CHAPTER 3

TRENDS IN THE REGIONAL ECONOMIC ACTIVITY OF IRELAND: THE ROLE OF PRODUCTIVITY

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ABSTRACT

The analysis in this chapter shows that the differential rate of growth in the manufacturing sector was the key driving force behind regional disparities in Ireland, and that this in turn has been driven by differential productivity growth. The degree to which the divergent pattern is due to the underlying industry characteristics was considered in detail. The analysis suggests that there are substantial differences between regions in terms of those characteristics and that these are significantly related to economic performance. These characteristics include the average scale, the degree of foreign ownership and the level of process sophistication, which in turn impact on the level of productivity and profitability.

3.1 Introduction

Perhaps the most pervasive feature about economic activity is that it is not spread evenly across space. Thus, regional disparities can be observed in all countries. Economists have extensively researched the underlying processes that lead to these disparities over the last decade and a half, following a long period over which economists largely ignored economic geography. This literature shows that while the uneven distribution of economic activity is an equilibrium phenomenon, this need not be the most efficient outcome as it results from externalities and path dependencies.[1] This justifies the political concerns about regionally balanced development. In Ireland, these political concerns appear to have grown over recent years with the Government seeking to bring about more balanced regional development through the National Development Plan and the National Spatial Strategy.[2]

The degree to which regional disparities can be observed depends crucially on the variable chosen. Thus, for example if one considers labour market indicators the differences between Irish regions are modest and declining. The difference between regions regarding the employment rate has declined from 7.7 per cent in 1998 down to 4.2 per cent in 2005. More strikingly, the unemployment rates across regions have converged almost continually between 1988 and 2005 with the gap between regions with the highest and lowest unemployment rates declining from 7.1 per cent to 2.9 per cent.[3] Another commonly used indicator is population growth. Again this shows that if anything, the more peripheral regions are performing better than those considered to be part of the core. Between 2002 and 2006 the slowest population growth was recorded in Dublin and the Mid-West while the fastest growth was recorded in the Mid-East and the Midlands. While the growth in these regions is likely to be related to the growth of the Greater Dublin metropolitan region, the growth in counties such as Leitrim, Cavan and Wexford also substantially exceeded the national average.

Turning to the variables more commonly considered by economists in relation to regional performance, a somewhat contradictory picture emerges. The overall gaps with regard to total per capita income and per capita output have declined between 1991 and 2003 from 33 per cent to 25 per cent and from 71 per cent to 66 per cent respectively. This suggests that there is convergence relating to these variables but a closer inspection through the calculation of the standard deviation reveals that while the level of income per capita has indeed converged, the level of per capita output has in fact diverged, which is a continuing trend (see Boyle et al., 1999 or O'Connor, 1999).

The fact that the labour market, demographic and income trends show convergence suggests that either the market is delivering a more even pattern of development or government policies aimed at generating more balanced regional development are effective. Of course there may well be a pay off between efficiency and spatial equity so this outcome is not necessarily the welfare maximising outcome.

While the regions are converging in terms of most variables, the divergence in output suggests that a closer analysis of output is warranted. This is clearly important for policy formation since the underlying driving forces that are behind the trends in output may well require policy intervention in order to safeguard the future economic performance at the regional level. In particular, the degree to which these differences are driven by productivity differences and their underlying factors is important and that is the subject of this chapter.

The analysis presented here updates previous work by Bradley and Morgenroth (1999) and to some extent the work of O'Leary (2001) which both covered the period to 1996 thus omitting a large part of the boom period of the late 1990s. In updating the analysis of Bradley

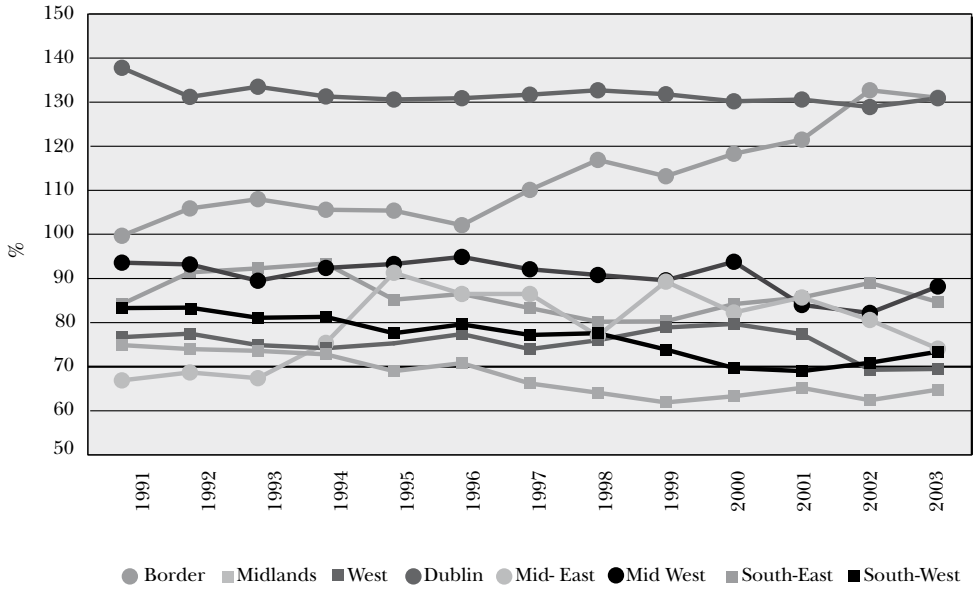
and Morgenroth (1999), the focus is on the evolution of the key characteristics of the industrial sector at the regional level, rather than the analysis at the regional and county level at one point in time. Unfortunately, data limitations mean that a comprehensive analysis is only possible for manufacturing and thus the services sector, which is becoming increasingly important, has to be largely ignored.

This chapter is organised as follows. Section 3.2 considers the evolution of regional output and its structural change. Section 3.3 decomposes the growth in output per capita into its productivity and labour market components. Section 3.4 outlines in more detail the underlying industry characteristics at the regional level while Section 3.5 briefly reviews some other underlying factors. Section 3.6 summarises the findings and draws some conclusions.

3.2 Gross Value Added and Structural Change

As was outlined above, in terms of Gross Value Added (GVA) per capita, there appears to be a process of divergence across regions. This is apparent in Figure 3.1, which shows that apart from Dublin, only the South-West has a GVA per capita in excess of the national average. Thus, the highest level of output per capita is found in the two regions with the largest urban centres. While the relative position of Dublin has remained relatively stable the South-West has substantially improved its relative position over time. Indeed it is the region with the most substantial change in the index. Of course, Dublin and the South-West together account for 57 per cent of total GVA and so they substantially determine the national average. While the overall pattern is characterised by divergence, if one excludes Dublin and the South-West then no pattern of convergence or divergence is observed. Therefore the divergence is driven substantially by the change in the relative position of the South-West. The remainder of this section investigates the sources of the divergence in more detail. It is however important to note that, as was pointed out by O'Leary (1999; 2001) among others, the published GVA figures are distorted through transfer pricing and profit repatriation of foreign multinationals, which is more important in some regions than in others.

Figure 3.1: Index of per Capita GVA



Source: CSO County Incomes and Regional GDP.

As a first step to analysing the sources of divergence, it is useful to consider the sectoral contributions to regional economic activity. A high share in more traditional activities and especially the primary sector has been shown to contribute to poor economic performance and consequently a shift towards more modern sectors contributes significantly to convergence (see Paci and Pigliaru, 1999).

Table 3.1 shows the sectoral shares to GVA in 1991 and 2003. The most striking feature is the substantial decline in the share of the primary sector (primarily agriculture) which now only accounts for 2.5 per cent of GVA. This trend is shared across all regions and indeed regions with a larger share in the primary sector in 1991 recorded a substantially faster decline than other regions (correlation coefficient –0.98). Industry recorded an overall increase in importance but this was not a trend shared across all regions, in that industry declined in importance in all regions except for the Mid-East, South-East and South-West. These regions also recorded a decline in the importance of market and non-market services, contrary to the overall trend of a growing importance of services. Unfortunately the data on the secondary sector cannot be disaggregated into building/construction and manufacturing, which would allow for an assessment of the role of the construction sector in driving the growth of the secondary sector.

Table 3.1: Sectoral Distribution of GVA by Branch, 1991 and 2003

Region	Agriculture, Forestry and Fishing		Manufacturing, Build. and Constr.		Market and Non Market Services		Total GVA
	1991	2003	1991	2003	1991	2003	
Border	13.1%	5.3%	42.4%	35.4%	44.5%	59.3%	100%
Midlands	15.5%	5.0%	35.6%	29.7%	48.9%	65.3%	100%
West	13.4%	4.6%	33.9%	30.2%	52.6%	65.2%	100%
Dublin	0.5%	0.2%	28.8%	27.0%	70.7%	72.7%	100%
Mid-East	12.2%	3.2%	36.9%	47.5%	50.9%	49.2%	100%
Greater Dublin	2.0%	0.8%	29.9%	30.6%	68.1%	68.6%	100%
Mid-West	11.3%	3.4%	41.3%	40.6%	47.4%	55.9%	100%
South-East	16.4%	4.9%	39.1%	4.0%	44.6%	51.1%	100%
South-West	12.7%	2.8%	42.0%	57.3%	45.3%	39.9%	100%
State	**8.2%**	**2.5%**	**35.2%**	**38.1%**	**56.6%**	**59.4%**	**100%**

Source: CSO County Incomes and Regional GDP.

It is possible to decompose the sectoral sources of regional growth and their contribution to overall growth relative to the national average (see Morgenroth and O'Malley, 2003), the results of which are shown in Table 3.2. As can be seen from the first set of rows in the table, in all regions except Dublin there was a negative growth rate for the primary sector. However, since the relative share of the primary sector is quite small its performance makes only a small contribution to the overall growth rate (see the second set of rows). The tertiary sector has on average the largest contribution to overall growth, but in the case of two regions, namely the Mid-East and the South-West, the secondary sector has grown particularly strongly.

Considering the performance of each sector in each region relative to the national performance of that sector (the third set of rows) reveals the source of the convergence trends. This analysis reveals that the performance of the secondary sector had the largest bearing on the convergence/divergence performance of the regions. Of course the data limitations do not allow for a disaggregating, which could reveal which sub-sector has contributed most to divergence. However, sectoral employment trends indicate that the regional differences in the building and construction sector may in fact be the source of the regional divergence. Furthermore, a more detailed sectoral breakdown, were it available, might indicate whether some of the divergence is simply driven by data distortions due to transfer pricing by foreign multinationals.

Table 3.2: Decomposition of Growth and Convergence

Region	Agriculture, Forestry and Fishing	Manufacturing, Build. and Constr.	Market and Non Market services	Total GVA
Sectoral Growth Rates				
Border	-1.7	6.0	15.0	9.0
Midlands	-3.1	6.3	15.6	9.4
West	-2.5	8.1	14.8	10.2
Dublin	0.5	9.5	11.2	10.7
Mid-East	-1.8	26.0	17.3	18.2
Greater Dublin	-1.3	12.2	11.8	11.7
Mid-West	-3.1	10.1	14.0	10.5
South-East	-2.8	15.0	15.4	12.3
South-West	-3.0	28.2	15.0	18.3
State	**-2.5**	**13.9**	**13.2**	**12.2**
Contributions to Total Growth Rate				
Border	-0.2	2.5	6.7	9.0
Midlands	-0.5	2.3	7.6	9.4
West	-0.3	2.8	7.8	10.2
Dublin	0.0	2.7	8.0	10.7
Mid-East	-0.2	9.6	8.8	18.2
Greater Dublin	0.0	3.6	8.1	11.7
Mid-West	-0.4	4.2	6.6	10.5
South-East	-0.5	5.8	6.9	12.3
South-West	-0.4	11.8	6.8	18.3
State	**-0.2**	**4.9**	**7.5**	**12.2**
Growth Relative to National Average				
Border	0.0	-2.4	-0.8	-3.2
Midlands	-0.3	-2.6	0.2	-2.8
West	-0.1	-2.1	0.3	-1.9
Dublin	0.2	-2.2	0.5	-1.5
Mid-East	0.0	4.7	1.3	6.0
Greater Dublin	0.2	-1.2	0.6	-0.5
Mid-West	-0.1	-0.7	-0.9	-1.7
South-East	-0.2	0.9	-0.6	0.1
South-West	-0.2	7.0	-0.7	6.1

Source: Own calculations using data from the CSO County Incomes and Regional GDP various issues (this data is also available from www.cso.ie).

3.3 The Role of Productivity Growth

Output growth is a function of productivity growth, employment growth and demographic factors and it is straightforward to decompose the total growth into these sources (see Bradley et al., 1997, and at the regional level O'Leary, 2001). More formally we can write the relationship as follows:

$$\frac{Y}{P} = \frac{Y}{L}\frac{L}{P}$$

where Y is the level of GVA, P is the population and L is the number of workers. Thus, GVA per capita is equal to GVA per worker times the employment rate. The latter term could be further decomposed into age dependency; labour force participation and the inverse of the unemployment rate (see Bradley et al., 1997). Since the focus of this paper is on productivity, the simple decomposition of the growth in output per capita is preferred here. Instead of decomposing GVA, O'Leary (2001) used this type of decomposition to analyse the sources of income growth where the effect of profit outflows is accounted for. He found that there was weak divergence between 1979 and 1996, which was largely due to a slowdown in productivity convergence. Here we focus our attention on the published data, which of course is distorted due to profit repatriation. However, since the published data is the data used for policymaking such as the determination of Structural Funds eligibility, it is nevertheless important to consider the official data.

Figure 3.2 shows the decomposition of output per capita growth into the two components, which together account for the total growth in output per capita. The figure shows that the growth of the employment rate was more evenly distributed across the regions than productivity growth, which was quite heterogeneous. Overall, the two contributed equally in the first two periods but in the more recent period productivity was the predominant source for growth. Particularly significant was the growth in productivity in the Mid-East for the second half of the 1990s and the strong growth in the South-West during all periods. The employment rate increased particularly strongly over the latter half of the 1990s but has not grown as strongly between 2000 and 2003.

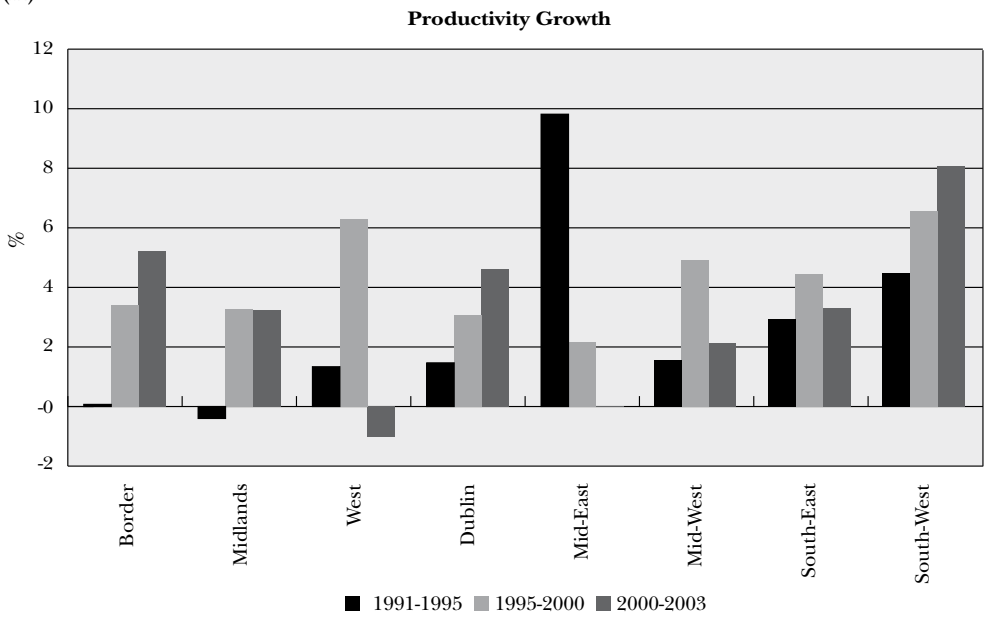
Interestingly, the standard deviation of productivity growth has declined significantly from the early 1990s and the productivity growth in the more recent periods is negatively correlated with that in the early 1990s, which indicates that productivity growth differentials are decreasing. The decomposition suggests that over the more recent period productivity growth differentials were not responsible for the further widening in output disparities in the Border and Midlands regions while they actually helped the South-East in improving its relative position. However, in the West the decline in productivity has had a negative effect on the relative position in terms of output per capita.

A closer inspection of productivity at the sectoral level, which due to the lack of consistent sectoral employment data can only be conducted for the period 1994 to 2003, shows that the level of productivity in the primary sector has been steadily increasing and that productivity levels have been converging. This is consistent with positive structural change in the agricultural sector where the number of full time farmers has declined. On the other hand, productivity in industry, while recording strong growth on average, has not been evenly distributed and in fact has been subject to strongly divergent patterns. Finally, services productivity, while growing more modestly than that of industry, has not been subject to a divergent pattern. Thus, overall,

the evidence suggests that the differential performance of industry is the significant driver of divergence in output per capita.

Figure 3.2: Average Productivity and Employment Growth Rate for Three Sub-Periods

(A)



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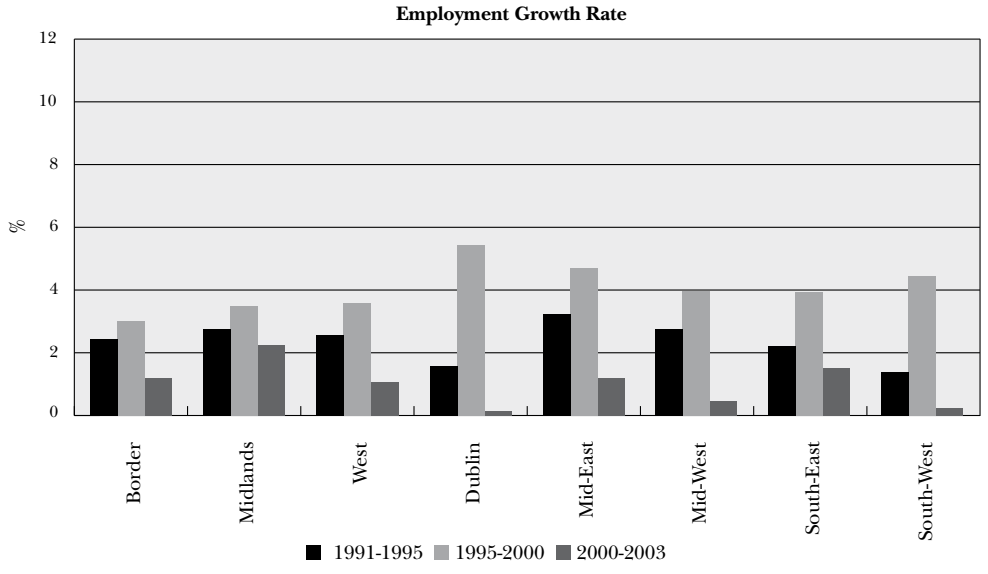


Source: Own Calculations using CSO County Incomes and Regional GDP, various issues, CSO Quarterly National Household Survey, CSO Labour Force Survey, CSO Census of Population, and CSO Population and Migration Estimates, various issues.

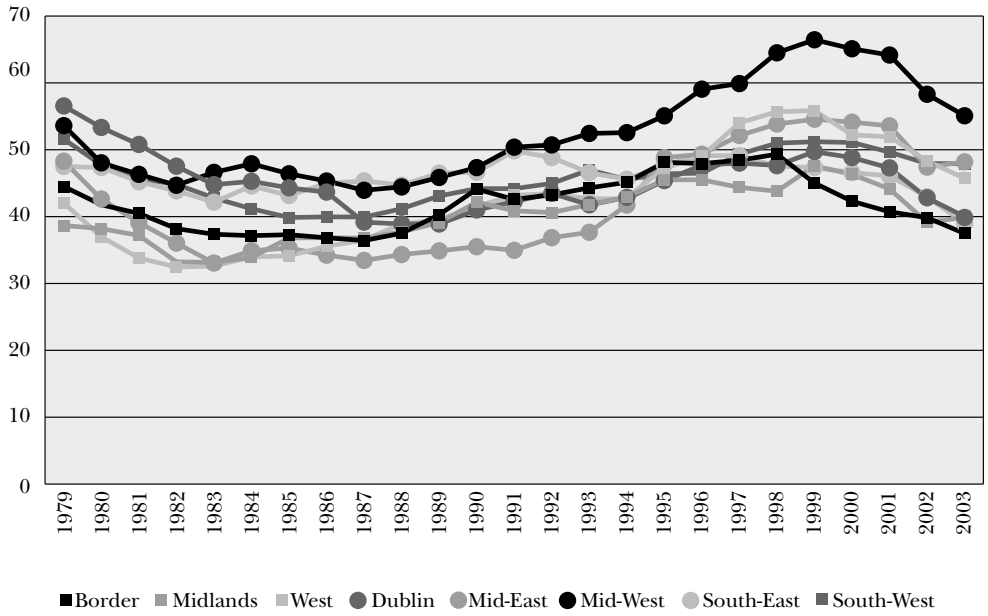
3.4 Regional Industrial Development

Following Bradley and Morgenroth (1999), it is useful to consider a small set of relevant indicators that capture the key characteristics of manufacturing at the regional level. Of particular interest will be to identify regions where the characteristics of the local manufacturing base are unfavourable (e.g., traditional activities, less skilled jobs, low pay, low technology, etc.). The variables considered here are:

1. Average plant size, which indicates the potential for plant level returns to scale;
2. The percentage of employment in foreign owned plants;
3. 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);
4. Gross output and net output per local unit indicate average size of plants;
5. Net output per worker which measures the level of labour productivity; and
6. The wage bill expressed as a share of net output which gives a measure of the profitability of the regional manufacturing base.

Starting with the average size of these firms (Figure 3.3), this shows that during the 1980's the average size of manufacturing firms declined while it rose in the 1990's only to decline again in recent years. The largest average size is found in the Mid-West region while the lowest is found in the Border and Midlands regions. Overall this indicator is positively correlated with productivity suggesting that a greater scale does indeed result in significant economies.

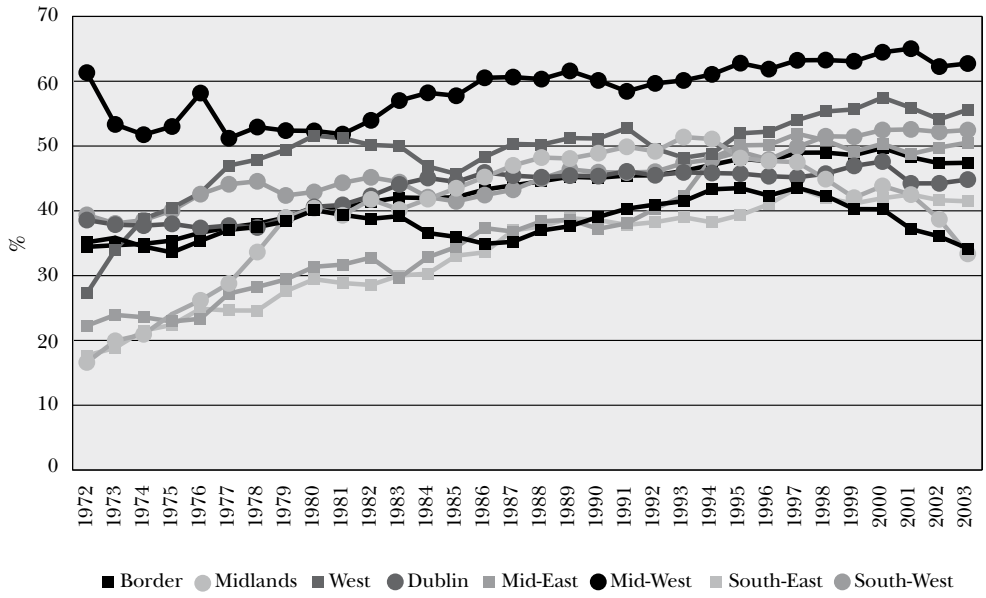
Figure 3.3: Average Size of Firms



Source: Census of Industrial Production, various issues.

As was mentioned above, the importance of foreign owned firms differs between regions and this is an important source of data distortions especially with regard to output measures. It is therefore useful to consider the degree to which manufacturing employment is dominated by foreign firms at the regional level, which is shown in Figure 3.4. Overall the importance of foreign firms increased continuously in all regions until the early 1990s at which point a number of regions recorded a decline in the importance of foreign firms. This was particularly pronounced in the Midlands region where the foreign share declined from 51 per cent to 33 per cent. The Border region also recorded a declining share in foreign employment.

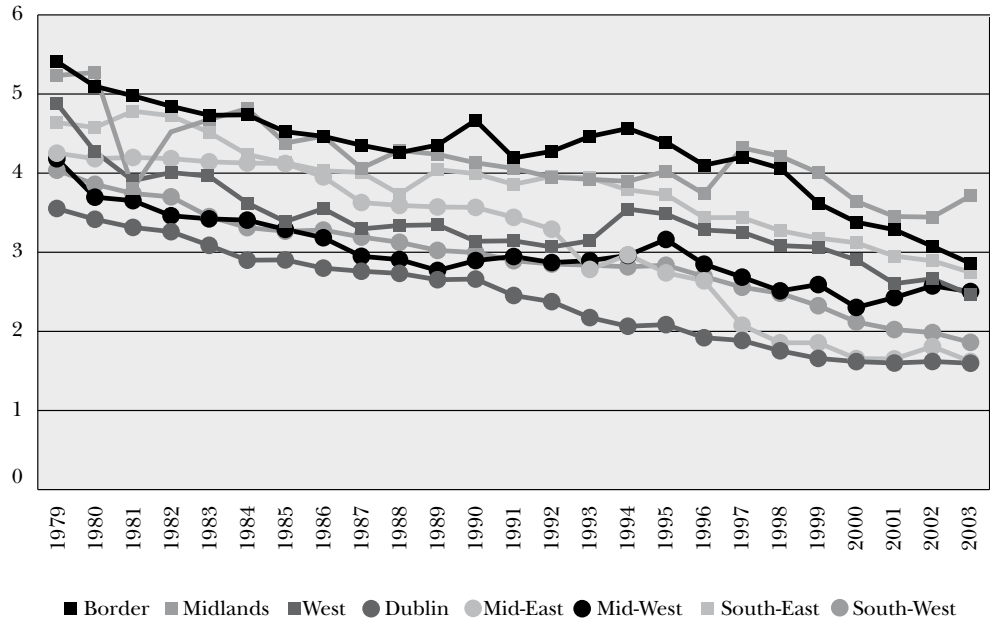
Figure 3.4: Percentage of Employment in Foreign Owned Firms



Source: Own Calculations using Forfás Employment Survey.

The next variable of interest is the ratio of industrial to administrative and clerical workers, which gives an indication of the process sophistication. A lower ratio is related with more high-tech or headquarter activities. This variable is graphed over time in Figure 3.5, and shows a steady decline in the ratio, which suggests an increase in process sophistication. Thus, Ireland has moved from very basic manufacturing to more sophisticated manufacturing. At the regional level Dublin has the lowest ratio followed by the Mid-East and the South-West. The highest ratios and therefore the lowest average process sophistication are found in the Border, Midlands and South-East regions.

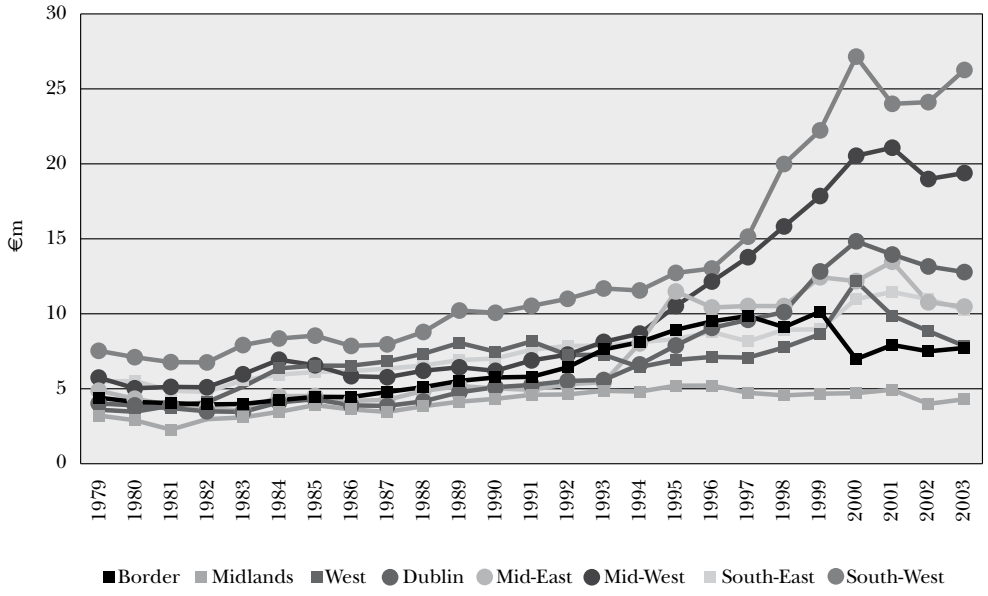
Figure 3.5: Ratio of Industrial Workers to Administrative and Clerical Workers



Source: Census of Industrial Production, various issues.

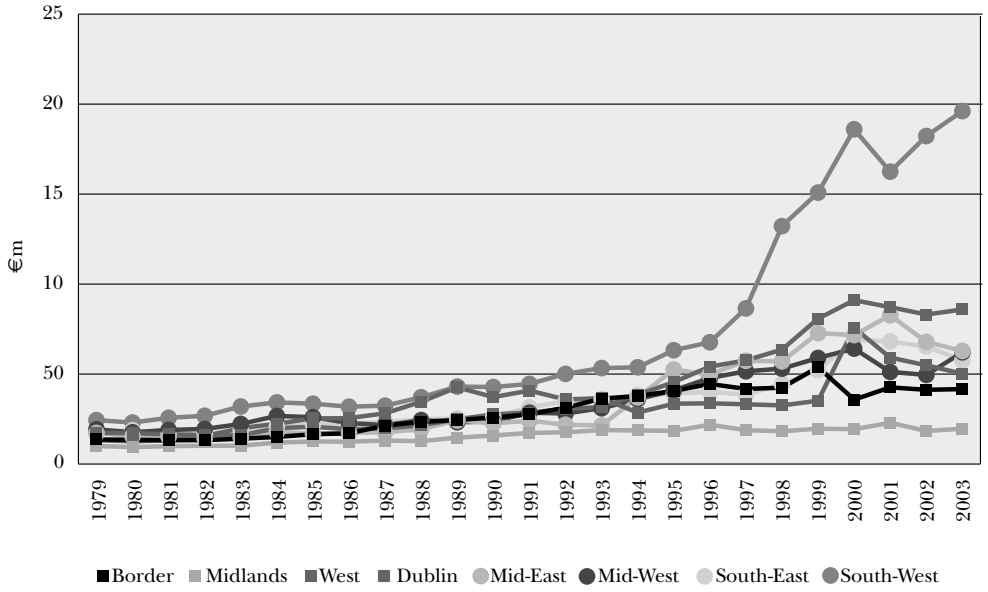
The next two figures refer to the level of output, scaled in different ways. Firstly, Figure 3.6 shows the level of gross output per local unit. This is increasing for most regions except the Midlands region. Noticeable is also a clear pattern of divergence with gross output being highest in the South-West and Mid-West. Once we take out the influence of intermediate inputs, the picture changes slightly (Figure 3.7), in the sense that the very high level of gross output per local unit for the Mid-West is not replicated with regard to net output. Thus, the manufacturing plants of the Mid-West region have a high level of intermediate input usage.

Figure 3.6: Real Gross Output per Local Unit



Source: Census of Industrial Production, various issues.

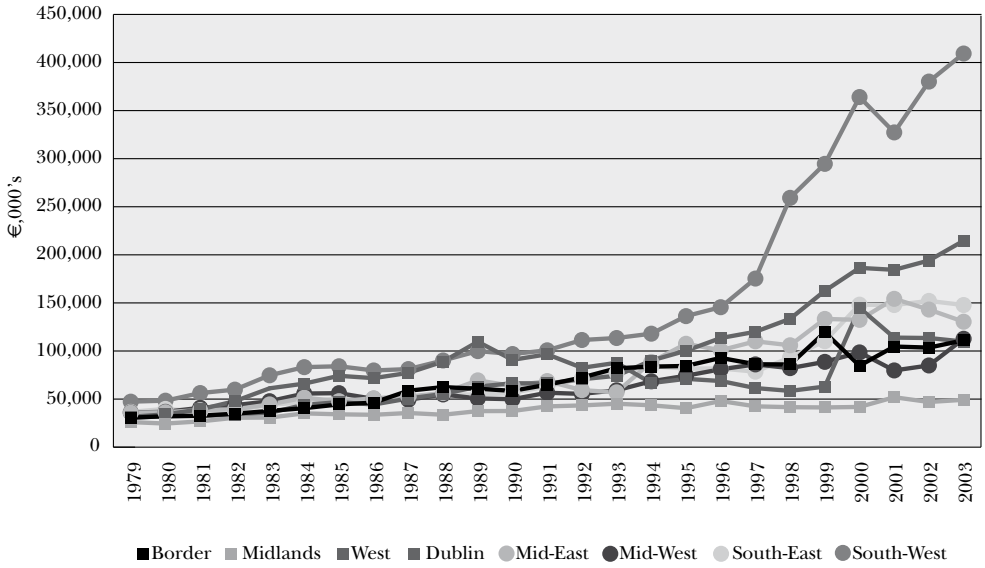
Figure 3.7: Real Net Output per Local Unit



Source: Census of Industrial Production, various issues.

The same pattern of increasing differences between regions regarding output per local unit is also noticeable with regard to net output per worker (productivity), which is extremely high in the South-West region, reaching just over €400,000 per worker in 2003. Clearly this kind of productivity is not realistic and it points to the predominance of foreign multinationals, which report high profits in Ireland for tax purposes. This important distortion has been pointed out by O'Leary (1999; 2001) who shows that once one adjusts the GVA data for profit shifting then the South-West region appears considerably less prosperous.

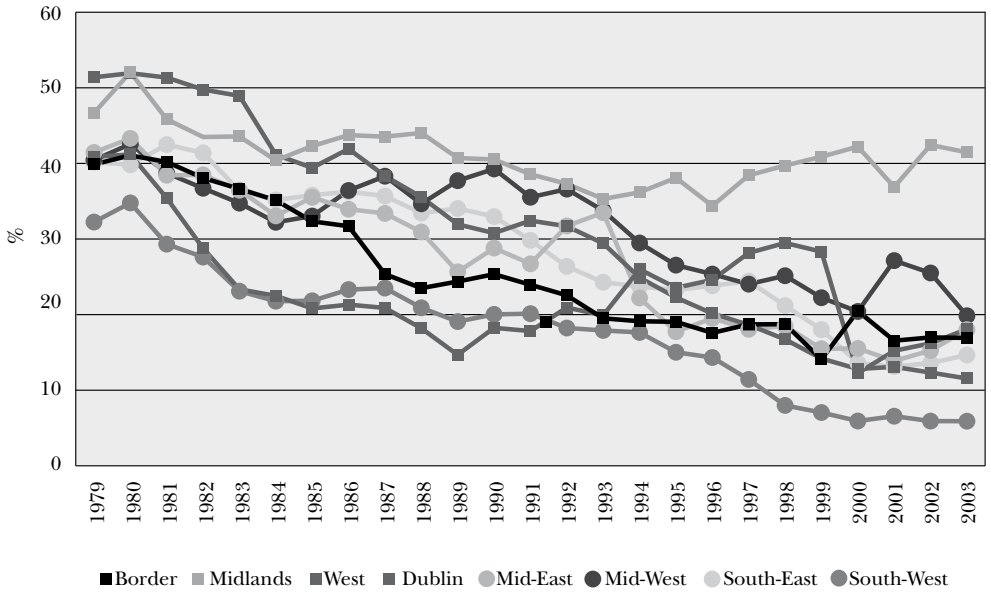
Figure 3.8: Real Net Output per Worker



Source: Census of Industrial Production, various issues.

Finally, the wage bill as a percentage of net output (Figure 3.9) gives an indication of the profitability of manufacturing at the regional level. The general trend is a decline in the ratio, which implies an increase in profitability. Again, the Midlands region performs very poorly, while the South-West region has the lowest ratio. There is also a noticeable jump in the ratio for the Mid-West region over recent years, which might indicate that the profitability is declining in that region.

Figure 3.9: Wage Bill as a Percentage of Net Output



Source: Census of Industrial Production, various issues.

3.5 Underlying Factors

The basic characteristics outlined above are also related to the fundamental drivers of growth identified in the economic growth literature, namely education, R&D and infrastructure.[4] The level of human capital is particularly important if the regions are to attract high value added activities, and to stay competitive. In the literature a number of different measures of the level of human capital have been put forward including enrolment rates, expenditure, and average years of schooling. While these variables are not available for Irish regions, the Census of Population gives details of the highest educational attainment of the population. Figure 3.10 shows the percentage of those in the population that have completed their education that have attained a third level qualification. This includes non-degree qualifications (e.g. certificates and diplomas). The figure clearly shows a strong increase in the numbers that hold such a qualification. Unsurprisingly the more prosperous regions such as Dublin and the Mid-East have the highest shares while the poorer regions have the lower shares (e.g. Border). However, it is also evident that there is strong divergence between the regions regarding this variable. This may well be an important explanation for the divergence in output.

Figure 3.10: Percentage of the Population with Third Level Qualifications

Source: Own calculations, using Census of Population, various issues.

Closely related to the divergence in educational attainment is the capacity of the regions to innovate. The recent gateways study (Fitzpatrick Associates, 2005) shows that third level based research capacity is heavily concentrated in Dublin and to a lesser extent in Cork, Limerick and Galway. Since the international literature on spillovers from university research suggests that such spillovers are quite limited in distance, the concentration of university-based research could impact negatively on region economic development. However, Jordan and O'Leary (2004) suggest that in Ireland firms utilise a wider network for innovative activities. This may well be related to the high level of FDI in Ireland where the Irish operation of a foreign multinational will have the closest connection with their headquarters rather than firms located in closer proximity. This might also hold for the relationship between firms and universities.

It is more difficult to get a good indication of the level of infrastructural endowment at the regional level. The most useful data is published by the Department of the Environment, Heritage and Local Government as part of their annual review of the construction sector, which includes a regional breakdown of public investment at the regional level. This data is available only from 1995 so it cannot be easily used to construct capital stock. However if one accumulates the real investment between 1995 and 2004 on a per capita basis, an assessment of the addition to the infrastructural stock can be made. Taking investments in roads, water services, education, health, social housing and public buildings this shows that there is relatively little difference on a per capita basis between most of the regions. The highest level of spending is recorded in the Mid-East and the lowest in the South-East, which is something of an outlier. Of course this does not account for differences between the regions in terms of the starting stock in 1995, but recent investment does not seem to systematically disadvantage the weaker regions in that the average per capita public investment in the Borders Midland and West (BMW) regions slightly exceeds the national average.

Apart from these conventional growth drivers, the economic geography literature has identified agglomeration economies and in particular the density of economic activity as an important factor in determining productivity (see Ciccone and Hall, 1996 and Ciccone, 2002). A number of studies on Ireland have highlighted the underdeveloped urban system and the resulting low level of agglomeration and density as an underlying source for regional disparities (Bradley and Morgenroth, 1999). To a large degree the differences arise out of the dominance of Dublin where in 2002, 94 per cent of the population resided in urban areas with a population in excess of 10,000 inhabitants. In contrast, the lowest level of urbanisation is found in the West where just 21 per cent of the population resided in such urban centres.

3.6 Conclusion

While regional disparities in Ireland are relatively small compared to those in most other countries, and the fact that in relation to many variables these disparities have declined, the regional focus of policy appears to have strengthened. The key indicator that has been subject to divergence is GVA per capita. This chapter first considered the components that are driving this divergence. In this respect the analysis showed that the differential rate of growth in the manufacturing sector was the key driving force, and that this in turn has been driven by differential productivity growth.

The degree to which the divergent pattern is due to the underlying industry characteristics was considered in detail. This analysis suggests that there are substantial differences between regions in terms of those characteristics and that these are significantly related to economic performance. These characteristics include the average scale, the degree of foreign ownership and the level of process sophistication, which in turn impact on the level of productivity and profitability. In most cases, the differences in underlying characteristics are persistent and divergent suggesting that they play an important role in driving divergence in growth or at least the lack of convergence.

Finally, the chapter briefly considered some of the key growth drivers, which given data availability is not an easy task. Particularly in relation to the educational attainment of the population there appears to be a strong divergent trend, which is likely to have a significant impact on the regional economic performance, especially since the more viable activities in the future will be high skilled knowledge based activities.

While the chapter could show the importance of the various factors in driving the regional performance, it could not assess whether the resulting outcome, with divergence in output levels and convergence in other variables constitutes an inefficient or inequitable outcome. If it is established that the outcome is sub-optimal, then the persistence of the underlying processes suggests that policy intervention is called for.

From a policy perspective, the divergence in output is significant if it signals more fundamental regional problems that might reduce the overall performance of the Irish economy. However, if the relatively poor performance in some regions does not have a negative impact overall, and if other variables such as income are converging, policymakers should not be overly concerned about the divergence in itself. Of course the mechanisms by which incomes are converging are important from an efficiency and equality perspective. Commuting is likely to be the key means by which incomes are converging while output levels are diverging since output is measured where it is produced and income is measured in terms of the residence of individuals. Of course long distance commuting is neither efficient nor environmentally friendly. Apart from

commuting, state transfers also play an important role in reducing income differentials across regions. Unfortunately there has been no research on the magnitude of transfers and spatial equity.

Notes

1 A trade-off between equity and efficiency has also been the focus of some recent research. Williamson (1965) showed that promoting national growth may require concentration of economic activity in the core region at the expense of lagging periphery. At the earlier stages of integration, inter-regional linkages, factor movements and central government policies are selective in favour of the centres. This tendency is reversed as integration proceeds and the income levels converge. A number of new economic geography models directly address the trade-off between efficiency and income (see for example, Martin, 1999). Some empirical evidence has supported the existence of the trade-off between equity and efficiency (e.g. De la Fuente (1996) in a study of Spain or Barrios and Strobl (2005) in a recent study for European regions). For Ireland the correlation coefficient between the standard deviation of regional per capita GVA and national per capita GVA growth is –0.6, which is statistically significant, indicating that the strong national growth led to a relative concentration of activity (see Morgenroth and Fitz Gerald, 2006).

2 Regional policy measures and approaches have changed over the post war period. Specific policy measures included the designation of certain areas for preferential industrial grants rates, building of advance factories, the establishment of the Shannon Free Trade zone etc. A thorough review of these policies can be found in Bannon and Lombard (1996).

3 See Walsh (2006) for a detailed discussion.

4 See Morgenroth (2003) for a review of this literature.

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