CELTIC CUBS? REGIONAL MANUFACTURING IN IRELAND

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1 Introduction

Irish economic development has attracted considerable attention internationally, in particular the dynamic role played by foreign direct investment (FDI). After a slow start, the foreign sector in Ireland grew rapidly during the 1980s and now accounts for about one half of manufacturing employment and over two-thirds of gross manufacturing output. Directly as well as indirectly, the foreign-owned manufacturing sector now affects every corner of the economy and Ireland is a textbook case-study of the benign effects on a small host economy of export-oriented FDI. More recently it has become apparent that the attention given to the phenomenal success of foreign manufacturing served to mask an impressive and sustained resurgence of the performance of indigenous industry, the causes of which appear to be associated both with its sub-supply linkages to foreign firms and to more general improvements in the wider domestic competitive environment (O'Malley, 1998).

The story of recent Irish economic performance cannot be told in simple mono-causal terms. The timing of the growth acceleration of the late 1980s was expected by some, even if its strength and duration were not.[1] There were many reasons why an improvement in performance was likely to happen. At the top of the list comes the extreme openness of the economy, a factor that encompasses large inflows of FDI, sizeable labour migration flows, an export orientation towards fast growing markets and products, together with the benefits arising from participation in the European Monetary System (EMS), the completion of the Single European Market and full participation in Economic and Monetary Union (EMU).

Although much is known about manufacturing at the aggregate or national level, rather less is known about the nature, causes, consequences and prospects of the spatial distribution of manufacturing throughout the regions of Ireland and its knock-on impacts on wider regional performance. The recent shift from designating the whole country as *Objective 1* to a regionalised approach to Structural Fund aid means that regional development mechanisms are likely to attract more attention in the future. This article is intended as a contribution to regional economic and policy analysis.

First, we briefly summarise the stylised facts of manufacturing at the national level in order to set the stage for regional and sub-regional analysis since we are mainly interested in how and why regions *deviate* from the national benchmark. We then summarise some facts on the regional distribution of economic activity, drawing attention to conceptual and practical difficulties that arise, mainly because published data sources use administrative rather than meaningful economic spatial classifications. Based on published CIP data for the year 1996 (the latest available data), we examine the structure of manufacturing in the main Irish planning regions. Since the eight planning regions tend to be internally quite heterogeneous, we also look at their

[1] This *Review* can claim to be the first report to predict a strong recovery in the late 1980s (*Medium-term Review, 1987-1992*). Subsequent *Reviews* charted and documented the continuing recovery into the 1990s, *albeit* under-predicting its strength. For a fuller treatment of recent Irish growth experience, see Bradley *et al.,* 1997 and Barry (ed.) 1999.

constituent counties, that being the smallest spatial classification available. Within these limitations, and drawing on the research literature of economic geography, we summarise what is known of the determinants of the distribution and dispersal of manufacturing throughout the Irish regions. Combining theoretical knowledge with the empirical data, we discuss the spatial pattern of activity and identify the more successful and the less successful regions.

2 The National Pattern of Manufacturing Industry

The most recent detailed and complete census data for manufacturing classified by nationality of ownership is for the year 1996. Table 1 shows that although only 16 per cent of local plants are foreign owned, these foreign owned plants produce just over two-thirds of gross output and make up nearly half of total manufacturing employment. The importance of the US connection is illustrated by the fact that almost 40 per cent of the foreign plants are US-owned, with 16 per cent British and 13 per cent German.

A striking difference between locally owned and foreign owned firms is that Irish owned plants export on average just over one-third of their output while foreign plants export almost 90 per cent, rising to above 95 per cent for US-owned plants. Thus, the domestic market is of little significance to the foreign plants. They locate in Ireland to produce for export. It is the cost competitive characteristics of the supply-side of the Irish national and regional economies that attract inward investment: i.e., tax rates, labour costs, skill levels, infrastructure, etc.

Table 1: National Manufacturing Characteristics

Nationality of Ownership	No. of Plants	Total Persons Engaged	Gross Output (£m)	Materials Purchased	Per Cent of Gross Output Exported
				Per cent Imported	
Irish	3871	120,224	12,188	25.1	34.0
Other EU	344	37,114	4,765	65.2	70.5
of which UK	117	12,283	1,960	52.9	53.5
of which Germany	98	10,684	855	80.3	93.3
Non-EU	384	69,296	19,343	65.7	93.9
of which US	286	54,167	15,814	61.6	95.3
Total foreign	728	106,410	24,108	65.6	89.3
Total	4,599	226,634	36,296	47.0	70.7

Source: *Census of Industrial Production,* 1996, CSO, published September 1998.

There are some further differences between foreign and indigenous plants, illustrated in Table 2. Foreign plants tend to be larger (measured in terms of gross output, or in numbers employed, per plant); they are more productive (measured in terms of net output per person engaged) and consequently they are more profitable since they face similar wage costs to local firms (a point we return to below). In terms of these proxy measures, US owned plants are over seventeen times larger than Irish owned plants, over five times as productive, and almost eight times as profitable.

Another characteristic difference between Irish and foreign plants concerns export destinations. Although the US is the pre-eminent source of inward investment, it makes up a modest part of the destination of exports (about 10 per cent of the total). Between the foreign plants there are also interesting differences; UK-owned plants, which export over 50 per cent of their output, send almost three-quarters of their exports to the UK market, and only about 11 per cent to the rest of the EU. US-owned plants, on the other hand, export 95 per cent of output and send only about 20 per cent to the United Kingdom and over 50 per cent to the rest of the EU.

Table 2: Manufacturing Plants: Characteristics by Ownership

Nationality of Ownership	Gross O/P per Plant (£'000)	Nos. Employed per Plant	Net O/P per Person Engaged (£'000)	Destination of Exports			
				UK	OEU	USA	ROW
Irish	3,149	31.1	34.6	42.2	32.2	8.2	17.3
Other EU	13,851	107.9	65.3	36.8	46.8	6.8	9.6
of which UK	16,750	105.0	87.4	74.3	10.9	5.4	9.3
of which Germany	8,724	109.0	35.9	12.3	72.7	6.4	8.6
Non EU	50,372	180.5	166.7	19.9	50.6	11.4	18.1
Of which US	55,293	189.4	177.9	20.1	52.5	9.5	17.9
Total foreign	33,115	146.2	131.3	22.6	50.0	10.7	16.8
Total	5481	49.3	80.0	25.7	47.1	10.3	16.9

Source: *Census of Industrial Production.* 1996, CSO, published September 1998; £'000 denotes thousands of Irish pounds.
OEU denotes EU countries other than the UK; ROW denotes the rest of the non-EU world.

In summary, then, the foreign manufacturing plants in Ireland are predominately of US ownership, with a smaller proportion of UK and German origin. They have a much higher propensity to import their material inputs, are more export oriented (with only the UK plants having any significant reliance on the local Irish market), and are larger, more productive and (with the exception of German owned firms) more profitable than the indigenous plants.

3 The Irish Regional Economies

In Ireland, as in all other countries, economic activity is not spread evenly over space. However this does not automatically imply that there exist distinct economic regions. Furthermore, if distinct economic regions exist these may not correspond to the existing administrative regions.

The traditional Irish administrative units are the counties. For domestic planning purposes, these have been grouped into eight Planning Regions (NUTS III regions) which are administered by Regional Authorities since 1994.[2] For EU Structural Funds purposes Ireland was seen as one (NUTS II) region.[3] However it has recently been decided to split the country into two NUTS II regions: the Border, Midlands and West (BMW) regions will constitute one NUTS II region and the other five Planning Regions (Dublin, Mid East, South East, South West and Mid West[4]) will constitute the other NUTS II region.

These administrative regions and counties are the units for which data are collected, but they have their origins in history and seldom have any modern economic significance. However, since many variables are not available at the sub-county level, we are forced to limit our analysis to the counties and planning regions. Table 3 displays the main socio-economic characteristics of the eight Planning Regions.

The CSO regional estimates of Gross Value Added (GVA) per capita provide a measure of regional output or productivity. There are substantial differences between the regions with respect to GVA per capita. The Dublin region stands out from the other regions with a GVA of over 30 per cent higher than the average. The South West is the only other region with above average GVA. In contrast the Border, Midlands and West have substantially lower than average GVA, with the remaining regions having moderately below average GVA.

[2] The Planning Regions are defined as: Border (Donegal, Sligo, Leitrim, Cavan, Monaghan and Louth); Dublin (Dublin, Dun Laoghaire-Rathdown, Fingal and South Dublin), Mid East (Meath, Kildare and Wicklow); Midlands (Longford, Westmeath, Offaly and Laois); Mid West (Clare, Tipperary N.R. and Limerick); South East (Carlow, Kilkenny, Tipperary SR., Wexford and Waterford); South West (Kerry and Cork) and West (Mayo, Roscommon and Galway).

[3] There are 206 NUTS II (Nomenclature of territorial units for statistics) regions in the EU.

[4] This NUTS II region is sometimes referred to as the South, East and Dublin (SEAD) region.

It would initially appear that there is a significant difference between the Mid East (83.3 per cent) and Dublin (130.5 per cent) regions. This however does not properly reflect differences in income since output is measured in the region in which it is produced rather than where the benefits accrue (as income). A large number of individuals commute to work from the Mid East to the Dublin region thereby contributing to the output in the Dublin region and income in the Mid East region. For this reason the two regions should be viewed as one, with the resulting GVA still substantially above average (118.9 per cent).[5]

Table 3: Main Characteristics of the Irish Regional Economies

Region	Index of GVA per person (State=100) 1996	Population ('000s) 1996	Population density (pers. per km^2)	Unemploy-ment rate (1997)	Persons at Work ('000s)	Degree of Urbanisation (% in settlements > 10,000
		%			%	
Border	80.3	407 (11.2)	33	14.7	138 (10.4)	20.9
Dublin	130.5	1,058 (29.2)	1,148	12.8	415 (31.2)	93.6
Mid East	83.3	347 (9.6)	57	8.8	134 (10.1)	29.9
Mid East and Dublin	*118.9*	*1,406 (38.8)*	*201*	*11.8*	*549 (41.3)*	
Midlands	69.0	206 (5.7)	56	10.2	75 (5.6)	18.4
Mid West	90.3	317 (8.7)	40	11.9	114 (8.6)	30.5
South East	90.4	392 (10.8)	42	12.7	136 (10.2)	27.8
South West	105.9	547 (15.1)	45	10.2	194 (14.6)	38.7
West	75.8	352 (9.7)	25	10.4	124 (9.3)	16.6
State	100	3,626 (100%)	53	11.6	1,329 (100)	46.7

Sources: *Census of Industrial Production,* 1996, *Census of Population,* 1996, *Labour Force Survey*, 1997.

A further caveat is that these GVA figures are susceptible to distortions due to transfer pricing/profit shifting by foreign multinationals as a consequence of the favourable national tax regime in Ireland.[6] It is therefore not surprising to find that the two regions with the highest GVA also have a high concentration of foreign firms.

Unemployment was highest in the Border region (14.7 per cent) and somewhat below average in the Midlands, South West and West. While the GVA figures might indicate that Dublin should have relatively low unemployment this is in fact the second highest at 12.8 per cent, but this figure declines to 11.8 per cent when combined with the Mid East region which has the lowest unemployment rate at 8.8 per cent.

In terms of population Dublin is distinct in that it contains almost 30 per cent of the country's population while all except one of the other regions contain between 9 per cent and 15 per cent of the population. The exceptions with regard to population is the Midlands region which contains only 5.7 per cent of the population. This comparison however does not reflect the relative size in terms of land area of the regions. The population density accounts for the size of the regions and using this measure, three groups of regions can be identified. Dublin has by far the highest population density; the second group with an intermediate density of 40 to 57 persons per square kilometre consists of the Mid East, South East, South West, Midlands and Mid West; and the Border and West regions have low densities of 33 and 25 persons per square kilometre. The final column in Table 3 shows the degree of urbanisation as measured by the population living in settlements of more than 10,000 inhabitants. The Border, Midlands and West are clearly the least urbanised regions and these also have the lowest GVA per capita. This link between urban development and productivity is reflected by a strong positive correlation between the degree of urbanisation and GVA.[7]

[5] While this is a more meaningful region this still leaves out County Louth (Border region) from which a substantial number of workers commute into Dublin.

[6] See E. O'Leary, 1998, for an extensive discussion of this issue.

[7] Excluding the Dublin region, the correlation coefficient between the index of per capita GVA and urbanisation is 0.92. Furthermore there is strong evidence for the presence of scale effects since, when one redefines the degree of urbanisation to include the population of towns of over 1,500 inhabitants, this

Table 4: Regional Distribution of GVA by Branch, 1996

Region	Agriculture, forestry and fishing	Manufacturing, building and construction	Market and non-market services	Total GVA
Border	9.3	44.2	46.5	100
Dublin	0.3	33.4	66.3	100
Mid East	4.6	55.2	40.2	100
Mid East and Dublin	*1.1*	*37.1*	*61.8*	*100*
Midlands	9.0	36.8	54.2	100
Mid West	7.5	44.4	48.1	100
South East	9.0	49.7	41.4	100
South West	7.4	49.2	43.4	100
West	7.8	37.0	55.3	100
State	4.8	41.4	53.7	100

Source: CSO *Regional Accounts*, 1996.

In Table 4 we show the regional distribution of GVA of agriculture, industry and service activities. Agriculture, forestry and fishing are of relatively small importance nationally with manufacturing, building and construction and services accounting for 95 per cent of national GVA. However, the sectors are not of equal importance in all regions with the substantial regional variation reflecting differences in industrial structure. Manufacturing is the most important sector in the Mid East, South East and South West regions, with services being more important in the remaining regions. Manufacturing accounts for a smaller than average share of GVA in the Dublin, Midlands and West regions.

Services are particularly important in the Dublin region, reflecting the fact that it contains the national capital. Perhaps as a consequence, services are least important in the Mid East region, since it is largely served by the Dublin service sector. Somewhat surprisingly, services are of above average importance in the Midlands and West regions, which may reflect low productivity in manufacturing, while they are of below average importance in the remaining regions.

One of the purposes of a national government is to redistribute income from the more prosperous to the less prosperous regions. The effect of these policies is embodied in personal income measures since these include state transfers. A further advantage of such measures is that they are not susceptible to distortions due to commuting. In Table 5 we compare the index of GVA to that of personal disposable income per head. This comparison suggests that the impacts of redistribution policies is to greatly attenuate the large disparity in GVA per head (a production-based

measure).[8,9] In addition, the ranking of the regions changes. Thus the South West drops from second highest with regard to GVA to fifth with respect to personal disposable income. The Mid East, on the other hand, moves up from fifth to second place reflecting the income earned in the Dublin region. The Border, Midlands and West are significantly closer to the national average personal disposable income than to than national average GVA per capita.

correlation declines to only 0.75. The issue of urbanisation is also explored in Boyle, McCarthy and Walsh, 1999.

[8] This may also partly be explained by the phenomenon of commuting.

[9] This corresponds with the conclusions reached by O'Leary, 1998, which are however questioned by O'Connor, 1999.

Table 5: GVA (1996) and Personal disposable income (1995) per head by region

Region	Index of GVA per head (State = 100)	Index of PDI per Head (State = 100)
Border	80.3	90
Dublin	130.5	113
Mid East	83.3	106
Midlands	69.0	97
Mid West	90.3	91
South East	90.4	88
South West	105.9	94
West	75.8	97
State	100	100

Source: CSO *Regional Accounts*, 1996. PDI is based on CSO *Household Budget Survey*, 1995 (average annual disposable income).

In the foregoing we have taken as given the regional division of the country. Using data for these existing regions, it appears that there are significant differences between them and that one might conclude that these regions are distinct economies. However, as already mentioned in the context of the Dublin and Mid East regions, the proper definition of regional boundaries is important due to the high level of commuting. Thus the commuting patterns suggest that Dublin, Mid East plus Louth should form one region (Greater Dublin region) which would constitute a functional region as defined by a travel to work area or local labour market (Fox 1974; Barkley *et al*., 1995; Johnson 1995).

By functional region we mean one which is homogenous with regard to particular characteristics – especially socio-economic characteristics – which is territorially contiguous, where much of the activities and interrelationships occur within the boundaries of the region, and which possesses a central focal point, usually a dominant town or city around which the region is organised.[10] This concept of a region is distinct from that which defines a region on the basis of historic, but in an economic context often meaningless, boundaries.

While the Dublin or Mid East regions separately do not make up a functional region, the Greater Dublin region (see above) is obviously a functional region on the basis of travel to work. It is also questionable whether the existing regional boundaries for the remainder of the country define functional regions. However, defining these is more difficult, particularly since data on the destination of commuters is not collected by the CSO. Nevertheless potential travel to work areas can be identified through travel time calculations and these have been produced for selected centres (see Fitz Gerald *et. al.,* 1999, p. 118-119). Of course other economic variables need also be taken into account when defining functional economic regions.

[10] This definition of a region is a more general one than that of Fox (1974) and Barkley *et al.* (1995) in that it encompasses a wider range of socio-economic variables rather than merely the commuting pattern. This is important since the urban system is not well developed in some parts of the country and consequently only low levels of commuting occur. Nevertheless the commuting pattern would be a critical variable for the identification of a functional region using our definition wherever substantial numbers of workers commute.

4 An Empirical Overview of the Regional Characteristics of Manufacturing

In our examination of the regional and sub-regional characteristics of manufacturing, we restrict ourselves to a review of characteristics apparent in the most recent CIP data, for the year 1996. Initially we examine the sectoral distribution of manufacturing across the main Planning Regions in terms of numbers of plants. We then examine the Planning Regions and their constituent counties in more detail, in each case making use of the following set of stylised facts:

i. The number of local units (or plants) gives a rough idea of the density of manufacturing activity in any area.
ii. The ratio of industrial to administrative/technical workers is a proxy measure for the complexity of the regional industrial base (a high ratio indicates a more traditional type of manufacturing process).
iii. Gross output, net output and employees per local unit indicate average size of plants.
iv. Average wages per employee and per industrial worker is another measure of process sophistication.
v. Net output per employee is a measure of average regional productivity, but can be seriously distorted by transfer pricing.
vi. Finally, the wage bill expressed as a share of net output gives a measure of the profitability of the regional manufacturing base.

Of particular interest will be to identify regions and counties where the characteristics of the local manufacturing base are unfavourable (e.g., traditional activities, less skilled jobs, low pay, low technology, etc.).

4.1 MANUFACTURING IN THE MAIN REGIONS

Table 6 presents a disaggregation of industrial activity as classified using the NACE system, showing the number of plants in the State and the regions. The distribution of plant numbers for most regions is broadly similar to that of the State, although some differences are noticeable. A striking feature is the extremely small number of manufacturing plants in the Midlands region. Furthermore, some differences regarding the sectoral distribution can be identified. For instance, the Paper and Publishing sector is particularly important in Dublin, which is not surprising since this industry is strongly linked to the services sector which is particularly concentrated in the capital. The same sector is of much lower importance in the Border and South East regions. The sectors which are of high importance relative to that for the State are, both Fabricated Metal Products and Electrical and Optical Equipment in the Mid West region; Food and Drink for the South East and South West regions; Textiles in the Border and finally Wood Products in the Midlands. Overall the Border, Midlands and South East regions have few plants in the more high-tech sectors such as Chemicals and Electrical and Optical Equipment while these are particularly important in Dublin and the Mid West.

Table 7 gives details of manufacturing characteristics which were described above. Not surprisingly, Dublin has the lowest ratio of industrial to administrative workers reflecting the large number of headquarters located in that region. Conversely the Border and Midlands region, and to a lesser extent the South East and West regions, have a high ratio of industrial to administrative workers, indication the greater importance of branch plants in these regions.

There are large differences between the regions with regard to gross output per local unit, with the highest (South West) being over twice as high as the lowest (Midlands). The West region also has low gross output and a similar picture emerges for net output. Most of the regions have very similar average number of employees per local unit. However, the Mid West is the exception, with a substantially higher than average number of workers per unit.

The average wage per employee is lowest in the Border, Midlands and West regions and highest in the Dublin region, with a similar picture emerging for average wages of

industrial workers, which are lower than those for administrative workers. There is a substantial gap between net output per employee in the Midlands region and that in South West region, with that for the latter being three times higher than that for the former. Finally, the percentage of net output which is accounted for by the wage bill is lowest in the South West and highest in the Midlands.

Table 6: Regional Distribution of Plants by Main NACE Sector

NACE Code	Border	Dublin	Mid East	Midlands	Mid West	South East	South West	West	State
15 – 16 (Food & Drink)	123 (19 %)	137 (10.8%)	81 (17.9%)	49 (18.3%)	64 (15.0%)	140 (25.4%)	166 (22.6%)	70 (17.3%)	830 (17.3%)
17 – 18 (Textiles)	78 (12.1%)	121 (9.5%)	25 (5.5%)	12 (4.5%)	21 (4.9%)	27 (4.9%)	50 (6.8%)	36 (8.9%)	370 (7.7%)
20 (Wood)	42 (6.5%)	28 (2.2%)	20 (4.4%)	26 (9.7%)	15 (3.5%)	31 (5.6%)	25 (3.4%)	28 (6.9%)	215 (4.5%)
21 – 22 (Paper, publishing)	35 (5.4%)	292 (22.9%)	39 (8.6%)	21 (7.8%)	31 (7.3%)	32 (5.8%)	55 (7.5%)	34 (8.4%)	539 (11.2%)
24 (Chemicals, etc.)	21 (3.2%)	77 (6.0%)	29 (6.4%)	6 (2.2%)	19 (4.5%)	24 (4.4%)	45 (6.1%)	16 (4.0%)	237 (4.9%)
26 (Non-met-minerals)	36 (5.6%)	56 (4.4%)	28 (6.2%)	20 (7.5%)	23 (5.4%)	45 (8.2%)	44 (6.0%)	24 (5.9%)	282 (5.9%)
27 – 28 (Fabricated metal products)	56 (8.7%)	129 (10.1%)	44 (9.7%)	37 (13.8%)	67 (15.7%)	75 (13.6%)	81 (11.0%)	45 (11.1%)	534 (11.1%)
29 (Machinery & equipment)	50 (7.7%)	68 (5.3%)	39 (8.6%)	19 (7.1%)	38 (8.9%)	57 (10.3%)	51 (6.9%)	30 (7.4%)	352 (7.3%)
30 – 33 (Electrical & optical Equipment)	35 (5.4%)	145 (11.4%)	33 (7.3%)	17 (6.3%)	71 (16.7%)	21 (3.8%)	62 (8.4%)	44 (10.9%)	428 (8.9%)
All Industries	647	1,273	453	268	426	551	735	405	4,803

Source: Census of Industrial Production, 1996.

Table 7: Manufacturing Characteristics by Planning Region

	Border	Dublin	Mid East	Midlands	Mid West	South East	South West	West	State
Local Units (nos.)	647	1,273	453	268	426	551	735	405	4,803
Ind/Admin empl. Ratio	3.93	1.88	2.58	3.62	2.78	3.32	2.61	3.19	2.60
GO/ local unit (£'000)	7,609	7,263	8,354	4,176	9,740	7,041	10,435	5,710	8,007
NO/ local unit (£'000)	3,567	4,340	3,986	1,750	3,834	3,221	5,424	2,705	4,056
Employees/ local unit (nos.)	48	48	49	46	59	49	46	49	51
Average wage/employee (£p.a.)	13,194	18,442	15,859	13,314	16,559	15,733	16,846	13,655	16,395
Average wages/industrial worker (£p.a.)	11,620	16,179	13,190	11,922	14,323	14,028	14,671	11,786	14,341
NO/ employee (£'000)	74,413	90,964	80,801	38,460	64,914	65,559	116,670	55,152	79,658
Wage bill/NO (%)	17.6	20.2	19.5	34.4	25.4	23.8	14.3	24.6	20.5

Source: Census of Industrial Production, 1996.

Overall manufacturing in the South West appears to be particularly productive and profitable, followed by manufacturing in the Border, Dublin and Mid East regions, while the Midlands and to a lesser extent the Mid West, South East and West regions appear to lag substantially behind.

4.2 MANUFACTURING WITHIN THE MAIN REGIONS

In our earlier discussion about functional regions we highlighted the fact that the existing regions may not constitute distinct economies in any formal sense. We further explore this issue by noting some of the key characteristics of the manufacturing sector at the sub-regional (or county) level. However, sub-regional data need to be interpreted with caution since, due to the relatively small number of manufacturing plants in some counties, individual firms can substantially distort the overall figures for an individual county.

Starting with the Dublin region, there is considerable heterogeneity between its sub-regions. On average, manufacturing in the region has the characteristics of modernity, but these tend to be most apparent in the Dun Laoghaire-Rathdown and the Fingal sub-regions. The older centre city area has the largest concentration of plants, but these display some of the characteristics of traditional rather than modern manufacturing (i.e., smaller size, lower productivity). The adjoining Mid-East region (Table A3) resembles the State on average, but modern plants tend to be concentrated in Kildare and to a slightly lesser extent in Wicklow, with the larger plants in terms of employees and output being located in the former. The contrary is true for Meath, where the more traditional plants appear to be more prevalent as indicated by low net output per employee and a high share in net output of the wage bill.

The Border region (Table A1) shows up as traditional on average, but has a very high degree of internal heterogeneity. Manufacturing plants in Louth are considerably more modern on average than in Donegal: Louth has the lowest ratio of industrial to administrative workers, plants are largest in terms of output measures (but not in terms of size as defined by number of employees), wages are highest and, significantly, the wage bill as a fraction of net output is abnormally low. In Donegal these characteristics are reversed: Donegal has the highest ratio of industrial to administrative workers of all the Irish sub-regions (5.53, with a Region average of 3.93 and a State average of 2.60). This suggests that the location of Dundalk on the Belfast-Dublin corridor has attracted modern industry to the area, and that Donegal suffers from its extreme peripherality.

Similar characteristics to the Border are shared by the Midlands region (Table A4) which displays more traditional manufacturing characteristics than the state average, with small plants, low wages and low productivity. However, no sub-region stands out since there is no large urban centre about which clusters could form. Some of these characteristics are also shared by the West region (Table A8). Here, however, there is a rather complex degree of heterogeneity. Galway appears to have the most modern manufacturing on the basis of technology, wage levels and productivity. Roscommon is considerably more traditional, with the second highest ratio of industrial to administrative workers. Mayo is in an intermediate situation, with a small number of very modern plants distorting profitability, but with many of the traditional characteristics of Roscommon.

The final group of regions (Mid West, South East and South West) are characterised by intermediate levels of urbanisation (see Table 3 above). In the case of the Mid West (Table A5), Clare and Limerick display many of the characteristics of modernity, with Limerick in particular being better than the State average for six of the eight comparable measures. On the two remaining measures (ratio of industrial to administrative workers and the wage share of net output), Limerick is almost identical to the state average. Within the Mid West region, Tipperary North Riding displays the most traditional characteristics.

In the adjoining South East region (Table A6), the mix of characteristics between the sub-regions is more varied, with no single region dominating the picture. The largest plants and the highest profit share of net output, but low average wage rates characterise Tipperary South Riding. Carlow, Kilkenny, Waterford, and Wexford all have many traditional characteristics with the exception of above average wage rates in Waterford. Finally, the South West region, centred on Cork city, displays a dramatic dichotomy between the modernity of Cork and the traditional structure of the very much smaller Kerry.

Our brief examination of the constituent sub-regions of the eight Planning regions points to a high degree of internal heterogeneity which further suggests that these do not form functional regions. Within a Planning Region there can be dramatic differences in the structure of manufacturing. Perhaps the greatest contrasts occur between Louth and Donegal (within the relatively poor Border region), and between Cork and Kerry (within the relatively prosperous South West region). The role of urbanisation shows through as a crucial factor in determining the modernity of a region's or sub-region's manufacturing capacity. Leaving aside the anomalous case of Dublin, other examples include Galway (in the West), Cork (in the South West), and Louth (in the Border). In the case of the Mid East, proximity to the Dublin conurbation appears to influence two of the sub-regions (Kildare and Wicklow), but not Meath.

5 Regional Policy

So far we have concentrated on highlighting the characteristics of the regions and particularly manufacturing activity without alluding to the forces which have given rise to the regional differences. This spatial pattern is the product of two forces; regional/industrial policy and economic factors. We first review the debate on, and influence of, regional policy in Ireland.

A vigorous debate on a "growth centres" policy versus one favouring dispersal first flourished in Ireland during the early to mid-1960s, culminating with the commissioning of the Buchanan Report in 1966. After extensive review of past performance and analysis of options, Buchanan proposed a new policy orientation that embodied the growth centre idea, namely that 75 per cent of new industrial employment over a twenty year period should be concentrated into a limited number of urban areas. In particular, the development of two national growth centres at Cork and Limerick would enable them to attain a sufficient size to compete effectively with Dublin and six additional regional growth centres and four local centres were to receive preferential treatment.

Buchanan's proposals generated a heated and sometimes acrimonious debate. The government was reluctant to implement them, opting essentially for a continuation of the previous policy of dispersal. The formal rejection of the policy of concentration was eventually embodied in the first five-year plan of the Industrial Development Authority (IDA), published in 1972, and formal growth centre policy was quietly dropped.

A major economic argument against the promotion of growth poles made by the IDA was that improvements in transport and communications had greatly increased the locational flexibility of industry and that this was reflected in the ability of the weaker regions, outside the proposed Buchanan growth centres, to attract and support foreign direct investment. IDA policy was formulated in terms of systematic regional dispersal, accompanied by a comprehensive programme of fully serviced industrial sites and advance factories and greater locational variability in grants made available.

To the extent that IDA policy was indeed targeted at a redistribution of manufacturing employment more evenly throughout the country, it was quite successful. Using *location ratios* where these are obtained by dividing the percentage of total *employment in manufacturing* by the percentage of the total *population* (i.e., a value of unity indicates employment shares that are exactly proportional to regional population), by the late 1970s the earlier bias in favour of Dublin (the East region) had been largely removed and all the other regions had improved their position (Bradley, 1995).

Such a relatively equitable regional outcome might suggest that concentration was not necessary to ensure both strong national and regional growth. However, a different, less benign interpretation can be made based on specific features of the Irish experience of foreign direct investment, which was the main source of post-1960 industrial growth. The early foreign-owned industries locating in Ireland were originally, and largely remained, branch plants that seldom became involved in the core stages of product design and development, these activities remaining with the foreign parent company. Rather they were involved in relatively routine assembly and

manufacturing processes, often at the standardised stage of the product cycle which did not require close linkages with indigenous firms. Nevertheless these branch plants created employment opportunities which were badly needed. Furthermore, by importing technology, foreign direct investment increased the level of indigenous competence through the labour force which became accustomed to modern technology and work practices.

It is difficult to make an absolutely convincing case that the policy of dispersion of multinational branch plants definitely did impede the development of synergies between foreign and indigenous firms. However, there are many direct and indirect indications that show what synergies did come about were at best weak. For example, although industrial output and exports grew rapidly in the key areas where foreign-owned multinational firms dominated (e.g., chemicals, pharmaceuticals, computers, instrument engineering), the employment response was initially very attenuated both in these key sectors themselves and in the industrial and service sectors that would be expected to benefit from synergies (NESC, 1992). Furthermore, IDA work on targeting foreign-indigenous synergies (e.g., the National Linkage Programme) is designed to strengthen what are admitted to be weak linkages.

Geographic dispersion was obviously not the only issue at the root of the problem of weak foreign-indigenous synergies. In addition, the gulf that existed between the new high technology foreign-owned firms and existing largely traditional indigenous industries was probably too large to bridge satisfactorily during the first decades of the export-lead growth strategy. However, although the inter-firm synergies may have been weak, there were obvious direct benefits to the national and regional economies in terms of conventional income multiplier effects. A further important benefit came through human capital and labour market externalities, as the expansion of the Irish education system after the mid-1960s interacted with the demand of the foreign sector for an increasingly skilled labour force. After three decades of large-scale inward investment, the position in Ireland is now transformed.

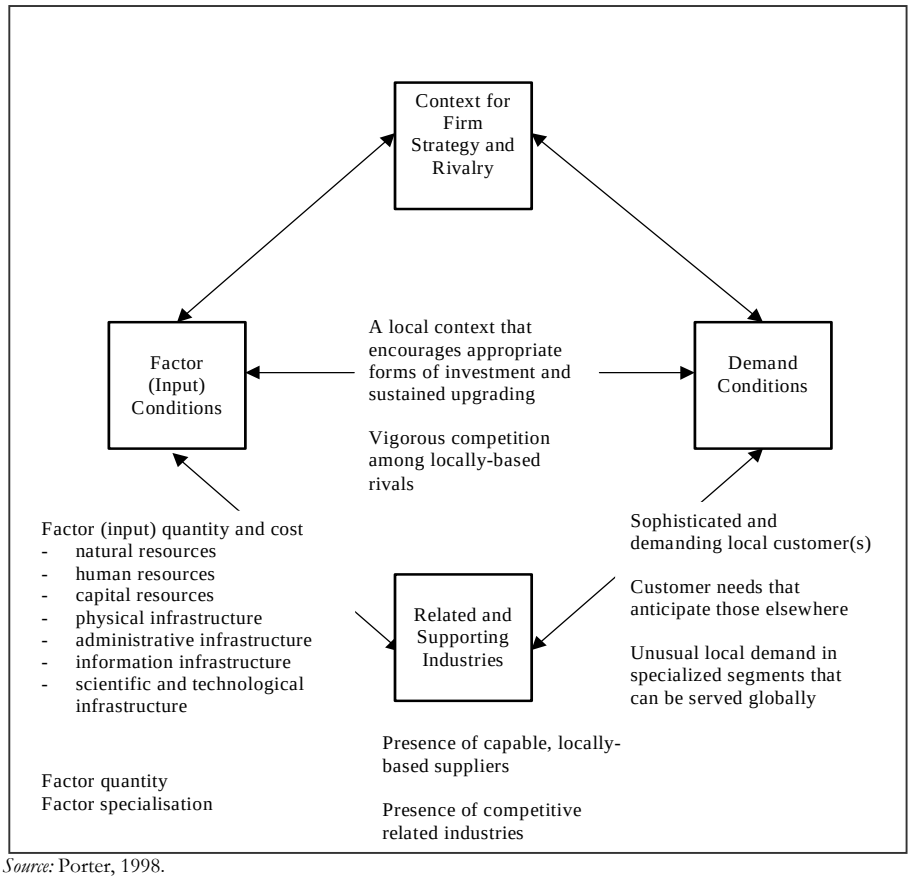
More recently Ireland has succeeded in attracting sufficient firms in the more modern sectors such as computer, instrument engineering, pharmaceutical and chemical sectors to merit a description of sectoral "agglomerations" or "clusters". However these Irish agglomerations and clusters are not as well developed or embedded as the dynamic clusters in regions like Baden-Wurttemberg in Germany, Silicon Valley and Route 128 in the US, and the M4 Corridor in the UK. Nevertheless, the levels of skills involved are being constantly upgraded and Ireland has become an attractive location for certain high-technology activities simply because of the presence of other similar industries, with their labour market externalities.

6 Economic Factors

The current spatial pattern of economic activity is not merely the outcome of regional/industrial policy. Rather it is the product of interaction between such policies and economic factors, such as comparative advantage, market conditions and agglomeration economies.

In the late 1980s a comprehensive strategic framework was developed within which the sources of national and regional competitive advantage could be placed – the so-called Porter diamond (Figure 1).

Figure 1: Sources of Locational Competitive Advantage



Source: Porter, 1998.

Porter asks how a nation or region can achieve international success in any particular industry or in groups of industries. His answers identify four broad attributes (the competitiveness "diamond") that shape the environment in which firms compete:

i. *Factor conditions*: the availability and quality of the factors of production such as skilled labour, infrastructure, etc.

ii. *Demand conditions*: the nature of local and external demand for the industry's product or service, where local demand can play a vital role in encouraging product innovation and improvement.

iii. *Related and supporting industries*: the presence or absence of both supplier and related industries that are also internationally competitive.

iv. *Firm strategy, structure, and rivalry*: the national conditions governing how companies are created, organised, and managed.

Porter's main contribution to deepening understanding of national and regional competitive advantage lies in the emphasis he placed on the interactions between these four attributes and the detailed study of individual successful nations, regions and industries that illustrate these interactions at work. In the early 1990s, Irish policy makers took note of Porter's treatment of competitive advantage, a body of work that

has been influential in the recent formulations of national and regional industrial strategies such as the Culliton Report of 1992.[11]

The Irish economy is only relevant to strategic planning of US-based firms as a profitable location for production of products mainly designed and developed elsewhere, and a location where an educated labour force as well as adequate infrastructure are available at reasonable cost. Until recently, the branch plant nature of foreign firms located in Ireland tended not to encourage the building of strong national or regional performance as suggested by the model of the Porter "diamond". It is well known that dependence purely on external investment makes it difficult to generate cumulative self-sustaining growth. Nevertheless, the branch plants of the multinationals that locate in Ireland have not in general been characterised by "footloose" behaviour (McAleese and Counahan, 1979). Thus, although they initially developed only limited linkages with the rest of the economy (O'Malley, 1989, pp. 177-181) many have stayed in Ireland because of the fiscal and other advantages offered.

In a recent essay on Ireland's growth, Paul Krugman suggested that economies can be viewed in two different ways: as a national economy or as a regional economy (Krugman, 1997). The facts that one is examining may be the same, but the national or regional perspectives will make a big difference to what one believes is important. Regionality involves more than small size and dependence on external trade. Krugman suggests that what makes Ireland as well as its regions resemble, say, Massachusetts, is that Irish labour markets as well as product and capital markets are very open. This is in sharp contrast to many other small EU states and their regions.

It is when he turns to examining the self-reinforcing nature of Irish success that Krugman comes close to the issues that will be central to the management of the Irish economy, and indeed all small open EU national and regional economies in the next decade. Krugman suggests that the Irish experience is a working out of regional Marshallian externalities, i.e.,:

(a) An initial clustering in urbanised areas of similar industries (mainly foreign owned and in the areas of computer equipment and pharmaceuticals) supported by local suppliers of specialised inputs subject to economies of scale;

(b) These clusters generated a local labour market for skilled workers which further facilitated the growth of the cluster. Education reforms (in particular the Regional Technical Colleges) as well as the human resource policies of the EU Structural Funds were crucial at this stage;

(c) Spillovers of information further encouraged growth in the electronics and pharmaceutical sectors and provided the basis for additional clustering effects, often in traditional areas that benefited from new technologies (e.g., food processing). To facilitate this stage, the improvements in physical infrastructure and in the productive environment supported by the EU were crucial. Some of the benefits at this stage moved out from the main urbanised areas into satellite towns and their hinterlands;

(d) A consensual process of social partnership was put in place from 1986 onwards to ensure that there were as few losers as possible in the economic restructuring that accompanied such a virtuous circle, with the result that growth was less likely to be choked off by industrial unrest as the social partners negotiated over their respective shares of added value. Although there were valuable lessons to be learned from wider EU experience in this area, the policies actually put in place were domestic in origin and national in focus.

However, Krugman also draws attention to some of the risks to which Ireland's successful regions are exposed. First, the dynamic foreign manufacturing base is concentrated on a narrow range of technologies that are fast moving towards maturity. Second, the policy initiatives that ensured an advantageous "first mover" status in the early 1960s may not be sufficient to facilitate the inevitable switches to newer technologies since other countries and regions have been learning by watching Ireland doing!

[11] See for instance Section 7.4 in the Culliton Report (Industrial Policy Review Group, 1992).

7 Summary and Conclusions

In general when one examines how economies have developed over time and over space, there are three characteristic features:

i. Economic activity tends not to be spread uniformly over space or over sectors, but tends to cluster or concentrate;

ii. Such clustering is clear evidence of some kind of increasing returns (i.e., doubling inputs more than doubles outputs) and this should be exploited by policy makers;

iii. "Growth centres" in specific locations (usually around cities of above a certain size) will tend to interact with each other over space to form corridors, or elongated growth centres.

As a description of the dynamics of growth, these points have wide application. The first element simply describes the physical realities of the cities, towns, villages and less populated hinterlands to be found in any country or region. The second element provides an economic explanation for why clustering occurs, and has been a very active area of research in industrial economics over the past decade (i.e., the "new" growth and trade theories). The third element is a logical consequence of the first two and describes the interaction of two or more contiguous growth poles as their areas of influence begin to overlap.

We have shown that these features can also be observed in Ireland. Thus the more successful Irish regional economies are the ones which grew up around the larger urban centres where clusters and therefore increasing returns are more likely to develop. This has come about in spite of the long-term aim of industrial policy to disperse the benefits of FDI throughout the country.

To the extent that some regions appear to have benefited less from the national success of manufacturing, there are lessons to be learned from past experience which should be incorporated into the next National Development Plan.[12] Clearly a policy of remaking the island into something resembling a single conurbation is as impracticable as it is undesirable. Hence, high technology activity is likely to continue to cluster about a limited range of large centres of population, and this should be further encouraged. However the aim of policy over the period 2000-2006 must also be to ensure that the more remote geographic areas continue to be facilitated in their efforts to link into these urban growth poles through the development of physical infrastructure and the identification of sectors that can thrive in non-urban environments.

A feature of recent economic policy in Ireland is that policy makers have transferred some of those areas of economic management, such as monetary policy, which may be better handled within larger blocks – like the EU – while refining those policies that address the specific local efficiency of the supply side of the economy (education, training, competitiveness), as well as issues related to equity and Social Partnership. Such policies will always retain essentially regional and local characteristics.

However the nature of such policies and how they are implemented is important. A recent report of the Northern Ireland Economic Council examined the political and economic governance of four European regions: Jutland; Rhone-Alpes; Saarland and Abruzzo (NIEC, 1996). It concluded that the most active regional governments are to be found in the most economically successful regions, and that their ability to act in a pro-active manner is predicated upon their location within national states characterised by decentralised systems of governance. Successful regions tend to be characterised by distinctive forms of local regulation and governance. They also have systems of governance which embrace enabling and facilitating institutions within the local state and civil society, as well as bridging the permeable boundaries between them and adjoining regions and states. Part of the problem of less successful regions (such as

[12] It has been recommended that the *National Development Plan* should have a strong regional dimension, and this would have the potential to alter the regional distribution of economic activity and remove disparities (Fitz Gerald *et al.*, 1999; Fitzpatrick Associates, 1999a,b).

Northern Ireland, the North of England, and the Saarland) is that they are locked into institutional structures that were relevant to an earlier phase of successful economic development but which now constitute a barrier to moving onto a new development trajectory.

Given the small size of Ireland as a whole, regional governance systems are unlikely to take over all (or even a significant proportion) of the policymaking roles presently exercised by central government. Nevertheless, the next stages of modernisation of the Irish economy will need to give much more attention to regional industrial policy, if only to address the congestion that has come to characterise the urban centres of population and industrial concentration.

Appendix: Manufacturing Characteristics Within Planning Regions

Table A1: Manufacturing Characteristics in the Border region

	Cavan	Donegal	Leitrim	Louth	Monaghan	Sligo	Border	State
Local Units (nos.)	77	175	34	177	110	74	647	4,803
Ind/Admin empl. Ratio	3.20	5.53	4.51	3.10	3.75	3.81	3.93	2.60
GO/ local unit (£'000)	6,758	3,450	1,854	16,674	4,422	4,031	7,609	8,007
NO/ local unit (£'000)	2,041	1,375	619	9,267	1,259	1,492	3,567	4,056
Employees/local unit (nos.)	41	57	32	50	37	51	48	51
Avg. wage/employee (£ p.a.)	14,110	10,852	11,181	16,129	12,873	12,646	13,194	16,395
Avg. wages/industrial worker (£p.a.)	12,464	9,810	10,422	13,923	11,914	10,917	11,620	14,341
NO/ employee (£000)	50,195	23,993	19,304	183,717	33,798	29,523	74,413	79,658
Wage bill/NO (%)	27.8	45.2	57.4	8.7	37.5	42.7	17.6	20.5

Source: Census of Industrial Production, 1996.

Table A2: Manufacturing Characteristics in the Dublin Region

	Dublin	Dun Laoghaire-Rathdown	Fingal	South Dublin	Dublin	State
Local Units (nos.)	781	130	111	251	1,273	4,803
Ind/Admin empl. Ratio	2.01	1.31	1.67	2.00	1.88	2.60
GO/ local unit (£000)	5,210	14,411	16,271	5,966	7,263	8,007
NO/ local unit (£000)	2,788	11,691	10,310	2,722	4,340	4,056
Employees/ local unit (nos.)	46	44	68	47	48	51
Avg. wage/ employee (£p.a.)	18,352	18,863	19,677	17,720	18,442	16,395
Avg. wages/ ind. Worker (£p.a.)	16,058	16,581	18,089	15,233	16,179	14,341
NO/ employee (£000)	61,095	266,534	151,284	57,759	90,964	79,658
Wage bill/NO (%)	29.8	7.0	13.0	30.5	20.2	20.5

Source: Census of Industrial Production, 1996.

Table A3: Manufacturing Characteristics in the Mid-East Region

	Kildare	Meath	Wicklow	Mid East	State
Local Units (nos.)	160	152	141	453	4,803
Ind/Admin empl. Ratio	2.19	3.12	2.86	2.58	2.60
GO/ local unit (£000)	13,777	4,671	6,172	8,354	8,007
NO/ local unit (£000)	6,487	1,515	3,811	3,986	4,056
Employees/ local unit (nos.)	64	43	40	49	51
Avg. wage/ employee (£ p.a.)	16,189	15,800	15,324	15,859	16,395
Avg. wages/ ind. worker (£ p.a.)	12,430	14,034	13,483	13,190	14,341
NO/ employee (£000)	101,107	35,538	95,934	80,801	79,658
Wage bill/NO (%)	15.9	44.2	15.9	19.5	20.5

Source: Census of Industrial Production, 1996.

Table A4: Manufacturing Characteristics in the Midlands Region

	Laois	Longford	Offaly	Westmeath	Midlands	State
Local Units (nos.)	59	48	86	75	268	4,803
Ind/Admin empl. Ratio	3.88	3.72	4.66	2.84	3.62	2.60
GO/ local unit (£000)	2,944	5,578	3,300	5,254	4,176	8,007
NO/ local unit (£000)	972	2,086	1,382	2,569	1,750	4,056
Employees/ local unit (nos.)	33	46	44	56	46	51
Avg. wage/ employee (£ p.a.)	12,330	13,696	11,638	15,090	13,314	16,395
Avg. wages/ ind. worker (£ p.a.)	10,735	12,720	10,627	13,369	11,922	14,341
NO/ employee (£000)	29,131	45,090	31,298	45,792	38,460	79,658
Wage bill/NO (%)	42.1	30.1	37.1	32.7	34.4	20.5

Source: Census of Industrial Production, 1996.

Table A5: Manufacturing Characteristics in the Mid-West Region

	Clare	Limerick	Tipperary North Riding	Mid West	State
Local Units (nos.)	141	211	74	426	4,803
Ind/Admin empl. Ratio	2.43	2.69	4.06	2.78	2.60
GO/ local unit (£000)	5,425	13,746	6,540	9,740	8,007
NO/ local unit (£000)	2,865	4,993	2,376	3,834	4,056
Employees/ local unit (nos.)	55	61	60	59	51
Avg. wage/ employee (£ p.a.)	17,139	16,994	14,259	16,559	16,395
Avg. wages/ ind. worker (£ p.a.)	14,634	14,790	12,596	14,323	14,341
NO/ employee (£000)	51,667	81,566	39,727	64,914	79,658
Wage bill/NO (%)	33.1	20.7	35.6	25.4	20.5

Source: *Census of Industrial Production*, 1996.

Table A6: Manufacturing Characteristics in the South-East Region

	Carlow	Kilkenny	Tipperary South Riding	Waterford	Wexford	South East	State
Local Units (nos.)	67	104	76	148	156	551	4,803
Ind/Admin empl. Ratio	4.05	2.69	2.99	3.39	3.57	3.32	2.60
GO/ local unit (£000)	4,931	4,764	18,777	7,247	3,551	7,041	8,007
NO/ local unit (£000)	2,132	1,391	11,723	2,903	1,069	3,221	4,056
Employees/ local unit (nos.)	52	31	68	66	35	49	51
Avg. wage/ employee (£ p.a)	15,231	16,530	14,841	17,367	13,508	15,733	16,395
Avg. wages/ ind. Worker (£ p.a)	13,605	14,627	12,652	15,818	12,070	14,028	14,341
NO/ employee (£000)	41,277	45,166	171,798	44,018	30,527	65,559	79,658
Wage bill/NO (%)	36.6	36.0	8.6	39.2	43.8	23.8	20.5

Source: *Census of Industrial Production*, 1996.

Table A7: Manufacturing Characteristics in the South-West Region

	Cork	Kerry	South West	State
Local Units (nos.)	600	135	735	4,803
Ind/Admin empl. Ratio	2.47	3.73	2.61	2.60
GO/ local unit (£000)	11,768	4,508	10,435	8,007
NO/ local unit (£000)	6,275	1,642	5,424	4,056
Employees/ local unit (nos.)	48	38	46	51
Avg. wage/ employee (£ p.a)	17,378	13,849	16,846	16,395
Avg. wages/ ind. worker (£ p.a)	15,069	12,660	14,671	14,341
NO/ employee (£000)	129,851	42,826	116,670	79,658
Wage bill/NO (%)	13.3	31.9	14.3	20.5

Source: Census of Industrial Production, 1996.

Table A8: Manufacturing Characteristics in the West Region

	Galway	Mayo	Roscommon	West	State
Local Units (nos.)	222	132	51	405	4,803
Ind/Admin empl. Ratio	2.53	4.41	5.26	3.19	2.60
GO/ local unit (£000)	6,033	4,655	7,038	5,710	8,007
NO/ local unit (£000)	3,202	2,427	1,261	2,705	4,056
Employees/ local unit (nos.)	51	49	40	49	51
Avg. wage/ employee (£ p.a)	14,420	12,567	12,794	13,655	16,395
Avg. wages/ ind. worker (£ p.a)	11,994	11,322	12,210	11,786	14,341
NO/ employee (£000)	62,392	49,828	31,506	55,152	79,658
Wage bill/NO (%)	23.0	25.0	40.3	24.6	20.5

Source: *Census of Industrial Production*, 1996.

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