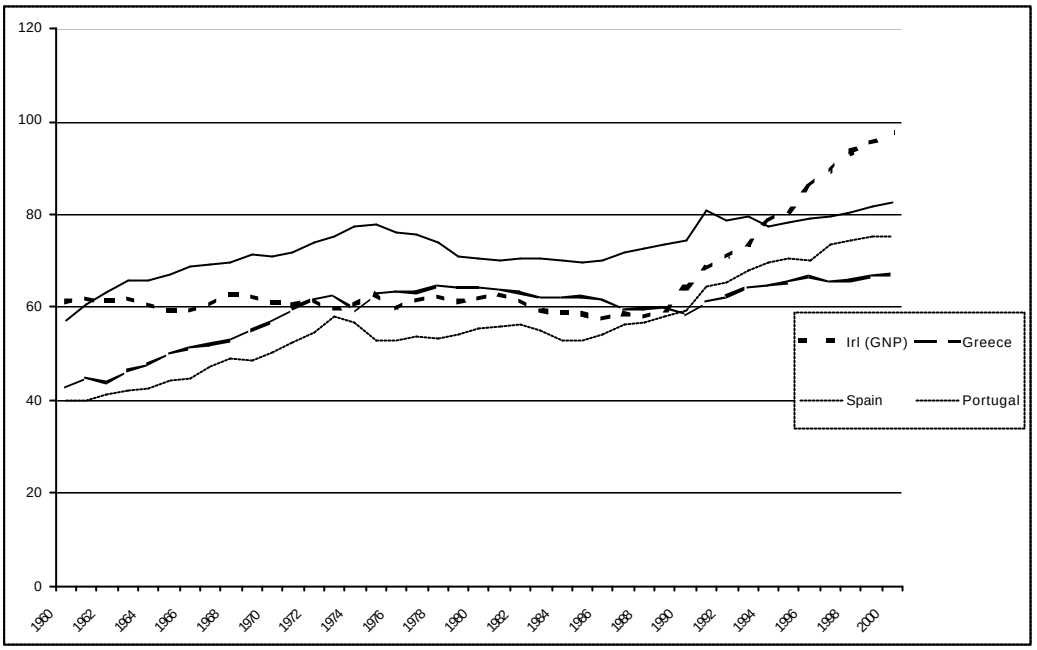

Figure 2: Spanish, Irish and Portuguese Unemployment Rates minus that of the EU15.

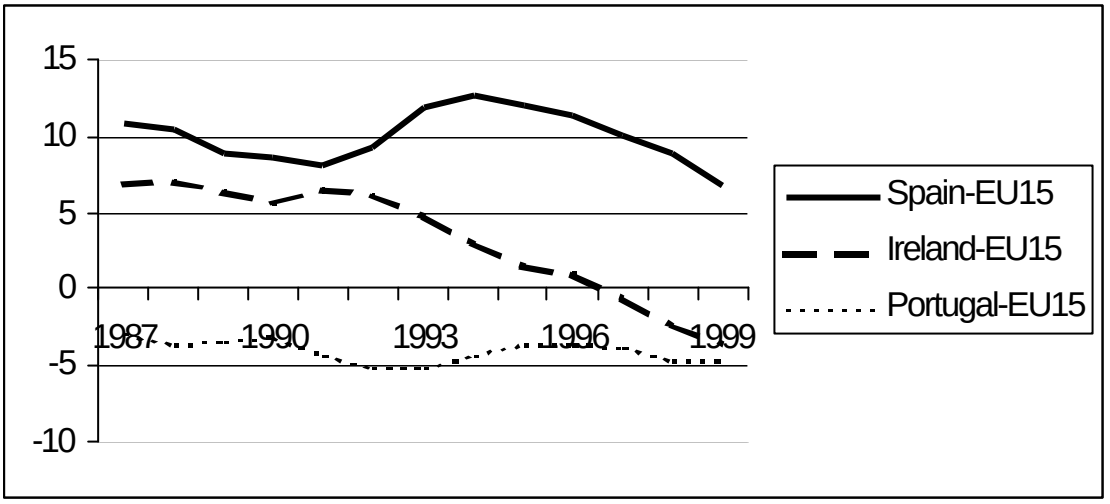

Figure 3: Distribution of employment in foreign-owned industry in Ireland by technological level