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# AN EXAMINATION OF REGIONAL DISPARITY

# IN

# THE REPUBLIC OF IRELAND

# 1926-1996

BRIDGET E. GRIFFITH

THESIS SUBMITTED FOR PHD QUALIFICATION

TRINITY COLLEGE, DUBLIN

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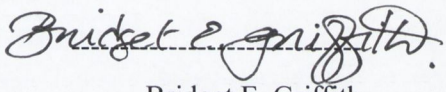

Bridget E. Griffith

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# Summary

Regional disparity has long been a feature of the Irish economy and the thesis accordingly attempts to provide a comprehensive understanding of its nature and causes. First of all, the nature of regional disparity is illustrated by drawing upon a range of international studies. The causes of regional disparity can conveniently be divided into "structural" and "locational" factors. We examine these factors using neo-classical growth theories, various regional paradigms (for example, the circular cumulative causation approach), and the "new" economic growth literature.

The thesis then examines the nature and causes of regional disparity in the Republic of Ireland over the 1926 to 1996 period. In adopting a long-run view, the thesis builds upon previous studies -- discussed in detail in the text -- in three important respects. First, a comprehensive inter-regional database is compiled for the regions in Ireland. Second, relating the economic growth literature and, in particular, the recent developments in this literature to the Irish regional context is a new departure for Irish regional studies. Third, this study of regional disparity departs from previous studies in applying statistical and econometric techniques to the data gathered at both the inter-regional and intra-regional level over time.

Following a detailed examination of the socio-economic profile of the eight planning regions using 32 indicators, three concepts of convergence from the new economic growth literature are examined. The first, sigma convergence, focuses on the pattern of disparity among the regions over time identifying periods of convergence and divergence based on decreasing and increasing values of variance respectively for selected economic welfare variables. Second, tests of absolute convergence examine the relationship between the growth rate and initial level of these variables. Finally, conditional convergence analysis examines the reasons for convergence by including ancillary variables that promote economic growth.

Tests of sigma convergence indicate patterns of divergence in (i) total employment, (ii) agricultural employment, and (iii) service employment across the planning regions over the 1926 to 1996 period. On the other hand, while industrial employment also shows divergence up to 1966, they have seen a sustained period of convergence since then. Convergence is also present over the entire sample period for the "productivity enhanced employment rate", reflecting the convergence that has taken place among regions in their employment mix. Sigma analysis indicates that disposable income converged over the 1973 to 1987 period (1973 is the first year for which regional income data are available) with divergence then occurring up until 1994, the latest year for which data have been published.

Turning next to the absolute convergence analysis, we employ regressions of the economic welfare variables, productivity-enhanced employment and disposable income on their initial levels to ascertain the presence and speed of absolute convergence. We find that productivity enhanced employment and disposable per capita income converges across regions in Ireland over the 1926 to 1996 period at rates of 1.2 per cent and 2.9 per cent per annum respectively. While the former convergence rate is somewhat lower than the rate suggested by the international studies reviewed (approximately 2 per cent per annum); it is, nevertheless, a statistically significant finding. On the other hand, while the income convergence rate is much higher, it is not statistically significant at the 10 percent level.

The thesis then focuses on conditional convergence analysis, which is used to help uncover the reasons underlying the above convergence findings. Using this analysis, it is shown that for productivity enhanced employment the higher the agricultural employment share and the unemployment rate in a region, the lower its rate of convergence to the national average, while higher industrial investment rates tend, on the other hand, to promote convergence. Moreover, including these ancillary variables increases the rate of convergence among the regions to 6 per cent. As for disposable income per head, while agricultural employment share and unemployment once again enter with the expected negative signs, this time the education rate is the factor that promotes convergence. Once again, the rate of convergence among the regions increases to 4.8 per cent.

Finally, the intra-regional analysis examines employment change at the county level within the eight planning regions. The results for employment and its components show no clear pattern of convergence except for agricultural employment (although convergence in industrial and service employment occurred within the East region). On the other hand, convergence occurs within each region for the productivity-enhanced employment rate from 1966. A test of absolute convergence for the productivity enhanced employment rate indicates a statistically significant convergence rate of 1 percent per annum in the East, Midlands and North East regions while no significant findings emerged within the other regions. The same test applied to employment showed a convergence rate of 3 percent per annum in the North East region, with no statistically significant findings elsewhere.

# Chapter One

# INTRODUCTION

For many years, academics have studied inter-regional differences by focussing on a wide range of economic and social variables, including income, employment, productivity, unemployment, infrastructure provision, foreign investment, education and social welfare. Various terms have been used to denote these differences such as "regional disparity", "regional inequality" and "regional imbalance". Although the terms tend to be used interchangeably, it could be argued that the latter two imply that regional differences represent, in effect, a "regional problem". In this thesis, we therefore prefer the term "regional disparity" as a relatively 'neutral' indicator of differences between regions.

Long described as a "duality" between leading and lagging regions, recent empirical evidence has, in certain instances, undermined this description of regional disparity. At the same time, developments in the new growth literature have emerged that are directly relevant to the nature and causes of disparities between regions. This new literature provides a deeper understanding than before of the factors leading to economic growth and welfare, both at an economy-wide and regional level. Moreover, it brings to centre stage the debate of whether economies converge or diverge in the long run and what factors are responsible for the growth patterns actually observed across regions.

The thesis will make a number of contributions. After examining the existing international and Irish regional literature, the thesis will focus on regional change in the Republic of Ireland at both an inter-regional and intra-regional level. A specially constructed and comprehensive database covering the period from 1926 to 1996 will be discussed and analysed in this context. This represents the first long-run longitudinal study of its kind in Ireland and, as such, represents a significant departure for Irish regional studies. It also builds on previous work by focusing on the underlying reasons as to why convergence has taken place.

Chapter two will begin by defining and describing what is meant by regional disparity. International examples of disparity will be provided. Underlying causal factors will subsequently be identified and examined. The chapter will continue with an examination of the process of economic growth and its implications for regional disparities. Two opposing views of the nature of regional disparity will be evaluated with particular reference to the economic growth literature. The first, which subscribes to ongoing persistence of regional disparities over time, considers the

implications of "circular and cumulative causation" and the export led theory of economic growth. The second, which argues that regional disparities should disappear automatically in the long run, bases its analysis on the neo-classical economic growth approach. The chapter will conclude by examining the nature and the causes of regional disparity within the "new" economic growth literature.

Chapter three will review the Irish literature on regional disparity. A number of regional studies from the 1960s to the present will be examined for their contribution in documenting the existence of Irish regional disparity.

Chapter four will discuss the methodology to be used in examining the nature and causes of regional disparity in the Republic of Ireland. This will involve the selection of an appropriate spatial unit and the development of a comprehensive database for the long-run study. The chapter will also include a discussion of the statistical and econometric techniques to be used in presenting and analysing the data.

Chapter five will be the first of three empirical chapters concerned with the nature and causes of regional disparity in Ireland over the 1926 to 1996 period. In this chapter, the socio-economic profile of eight planning regions in Ireland will be examined for 32 indicators. Specifically, the absolute and relative position of each region will be assessed using demographic, employment, unemployment, industrial composition, output, investment, income and education data.

Chapter six will examine various relevant variables for convergence properties over time. Three variables will be used in the statistical and econometric analysis - employment, the "productivity-enhanced employment rate" and disposable income. Three separate tests of convergence will be undertaken and these will seek to determine whether regional disparity has narrowed or grown over time. The chapter will finally seek to ascertain what causal factors underlie the observed patterns of convergence/divergence.

Chapter seven will focus on employment change at the intra-regional level over the 1926 to 1996 period and, in so doing will provide a further tier to Irish regional analysis. The county data will be examined to ascertain whether or not convergence has occurred within the various regions and particular reference will be made to the underlying population and employment structure. The chapter will conclude with a bi-variate test of convergence for employment and the productivity-enhanced employment rate.

Chapter eight will focus on regional policy developments over the decades from the 1950s to the present, culminating in a discussion of the regional development strategy proposed in the most

recent National Development Plan (1999). The chapter will illustrate the dominant role played by regional disparities in formulating policy.

Chapter nine will provide a summary of the main findings and conclusions.

# Chapter Two

# INTERNATIONAL LITERATURE REVIEW: REGIONAL DISPARITY - CAUSES AND OUTCOME

## 2.1 INTRODUCTION

The chapter reviews the literature on regional disparity. Three aspects are considered. The first, section 2.2 examines the issue of regional disparity with reference to key economic indicators. These indicators attempt to capture broad economic and social wellbeing at a particular point in time and thus illustrate the existence of regional disparity. The second aspect examines the causes of regional disparity. The causes relate to structural and location characteristics of the region, which determine its position vis-à-vis other regions. The final aspect, discussed in section 2.3 examines the process of economic growth and its implications for the existence and persistence of regional disparity over time. Following on from this, section 2.4 examines the reasons for convergence at the cross-country and cross-regional level as put forward by the new economic growth literature. Section 2.5 concludes.

## 2.2 INDICATORS, CAUSES AND OUTCOME OF REGIONAL DISPARITY

Regional disparity is a long-standing phenomenon in many countries and has been referred to as "an historical statement" by Massey (1979) in that there has always been regional disparity in developed and developing economies (Massey, 1979, Williamson, 1965). It can be illustrated in various ways. Indicators of welfare, such as economic growth rates, employment rates, unemployment rates, disposable income, migration and mortality all help to assess the "health" of a region. Such indicators, which are heavily interdependent, identify differences between regions at a specific point in time and provide therefore an essentially static viewpoint.

The causes of regional disparity may be discussed under two broad headings of structural and location factors. The former refers to the structure of the regional economy as described by its demographic make-up, including education skills, its industrial mix including the proportion of export led industries and the composition of employment. On the other hand, location factors refer to the geographical location of the region - its proximity to markets and raw materials and its infrastructure environment including transport and telecommunication links. Structure and location factors are also essentially static concepts.

The outcome of regional disparity is however a dynamic concept. It represents the manner in which regions have or have not adapted to changing economic circumstances based on their structure and location factors. The process of economic growth and change has therefore clear implications for regional disparity with the empirical outcome suggesting various interpretations of the economic growth process.

The following paragraphs examine these three issues of regional disparity- nature, causes and outcome - although the latter is dealt with in more detail in sections 2.3 and 2.4 below. The discussion is supplemented by Table 2.2a, which illustrates those indicators that have been used to describe regional disparity in a sample of countries.

There is a substantial body of evidence to illustrate regional disparity at both the inter-country and intra-country level, Table 2.2a. First, while the spatial unit is more likely to refer to regions within a country, there are a number of studies that examine regional disparities across countries (Allen and Yuill, 1980; Molle *et al.*, 1980; Iqbal, 1986, Saunders and Hobbes, 1986; Rhodes, 1992; Suarez-Villa and Cuadrado Roura, 1993; Maxwell, 1994; Dignan, 1995; Dunford, 1996; Puga, 1999). Second, income, population, employment and unemployment are the most commonly used indicators. Of the 42 studies identified in Table 2.2a, 34 use income or some variant as the principal indicator. The most obvious income measures include gross domestic product (GDP); a regional variant such as gross state product (GSP) and gross value added (GVA).[1] Other measures that may be used include disposable household income and household expenditure. These latter measures may provide a greater insight to regional welfare as they capture directly the overall purchasing power and standard of living of households.

While regional income and expenditure indicators serve as useful summary measures of regional wellbeing, comprehensive analysis of regional economic welfare should attempt to also cover unemployment, poverty, education standards, health and nutrition so as to provide a more informed assessment of a region's well being.[2]

Moreover, data constraints often preclude the use of income measures. Reliance must often be placed on the other three indicators; population, employment and unemployment. These describe the economic structure of a region reasonably well and are discussed below under the two broad headings-structure and location.

---

[1] GVA is used to measure regional output in the Republic of Ireland.

[2] The problems of concentrating on GDP alone as a development measure have been documented in, for example, Seers (1969, p.3), Owens (1987, p. xv), the World Bank Development Report (1991) and the European Commission (1993).

**Table 2.2a Regional disparity: international country examples**

| Author(s) | Country/region | Indicator | Causes/explanatory factors | Outcome |
|---|---|---|---|---|
| Puga (1999) | Europe/USA<br>European regions, US States | Regional differences in production structures and income levels | Regional integration | Greater inequality among EU regions compared to US states based on GSP |
| Cashin & Strappazzon (1998) | Australia<br>6 Australian States; 57 Australian Statistical Divisions (SDs)<br>(1976-1991) | Real aggregate and real per capita regional incomes | | Cross state dispersion of per capita income has increased; little change at the cross SD level while distribution of income within states and SDs has become more equal. |
| Black & Dowd (1997) | USA<br>50 States<br>(1963-1989) | Real income inequality index | Regional prices | Real interstate inequality is greater than that indicated by the nominal index; both have increased from 1981 |
| Dunford (1996) | Europe<br>NUTS II level (1992)<br>(EU15) | GDP per capita | Productivity and employment differences | Based on a plot of productivity against employment and EU 15=100, regions lay in four quadrants that maintain a core-periphery pattern[1] |
| Knight & Shi (1996) | China<br>Province<br>(1988) | Education level | Education level of family members, income, age | Divide between urban and rural areas. |
| Dignan (1995) | EU 12 | GDP per capita | Population, employment, regional policy | Decrease in disparities to 1974. Little convergence from 1974-mid-1980s. |
| Gudgin (1995) | UK | Imbalances in regional labour markets, incomes and living standards | Slower rate of economic growth in North compared with South | Convergence tendency re-emerged from 1980s, but weaker. |
| West & Wong (1995) | China<br>Compares two provinces: Shandong & Guizhou | Income differentials | Education, health, Governmental expenditure and revenue | Urban / rural divide |
| Maxwell (1994) | Australia/Canada<br>8 regions in Australia<br>12 regions in Canada<br>(1920-1990) | Population share<br>Per capita income | | Identified 5 categories of regions[2]: dominant core, resource rich/amenable climate, remote territories, lagging, other. |
| Murfin & Wright (1994) | UK<br>12 regions<br>(1971-1992) | Real GDP per capita | Regional inflation rates, unemployment rates, industrial composition, manufacturing activity, housing market, consumer confidence, regional labour market | Differences in average income levels have been persistent across regions, but convergent patterns in regional unemployment and similar growth rates suggest a decreasing inequality. |
| Harris & Harris (1994) | Australia<br>NSW, Vic, Qld, WA, SA, Tas, ACT, NT<br>(1977-1993) | Real GDP at factor cost, population, real GDP at factor cost per head | | 8 states can be divided into groups based on the outcome from the indicators of disparity. |
| Seale, Jr., Theil, Deepak (1994) | 4 regions:(1) North (2)South East Asia (3) South Central Asia and (4) Sub-Saharan Africa<br>(1953-1990)[3] | Per capita GDP | | Inequality declined in North, increasing inequality in SE Asia. Inequality low in SC Asia. Inequality increased to the late 1970s in Sub Sahara Africa and decreased to 1960s level over the 1980s. |

| | | | | |
|---|---|---|---|---|
| Krongkaew (1994)[4] | Hong Kong (1960 - 1991) | Income (Gini coefficient) | Fiscal policy, de-industrialisation, decline in average family size, fall in labour force participation rate, weak labour unions, wealth effects of high stock prices and high property prices | Greater inequality over time |
| | Korea (1964-1988) | a. Distribution of wealth<br>b. Labour income | a. land holdings<br>b. tight labour market, increase in educational attainment, enactment of minimum wage | a. increasing inequality<br>b. greater equality |
| | Singapore (1966-1989) | Household income (Gini coefficient) | Disparity in wage increases, rapid expansion of commercial and service sectors, | Stable inequality |
| | Taiwan (1964-1990) | a. Household disposable income (Gini coefficient)<br>b. Individual income | a. Differences in household size, number of employed members between rich and poor households, decline of extended families<br>b. Number of income earners less equally distributed | a. Increasing inequality (from 1980)<br>b. Decreasing inequality |
| | Indonesia (1976-1993) | Per capita income distribution (Gini coefficient) | Pace & pattern of economic growth, improvements in real earnings, trade & industrial deregulation, exchange rate depreciation, government management | Reduction in inequality |
| | Malaysia (1979-1987) | Household income (Gini coefficient) | Rural development programmes, increase in educational attainment, shift to export oriented industrialisation, expansion of public sector, increasing labour force participation | Decreasing inequality |
| | Philippines (1961-1988) | Income distribution (Gini coefficient) | Growth in agriculture, adoption of modern technologies | Continuing urban/rural divide |
| | Thailand (1975-1990) | Income (Gini coefficient) | Large share of employment in agriculture, low share in industry and services, investment favouring capital intensive activities, protection of industrial sector by Government | Increasing inequality, rural inequality more evenly distributed than urban. |

| | | | | |
|---|---|---|---|---|
| Suarez-Villa & Cuadrado Roura (1993) | Europe/USA<br>11 EU nations, 171 EU regions, 50 US states<br>(1960-1988) | Per capita income | Migration | Decreasing inequality (1960-1970 - Europe). Increasing inequality to mid 1980s and decreasing inequality thereafter. Decreasing inequality in US with some increasing inequality from mid 1980s. |
| Castro (1993) | Spain<br>17 regions<br>(1985-1992) | GDP per capita | Infrastructure indicators, R & D expenditures & employment, productivity disparities, structural funds | Inter-regional disparities are considerable and have not changed over the study period. |
| Danielson & Wolpert (1992) | USA<br>365 municipalities in Northern New Jersey<br>(1970-1987) | Per capita income | Economic and social characteristics of individuals, local employment, land use distribution, property tax base of commercial & industrial parcels, state equalised expenditure for schools, public safety & other local functions, state economic development authority loans, population | Economic growth over the period maintained a divide between richer and poorer communities. |
| Rhodes (1992) | Europe<br>Belgium, France, Germany, Netherlands, Denmark, UK, Ireland, Greece, Italy, Portugal, Spain<br>(1974-1989) | Unemployment rate | Participation rates in education, labour market policies, labour market flexibility | Dichotomy between the EU's southern frontier and Ireland and the rest |
| Taylor (1991) | UK<br>North, Midlands and South regions<br>(1974-1990) | UK unemployment | Industry mix, entrepreneurial activity, loss of local decision-making | North -South Divide |
| Dunford (1990) | Europe<br>NUTS level I, II, III.<br>(1989) | GDP per head | Productivity, employment, regional prices. | Most marked regional imbalances are in Italy (north-south divide), France, (Paris & the rest of the country); Spain (North East, Madrid and rest of the country) and the UK (Home Counties and rest of country). |
| Stoffelsma & Oosterhaven (1989) | Netherlands<br>11 regions<br>(1979-1986) | Income per capita | Social security payments | Identifies three groups: urbanised, next and peripheral. All come closer to national average when social security benefits are included. Change takes place within the three groups. |
| Amos (1988) | USA<br>50 States<br>(1969-1983) | Per capita real income | | Income inequality is increasing for 37 of the 50 states, stable for 9 and inconclusive for 4. |
| Fischer & Nijkamp (1988) | 18 European regions | Unemployment, gross value added | Regional production environment | Peripheral regions performing better than the core. |

| | | | | |
|---|---|---|---|---|
| Amos (1988) | USA Counties | Income | Natural resource endowments, labour migration, capital movement, government policies | Factors contribute to increase regional inequality at early stages of development and to reduce inequality at later stages of development. Intrastate study shows clear urban/rural divide at early stages of development. |
| Ikemoto & Limskul (1987) | Thailand 5 regions - Bangkok, Centre, North, Northeast, South (1962-1981) | Household income | | Income inequality stable until 1975 and increasing since then |
| Vanhove & Klaassen (1987) | EU 12 | Employment GDP per capita | Differences in labour productivity, labour force participation rates | 6 types of problem regions (1) peripheral (2) other agricultural (3) stranded region (4) frontier regions (5) border regions (6) conurbations |
| Lakshmanan & i-Hua (1987) | China Provinces & Metropolitan District (1979-1984) | Gross valued added per capita | | Divide between coast and interior, between rural and urban areas |
| Iqbal (1986) | Asia 13 Asian countries classified into 4 groups ranging from most industrial to less industrial (1960-1982) | Trends in: GDP growth rates, export growth rates, ratio of growth rates in exports to GDP | (Lesser) use of available resources, (low level of) management & control issues, intra-regional imbalances, low level of production & productivity, high level of protectionism | Countries remain within their initial grouping |
| Saunders & Hobbes (1986) | Australia, Canada, Germany, Norway, Sweden, United Kingdom, United States | Distribution of gross and net family income among quintiles of families - summarised in Gini coefficient | | Sweden has the most equal distribution and Germany and the US have the most unequal. In between are Norway, United Kingdom, Canada and Australia. |
| Mathur (1983) | India State level (1950-1976) | Per capita income Index based on share of primary & non primary sectors in State income | Productivity per worker, participation rates (worker to population ratio) | Beginning of study period showed a narrowing of inequality followed by increasing inequality for remainder of period |
| Fothergill & Gudgin (1982) | UK | Employment change | Industrial structure, urban structure, size structure of firms, regional policy | Differences within regions far greater than contrasts between them |
| Jha (1982) | India States (1979) | Indices of income, poverty & unemployment; agricultural indicators; industrial indicators; infrastructure indicators; social service indicators; resource allocation indicators | | 72% of total poverty population are concentrated in 7 States (U.P. Bihar, West Bengal, M.P., Maharashtra, Tamil, Nadu & Andhra Pradesh). |

| | | | | |
|---|---|---|---|---|
| Allen & Yuill (1980) | EUR 9<br>The regions of: Germany, France, Italy, Netherlands, Belgium, UK, Denmark<br>(1970, 1976 & 1977) | Population density, unemployment rate, value added per inhabitant, employment by sector (1977 only) | | Regional disparities have remained static over the study period |
| Enders (1980) | Brazil<br>25 States (1960-1970) | Industrial growth | Economic growth and regional policy | Divide between core (Rio de Janeiro and Sao Paulo axis) and peripheral states[5] |
| Molle *et al.* (1980) | 10 European Countries | Growth rates in GDP per capita/per labour force | Population density, sectoral employment, participation rates | Concentration of economic activity (50% population live in 20% land area). |
| Nicol & Yuill 1980 | *<br>Italy<br>(to 1975) | Low income levels, high rates unemployment & underemployment, low activity rates, out-migration | Decline in agricultural employment due to decreased demand & technological change, lack of resources & human capital, undeveloped infrastructure | A continuing divide between the (poor) South or Messogiorno and the (rich) North |
| | *<br>Spain | Increasing agricultural productivity | Decline in agricultural employment | Spatial imbalance between urban centres (Madrid, Barcelona, Valencia & Seville) and rest |
| | *<br>Netherlands | Unemployment | Decline in agricultural employment | Identified North as a problem region[6] |
| | *<br>France<br>(to 1968) | Declining population & employment, out-migration | Decline in agricultural employment | Identified Western France as a problem region[7] |
| | **<br>UK<br>(from 1950s and 1970-1976 for manufacturing industry) | Migration and employment | Decline in traditional industries<br>Decline in manufacturing employment | Identified a North (poor) and South (rich) divide<br>Identified a centre - periphery within the 6 major conurbations |
| | **<br>France<br>(1947-71) | Declining employment | Decline in coal sector, high birth rates, decline in agriculture | Identified the Nord as a problem region[8] |
| | **<br>Belgium<br>(1953-73) | Unemployment | Decline of mining sector | Identified Wallonia as a problem region, particularly provinces of Hainaut and Liege |
| | **<br>Germany<br>(1973) | Unemployment,<br>GDP per capita | Decline of coal industry | Identified Ruhr as a short term problem region[9] |
| | ***<br>Paris<br>(to 1968) | Population, employment | In migration, expansion of service sector, proliferation of high quality occupations and government departments | Disparity between Paris and the rest of France |
| | ***<br>Netherlands<br>(to 1950) | Population, employment | In migration | Disparity between Ranstad of Amsterdam, Utrecht, Rotterdam, The Hague & the rest |
| | ***<br>London and the South East<br>(to 1971) | Population | In migration, proliferation of high quality occupations and government departments | Identified the South of the UK as more prosperous than the North |
| Copithorne (1979) | Canada | Provincial GDP growth rates | Differences in productivity, aggregate demand & urban structure | |

| | | | | |
|---|---|---|---|---|
| Foley (1977) | USA<br>SMSA, urban, rural and independent (contain an urban place)<br>(1950-1970) | Growth rate of per capita income | Level of per capita income, racial cleavage, mature local economy, family participation in workforce, agribusiness activity | |
| Gunther & Leathers (1975) | USA<br>South compared with Northeast, Midwest & West<br>(1950-1970) | Statistical measures of income inequality | Effect of race | The inequality in the South is greater than the other regions |
| Kaldor (1970) | UK | Economic growth rates | Sectoral composition of industry, agricultural & manufacturing employment | Causes/explanatory factors (left) explain divide between regions. |

Notes: * refers to agricultural problem regions and covers the 1950s, 1960s and 1970s period.
** Refers to industrial problem regions and covers the 1950s, 1960s and 1970s period.
*** Refers to congested problem regions and covers the 1950s, 1960s and 1970s period.

1. The four quadrants are defined as low productivity/low employment in the South West position, (Ireland, North UK regions, Southern Italy, Spain, Greece and Portugal) low employment/high productivity in the North West position (Netherlands, Belgium and France) high productivity, high employment in the North East position (Luxembourg, Norway, Denmark, Sweden, Ile de France, Brussels, North Italy) and high productivity/high employment in the South East position (South UK regions, Iceland and Finland).
2. **Australia**: Dominant core (New South Wales, Victoria, Australian Capital Territory); Resource Rich (Queensland); Remote Territories (Northern Territory); Lagging (Tasmania) and Other (South Australia). **Canada**: Dominant core (Ontario, Quebec); Resource Rich (Alberta, British Columbia); Remote Territories (Yukon, North West Territories); Lagging (Nova Scotia, New Brunswick, Newfoundland, Prince Edward Island) and Other (Manitoba, Saskatchewan
3. North consists of the US, Japan, Canada, South Korea, and 18 European countries. South East Asia consists of Hong Kong, Indonesia, Malaysia, Papua New Guinea, Philippines, Singapore, Taiwan, Thailand), South Central Asia (Bangladesh, India, Myanmar, Pakistan and Sri Lanka) and Sub-Sahara Africa consisting of 37 countries.
4. Krongkaew (1994) provides a synopsis of individual country studies for each of the 8 countries. Some studies indicated greater inequality within a country and others indicated less over various time periods. The most recent studies are reported here.
5. The core-periphery divide was in evidence in 1960 - the results of the study on industrial growth over the 1960-1970 period showed that number of peripheral regions had improved their relative position and that the regions could be classified into two groups - those that had performed below the national average and those that had performed above the national average for number of firms, number of employees and gross value of production.
6. Regional disparity was not as evident as in other countries due to the rapid growth of the Dutch economy and net-out-migration from the North, which kept the "problem to manageable proportions" (Nicol and Yuill, 1980; p. 7).
7. "However, after 1968, the situation improved, the region not only gaining population (through reduced out-migration) but doing so faster than all other French regions.
8. "Level of employment in the North remained relatively stable, due to high out-migration of population as well as the general expansiveness of the French economy".
9. "Due to a rapid transformation and absorption process, many of the long standing problems normally associated with the run down of the mining sector were avoided.

- *Structural Factors*

Demographic indicators may be used to analyse regional disparities. Polese (1981), for example, argued that a region's population is its "basic resource" (p. 524). Despite earlier work[3] that hypothesised a negative relationship between income per capita and underlying population growth, modern regional analysis suggests that higher population growth rates are associated with higher

overall regional welfare. Various aspects of a region's demography, such as the level of human capital and the age structure are important considerations in explaining the causes of regional disparity. Rapid increases in human capital have contributed significantly to economic growth and this variable was included in the studies by Knight and Shi (1996) and West and Wong (1995) above. Moreover, the age structure of a population determines the available labour pool. Molle *et al.* (1980); Mathur (1983); Vanhove and Klaassen (1987), Rhodes (1992) and Krongkaew (1994), above included the labour force participation rate as a cause of regional disparity in their respective studies.

The distribution and composition of employment are also relevant in identifying disparities between regions. The distribution of employment across the agricultural, industrial and service sectors can have important implications for a region's overall prospects (Hull, 1980, Gudgin, 1995). Indeed industrial mix featured strongly in the cited work of; Kaldor, 1970; Molle *et al.*, 1980; Fothergill and Gudgin, 1982; Taylor, 1991; Murfin and Wright, 1994, Table 2.2a above. Among modern advanced economies, regions with a high concentration of agricultural employment tend to exhibit lower income levels (and growth rates) compared to regions rich in industrial and, in particular, service employment. While manufacturing has long been viewed as the "engine of economic growth" (Kaldor, 1970), the actual industrial mix has become more important in recent times. For example, over time, traditional industries based on natural resources have tended to fall behind modern industries such as chemicals, electronics and computer technology. Thus, regions that have not been overly reliant on a traditional industrial structure have tended to perform better than regions with a high concentration of heavy manufacturing industry (Hansen, 1995). The mix of service sector employment in a particular region has implications for its overall economic welfare also. For example, regions specialising in producer services would tend to have higher income levels than regions heavily dependent on public services.

The rate of unemployment is also used as an indicator of disparity in documenting regional differences. It summarises structural rigidities within regions. This indicator is, however, more meaningful when judged in conjunction with other demographic factors. While low regional unemployment rates may be associated with healthy economic performance within a region, it may also result from heavy out-migration or reduced labour force participation rates following poor economic performance. Regional unemployment rates may also be dependent upon the overall education levels within the region. For example, recent evidence in the Irish context has shown that the proportion unemployed is much higher among those having completed formal education at the Junior Certificate level or lower (approximately those aged 15 and under) than for all other

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[3] See for example, Malthus (1798).

groups.[4] The education rate of a population has been used as a disparity indicator in the work of Danielson and Wolpert, 1992; Rhodes, 1992; Krongkaew, 1994; West and Wong, 1995; Knight and Shi, 1996, see Table 2.2a.

Several of the studies referenced in Table 2.2a did not seek to identify specific causes of regional disparity. Such studies concentrated on presenting data on various indicators that helped to summarise regional disparity, see Allen and Yuill, 1980; Jha, 1982; Maxwell, 1994. Others examined the pattern of disparity (using a variety of statistical tools) over time with reference to one or two indicators, usually income - see Saunders and Hobbes, 1986; Ikemoto and Limskul, 1987; Seale, Jr., Theil, and Deepak, 1994; Cashin and Strappazzon, 1998; Puga, 1999.

The final column in Table 2.2a describes the outcome of regional disparity. Approximately half of the studies considered were interested in establishing the existence or otherwise of a regional problem within or between countries. In most cases a definite spatial divide was identified. For example, several studies (Enders, 1980; Nicol and Yuill, 1980; Gunter and Leathers, 1982; Lakshmanan and i-Hua; 1987; Stoffelsma and Oosterhaven, 1989; Taylor, 1991; Rhodes, 1992; Harris and Harris, 1994; Maxwell, 1994; West and Wong; 1995; Dunford, 1996; Knight and Shi, 1996;) identified a definite north - south divide, a rural - urban divide or a core - periphery divide.[5]

Other studies examined the persistence of regional disparity by focusing on its pattern within and between countries/regions over time (Allen and Yuill, 1980; Mathur, 1983; Iqbal, 1986; Saunders and Hobbes, 1986; Ikemoto and Limskul, 1987; Amos, 1988; Danielson and Wolpert; 1992; Castro, 1993; Suarez-Villa and Cuadrado Roura; 1993; Seale, Jr., Theil and Deepak; 1994; Krongkaew, 1994; Murfin and Wright; 1994; Black and Dowd; 1997; Cashin and Strappazzao, 1998; Puga; 1999). In some cases, disparity had narrowed and disappeared, while continuing in other cases.

- *Location*

It is widely recognised that location is of fundamental importance. A whole range of literature suggests a dichotomy between a "core", usually a prosperous area with an urban concentration and a "periphery", usually a poorer, less urbanised area. The main characteristics of peripheries according to Selwyn (1979) are dependence on decisions taken at the core, a lack of local innovation and weakness of internal linkages, i.e. very low multiplier effects. Information tends to flow from the core to the periphery and migration flows are generally from the periphery to the

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[4] The Green Paper on Adult Education (1998) showed that of those unemployed in 1997 28.3 percent had completed their formal education at primary level and 35 percent at Junior Certificate level compared to 25.4 percent at Leaving Certificate level, 10.9 percent at Third level and 0.4 percent for other.

[5] The latter refers usually to disparities between countries.

core. Regions in the periphery and/or rural areas are thus more likely to be lagging in terms of growth compared to their core and/or urban counterparts.

In some countries, the persistence of regional disparity has become very deeply ingrained. In the UK, for example, the pattern of lagging regions has been persistent for more than half a century (Gudgin, 1995; p. 18). Other well-known European examples of regional duality include the Flemish speaking Flanders area and French speaking Wallonia in Belgium (Donckels and Rompuy, 1980), the East/West divide in the Republic of Ireland (Micks, 1925; Attwood and Geary, 1963; Ross, 1969; Buchanan and Partners, 1968; IDA, 1972; An Foras Forbartha, 1979),[6] the North of Italy and the southern Mezzogiorna and the islands of Sicily, Sardinia and others (Ronzani, 1980).

On the other hand, the persistence of regional disparity need not enforce a permanent duality. In recent years, the simple suggested dichotomy between core and periphery has been increasingly questioned. For example, the significant growth of population and economic activity in the core area can lead to a range of difficulties, including agglomeration diseconomies, space constraints and associated land and housing price increases, pressures on social capital and environmental concerns. Danielson and Wolpert (1992), contend that "poorer communities with relatively lower labour and land prices for some selected set of activities can have a comparative advantage in attracting some investment and site development for new plants, offices and homes" (p. 495). Suarez-Villa and Cuadrado-Roura (1993), who argue that the ability of poorer areas to mobilise their resources is "seriously underestimated" (p. 371) further endorse this point. These sorts of changes can lead; it is argued, to "convergence" between cores and peripheries over time.

- *A Changing Nature?*

As advanced economies have continued to experience growth and development over times several country examples show a narrowing of regional disparity and a convergence of leading and lagging regions.[7] Suaraz-Villa and Cuadrado-Roura (1993) refer to this as a process of "regional inversion" (p. 372) and suggest that this has become the reality in several advanced nations where disparities between formerly leading and lagging regions have disappeared.

A number of studies covering advanced economies that adopt a longer run perspective have shown that lagging regions tended to perform better than their leading counterparts. Fischer and Nijkamp (1988) for example, examine the regional production environment of 18 European regions divided into 7 peripheral regions and 11 old industrial areas in Northern Europe. They provide detailed examples of a changing regional problem whereby the peripheral regions performed better relative

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[6] These studies are examined in detail in the following chapter.

[7] Indeed, several studies in Table 2.2a uncover a pattern of convergence when analysing the consequences or pattern of regional disparity (final column).

to the core and/or showed the potential for better performance. Their findings demonstrated that the peripheral regions had a relatively favourable performance in terms of a number of indicators, i.e. industrial employment, unemployment, and growth in gross value added. Martin (1997) referred to the narrowing of unemployment differentials between the North and South regions of the UK during the early 1990s. The South experienced greater losses in unemployment compared to the northern regions. Martin suggests that the regions in the North of the country had little surplus labour left after the recession in the 1980s and had not experienced the same gains in service employment compared to the regions in the South. Thus there was less surplus labour in the northern regions when recession hit in the 1990s.

Furthermore, West and Wong (1995) provided evidence suggesting that the US was more equal regionally than Europe in terms of the dispersion of income per head, and also that regional disparity had become less severe over time. Moreover, the gap between the urban and rural areas in terms of the metropolitan/non metropolitan distinction had narrowed (West and Wong, 1995; Hansen, 1995). For example, Hansen finds that in the 1970s the non-metropolitan areas grew faster than the metropolitan areas and experienced net immigration. Barringer (1993) also found that the non-metropolitan areas continued to experience net immigration in the early 1990s with an unemployment rate of 7% compared with 7.5% rate of unemployment in the metropolitan areas. Thus, as national development proceeded, regional inequalities manifest through disparate unemployment rates converged. Indonesia, Malaysia and the Philippines examined in the work of Krongkaew (1994) provided an example of a narrowing of regional disparity within the ASEAN-4 bloc (i.e. the countries of Thailand, Indonesia, Malaysia and the Philippines). Finally, Maxwell (1994) identified the narrowing of regional disparity in Canada and Australia measured by the convergence of regional per capita personal and household incomes.

Without delving too deeply into the causes of convergence at this stage, it is useful to discuss this issue briefly before proceeding. Authors such as Suaraz-Villa and Cuadrado-Roura (1993) argue that inter-regional population migration that occurred in Europe through the 1960s and first half of the 1970s has been a major equalising factor. In the US, market forces operated with less restraint than in Europe and large-scale migration also took place (Suarez-Villa and Cuadrado-Roura, 1993). While population was moving, structural change in both agricultural and industrial sectors was also taking place. Successful regions tended to be those capable of making the transition from an agricultural through an industrial to a service base.

Suarez-Villa and Cuadrado-Roura (1993) argue that the "overturning of the predominance of advanced or core areas by some previously peripheral regions is perhaps the most important spatial phenomenon of the late 20th century" (p. 372). Whether this amounts to a new regional geography is open to question. Massey (1979), Cuadrado Roura (1982), Mansley and Rhodes (1992) and

Martin (1997) are cautious in accepting a new spatial description of regional disparity. They argue that the employment and population dynamics of a region change over time and are subject to many internal and external influences. The current evidence suggests that patterns of convergence may describe regional disparity for particular time periods for regions within or across different countries. The issue of convergence or non-convergence thus emerges as an important research issue. Furthermore, it introduces a dynamic aspect that is lacking in those studies that focus solely on static indicators of disparity. Convergence itself, together with the factors leading to convergence, are examined in greater detail later in this chapter.

## 2.3 THE PROCESS OF ECONOMIC GROWTH AND REGIONAL DISPARITY

The gap between leading and lagging regions has spawned a considerable literature that attempts to explain the existence and persistence of regional disparity in a duality-type framework. This literature concentrates on those aspects of the economic growth process that tend to foster disparity. For example, it analyses the agglomeration economies that benefit certain regions as a result of their location, history and culture and highlights the propensity of such agglomeration economies to become self-enforcing, thus reinforcing spatial disparity. The process of circular and cumulative causation whereby countries/economies with favourable conditions for economic growth occupy leader positions and maintain or consolidate those positions over time underlies most of the studies explaining duality and/or a divergence among regions over time. Circular and cumulative causation is examined in section 2.3.1. Several authors (Prebisch, 1959; Seers, 1962; Kaldor, 1970; Dixon and Thirlwall, 1975; Thirlwall, 1980) have focused on the various factors leading to initial disparities between rich and poor regions. These authors have stressed the export component of aggregate demand as a factor underlying growth disparities. Under this approach, economies with buoyant export sectors reap rewards in terms of increased output and foreign earnings. The Kaldor, Dixon and Thirlwall model (1975) outlining such factors is examined in section 2.3.2. This model also incorporates the process of circular and cumulative causation. Section 2.3.3 concludes the discussion of the various duality approaches to regional disparity.

Recent and emerging evidence suggests that the simple duality description of regional disparity may not be sufficient. For example, several of the studies listed in Table 2.2a uncovered evidence of periods of convergence between leading and lagging regions, which is not consistent with the predictions of the duality approach. Such evidence, together with the discussion above of the changing nature of regional disparity, indicate the need to consider approaches that allow for convergence between leading and lagging regions. Convergence has been the mainstay of the neo-classical growth model and, accordingly, this model is examined in section 2.3.4 below. Several studies employ the neo-classical growth model to explain disparities between regions and these are

examined in section 2.3.5, which concludes with a discussion on the relevance of this model for regional disparity.

### 2.3.1 Circular and Cumulative Causation

Myrdal (1957) argued that there was no fundamental reason why automatic convergence between regions should be expected, and that regional disparities may be expected to strengthen over time. Myrdal is credited with introducing the hypothesis of "circular and cumulative" causation into the literature to account for the persistence of spatial differences in development indices, such as per capita income. His thesis is that: "*there are a small number of countries which are quite well off and a much larger group of extremely poor countries. The countries in the former group are on the whole firmly settled in a pattern of continuing economic development, while in the latter group, average progress is slower; in recent decades the economic inequalities between developed and underdeveloped countries have been increasing*".

The initial advantages common to the "well off group" become self-sustaining through the process of circular and cumulative causation. Myrdal considered this hypothesis for a geographically dual economy.[8] Assuming an initial equilibrium situation, an adverse shock to the economy results in a less favoured and more favoured region based on disparities in money wages. Contrary to neo-classical expectations, Myrdal contended that the forces of supply and demand would interact with one another to strengthen this dual economy and lead to a cumulative expansion of the favoured region at the expense of the less favoured region. This would be achieved by a "type of multiplier accelerator mechanism producing increasing returns in the favoured region" (Thirlwall, 1994, p. 130). Under this approach, capital movements and trade are instrumental in maintaining this dual economy. Assuming increasing returns to production, the favoured region will gain a competitive advantage by increasing its exports. In this context, the expansion of world trade would favour more rapidly growing regions in nation states.

Initially identified to account for the backwardness of developing nations, circular cumulative causation has been applied extensively to account for regional differences in more advanced economies. For example, Thirlwall (1994) examines the process of circular cumulative causation for the operation of the labour market in two different regions. Assume two regions, region A and region B. The labour market is in equilibrium in both regions and the wage rate is identical. We then assume an external shock which results in an increase in the demand for labour in region A and thus a higher wage rate compared to region B. According to neo-classical theory labour would

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[8] "Dualism is a description of a condition in which developing countries may find themselves in the early stages of development, the extent of which may have implications for the future pattern and pace of development" (Thirlwall, 1994, p. 128).

migrate to region A because of the higher wage rate. The result would be an equalisation of the wage rates once more as the labour supply curve shifts left in region B (due to the reduction in labour supply) and shifts right in region A (due to the increase in labour supply from immigration from region B); see Figures 2.3.1a and 2.3.1b below.

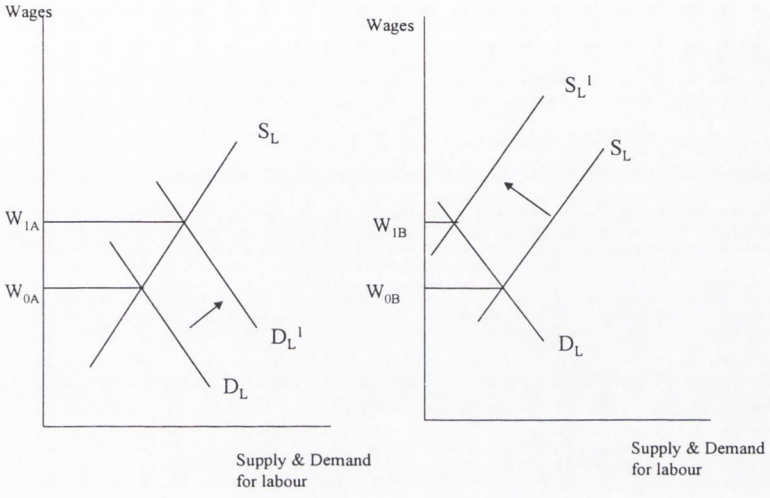


**Diagram 1** **Diagram 2**

**Figure 2.3.1a Illustration of cumulative causation in the labour market (1).**

According to the hypothesis of cumulative causation, which drops the assumption of a perfectly competitive labour market, this equilibrium may not arise. When labour leaves region B, we might assume a decrease in the region's human capital, its entrepreneurship and in the demand for goods and services. The result may be to shift the demand curve for labour to the left.

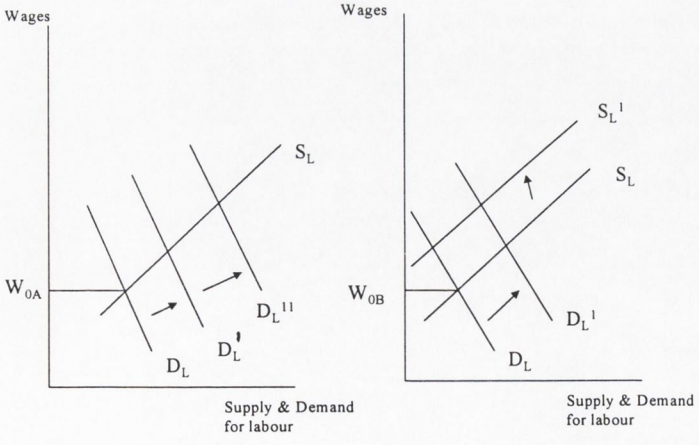


**Diagram 3** **Diagram 4**

**Figure 2.3.1b Illustration of cumulative causation in the labour market (2).**

Source: Adopted from Thirlwall (1994, p. 130).

On the other hand, increased migration into region A might be assumed to have the opposite effect, i.e. to increase its level of entrepreneurship, human capital and demand for goods and services, thus increasing the demand for labour and causing the demand curve to shift to the right. Thus, the initial wage discrepancy will persist and may even widen over time, as illustrated in Figures 2.3.1c and 2.3.1d. As Thirlwall (1994) explains (p. 131) "once development differences appear, there is set in motion a chain of cumulative expansion in the favoured region".

This example is by no means unique. The process of circular cumulative causation may be applied to many other situations. Figure 2.3.1c illustrates the process of circular cumulative causation arising from an initial reduction in rural employment opportunities.

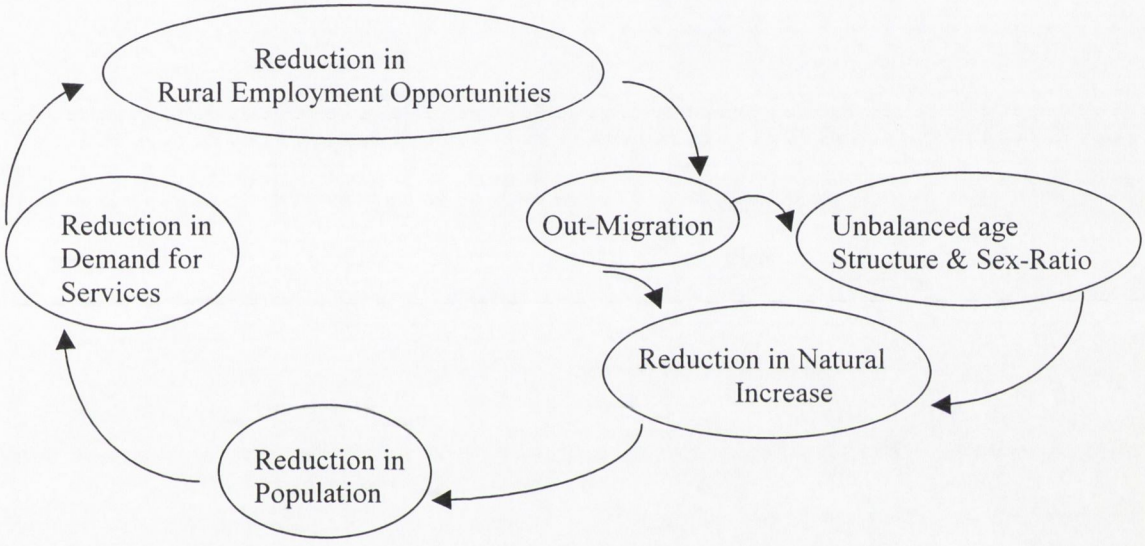


**Figure 2.3.1c The Process of Circular Cumulative Causation**
Source: Drudy (1989).

The large fall off in agricultural employment is documented in Drudy (1989). The numbers engaged in farm work in the ten EC countries decreased from 23.8 million in 1950 to 8.1 million in 1982 (Drudy, 1989). Alternative employment opportunities from both the private and public sector was unable to prevent the large out-migration from the agricultural areas. This contributed directly and indirectly (through changing age and sex ratios that translated into lower rates of natural population increase) to a reduction in population. The duality approach would argue that the decline in population leads to a reduction in demand for services, which in turn has a knock-on effect on employment. Thus, it is argued, following an initial shock the process became cumulative and reinforced itself over time.

According to Myrdal,[9] "backwash effects" arise from the cumulative expansion of a successful region, town or city on other regions causing disparities between them and the successful region. Backwash effects can arise from labour being attracted into the successful region from surrounding regions. The nature of this labour is likely to be young and skilled (Vanhove and Klaassen, 1987). The effects of this out-migration on the unsuccessful region can be severe. In the limiting case, these regions may come to be characterised by ageing populations and poor entrepreneurial bases. A possible second backwash effect concerns capital movements. Poorer regions' savings may be on lent through the financial system to the more successful regions and, over time, the effect is to inhibit growth in the less successful neighbouring region (Vanhove and Klaassen, 1987). In a similar vein, Hirschman (1958) refers to the "polarisation" effects that may arise in a dual economy setting from the increased specialisation of the successful region with no links to the weaker region. Migration may act as a negative effect if the migrants from the weak region are the "key technicians and mangers" (Hircshman, 1958).

On the other hand, "spread effects" arise from the positive externalities emanating from the successful region and its demand for the backward area's products and the diffusion of technology and knowledge from the successful region. The merits of spread effects depend on the underlying economy's state of development. In a developing economy, spread effects, or "trickle-down" effects (Hirschman, 1958) are weaker than backwash effects, whereas it is argued that the opposite holds for developed economies. Differentiation between developed and developing economies with respect to spread and backwash effects is, therefore, common in the literature (see for example, Gaile 1980). Furthermore, the impact of these effects varies across spatial units. Backwash and spread effects are stronger for regions within a country than across countries (Myrdal, 1957; Hirschman, 1958 and Thirlwall, 1994). This provides a strong argument for regional intervention. (Thirlwall, 1994).

### 2.3.2 Export Base Theory

The role of the export sector in explaining growth has received significant research attention and has a long history. Innis (1920), for example, argues that "several historical studies of the growth and development of resource based regions in North America lead to the emergence of the export base model of regional growth" (see Armstrong and Taylor, 1993). Focusing on the role of the export sector naturally emphasises the demand side of the economy in explaining economic growth. Thirlwall (1980) views demand considerations as being crucial to the understanding and explanation of regional growth: *"regional growth is demand determined for the obvious reasons*

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[9] Myrdal (1957) is accredited with the terminology of spread, backwash effects; Gaile (1980) refers to Smith (1776), Ricardo (1817), Lenin (n.d.), Colby (1933) and Hoselitz (1955) in earlier addressing the concept of spread, backwash effects.

*that no region's growth rate can be constrained by supply factors when factors of production are freely mobile. Supply adjusts to demand. We cannot return to the pre-Keynesian view that demand adjusts to supply. If we could, the solution to any region's lagging growth rate would be for it to save more and breed more!"* (Thirlwall, 1980, p. 420).[10]

Subsequent work on the export base approach has developed along two different, but related lines. On the one hand, there are writers who examined the reasons why regional specialisation occurred. Writers in international trade theory and theories of comparative advantage fall within this rubric. Secondly, the work concentrated on examining reasons for how a regional economy continued to grow and under what circumstances a region can decline. The latter approach is our concern here as it provides reasons for why disparities may persist in regional growth and overall economic performance.

One of the main ways in which a region can sustain its lead from initial export performance is through circular and cumulative causation as described in the previous section. Kaldor (1970) was the first to suggest such an approach for the explanation of regional disparities. He argued that the principle of cumulative causation "is nothing more or less than the existence of increasing returns to scale" (Richardson, 1979, p. 30). His interpretation of increasing returns was very much on the Young (1928) line whereby increasing returns did not just refer to the scale of a firm but to the whole manufacturing sector. [11] For him, regional growth came from the exploitation of economies of scale deriving from regional specialisation (through trade) in certain (exportable) products. The main function of markets argued Kaldor was not merely to allocate but to create more resources by enlarging the scope for specialisation and the division of labour. Once regions had achieved a growth advantage, this growth became cumulative and an emerging gap opened up between this region and the others. Dixon and Thirlwall (1975) provided a more detailed specification of Kaldor's initial model in which circular and cumulative causation played a dominant role. The model consists of a system of interrelated equations which explain four functional relationships between: (a) output growth and productivity growth, (b) price inflation, cost inflation and productivity, (c) exports, domestic and foreign price inflation and world income and (d) output growth and the growth of exports (see appendix A, section A.1). Once the actual coefficients and exogenous variables are known, it is possible to estimate a region's equilibrium growth rate. The following diagram illustrates the operation of the model.

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[10] Armstrong and Taylor (1993) criticise Thirlwall's model for concentrating solely on demand side factors. In an apparent contradiction of the above remarks, Thirlwall (1992) recognises the importance of (at least identifiying) supply side factors (Thirlwall, 1992; p.8).

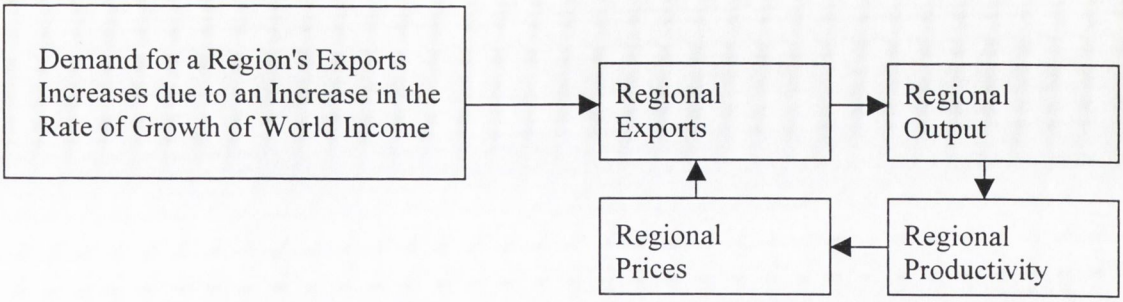


**Figure 2.3.3a Cumulative Growth Induced by an Increase in the Growth of World Income using the Kaldor-Dixon-Thirlwall model**

An increase in the growth of world income leads to an increase in regional exports which, operating as a component of aggregate demand, increases output in the region. This in turn increases productivity through the Verdoorn effect.[12] Growth in labour productivity leads to an increase in the region's export competitiveness by reducing price inflation (cost inflation is assumed constant). This increase in competitiveness causes the demand for the region's exports to increase once more. Thus the Verdoorn effect, by linking exports and growth through productivity and prices enables the process of circular cumulative causation. A number of criticisms have been made of the model, see Armstrong and Taylor (1993).

Thirlwall (1980) investigated the constraint imposed by the balance of payments position on a region's growth rate. A region that experienced a decline in the demand for its exports may find, in the short run, that its imports did not fall due to transfers into the region, and a trade deficit may result. The region (defined as a sub unit within the nation) is restricted in its ability to deal with a persistent trade deficit. However, Armstrong and Taylor (1993) identified five ways in which the region might finance such a deficit; a net income transfer from central government, residents running down their cash balances, residents borrowing from the banking system, residents selling assets to residents from other regions and/or inward investment by firms.

In the long run, Thirlwall argued for a balanced trade effect whereby regional exports equal regional imports. Assuming that the growth of exports are determined by world income and that imports are determined by domestic income then

$$m = \beta y \qquad \textbf{2.3.3i}$$

$$x = \alpha z \qquad \textbf{2.3.3j}$$

$$\Rightarrow \alpha z = \beta y \text{ (because } m = x)$$

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[11] It was argued that services and agriculture did not experience increasing returns to the same degree as the manufacturing sector.

[12] Verdoorn (1949) first suggested the positive relationship between growth of productivity and growth of output in 1949.

$$\text{or } y = \frac{\alpha z}{\beta} \qquad \textbf{2.3.3k}$$

where:

$\alpha$ and $\beta$ are income elasticities for exports and imports respectively.
$y$ = domestic income
$z$ = world income

Equation 2.3.3k states that the growth of a region's output is determined by the growth of world income and by the ratio of $\alpha$ to $\beta$. Thus if $\alpha < \beta$, the region's output will grow slower than world income, while if $\alpha > \beta$, the region's income will grow more quickly than world income.

### 2.3.3 Conclusion

Circular and cumulative causation and export led growth are the two most cited approaches that attempt to explain the persistence of regional disparity and were developed explicitly to account for the widespread evidence of economic growth inequalities. While not the only explanations provided in the literature for the existence and persistence of regional disparity, they would appear at first sight to be more relevant to its discussion than their neo-classical counterparts.[13] However, these approaches have failed to generate testable models. The sole focus of these approaches has been on the demand side of the economy with no reference to the effect of supply side improvements. Furthermore, the initial synthesis of these models was in the context of economies less advanced than they are currently. In summary, there has not been agreement among economists about the causes of regional disparities in spite of several noteworthy attempts to construct models of regional growth explaining such disparities over the past few decades. However, new developments in the economic growth literature, that encompass aspects of the previous discussion and lessons from the neo-classical approach to economic growth, present a wide range of additional possible explanations for regional disparity. These new developments are discussed in later sections.

### 2.3.4 Neo-Classical Growth Models

While the main preoccupation of the Solow (1956) neo-classical economic growth model was not to explain income disparities between economic areas, its long-term conclusions[14] would appear to have direct implications for regional disparity. Solow's seminal model proposed a model of economic growth that involved a single composite commodity produced by labour and capital

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[13] The neo-classical approach is considered in the following section.
[14] The convergence of economies towards their steady states.

under standard neo-classical conditions.[15] Output, which is equal to income in this closed economy model, is a function of capital and labour. It can be consumed or invested to create new units of physical capital. In the closed economy model, investment is equal to savings and (1-*s*) is the fraction of output that is consumed, where *s* is the savings rate. The savings rate is a positive constant in the Solow model. Capital depreciates at a constant rate. Thus the net increase in the stock of physical capital at a point in time equals gross investment minus depreciation.

Algebraically, $\dot{K} = I - \delta k = s \cdot F(K, L) - \delta K$ **2.3.4a**

where $\dot{K}$ refers to the change in the capital stock, I refers to investment, δ is the rate of depreciation of the capital stock, *s* refers to the fraction of output that is saved. Labour varies over time and it is assumed that population grows at a constant exogenous rate and that everyone works at a given intensity. Thus labour force growth is tied down by the population growth rate, which in turn is exogenously fixed, i.e. $\dot{L} / L = n \geq 0$ where $L$ refers to the labour force, $\dot{L}$ refers to the change in the labour force and *n* refers to the population growth rate.

The neo-classical production function described above is central to the economic growth model proposed by Solow (1956) and Swan (1956). The growth rate of capital, which is the fundamental determinant of economic growth in this model (under the assumptions of no technical progress and a fixed population growth rate) depends only on the capital/labour ratio *k*. Algebraically, this is shown as:

$\dot{k} = s \cdot f(k) - (n + \delta) \cdot k$ **2.3.4b**

Equation 2.3.4b translates as the rate of change of per capita capital stock $\dot{k}$ is equal to savings *s.f(k)* minus the growth rate of population *n* plus depreciation, δ, times the capital stock *k* per capita. Equation 2.3.4b arises from dividing the change in capital stock (equation 2.3.4a above) by the labour force, L and writing $\dot{K} / L$ as a function of *k*, see Appendix A, section A.3. The resulting variables are per capita values.

Solow showed that when capital and labour are freely substitutable (as with a Cobb Douglas production function) the system could adjust to any given rate of growth of the labour force and would eventually approach a state of steady proportional expansion.

In order to see the functioning of the Solow model, the concept of the steady state is required. The "steady state condition" refers to a situation whereby the various quantities, e.g. capital and output

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[15] These conditions are outlined in Appendix A, section A2 and include positive and diminishing marginal product with respect to each input, constant returns to scale for each individual input while both factors of

grow at constant rates that have no tendency to change over time. This is illustrated in Figure 2.3.4a below.

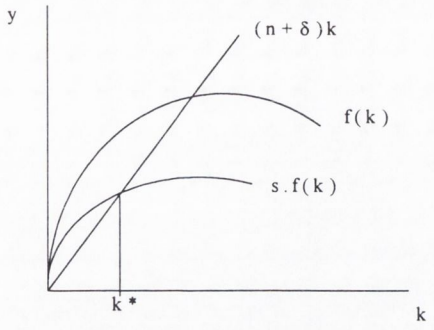


**Figure 2.3.4a Illustration of the steady state.**

The savings function, *sf(k)* shows that part of income that is saved, *sy* at each capital-labour ratio. The straight line, *(n+δ)* shows the amount of investment that is required just to keep the capital-labour ratio constant. At low capital-labour ratios, savings exceed the investment requirement and hence output per head grows. Conversely, at high capital-labour ratios, saving is less than the investment requirement and capital per head declines. With $k$=0, the corresponding value of $k$ is denoted $k^*$ in Figure 2.3.4a. Saving is just sufficient to maintain the capital-labour ratio constant. Algebraically, $k^*$ satisfies the condition: $sf(k^*)=(n+\delta)k^*$.

Since $k$ is constant in the steady state, $y$ and $c$ are also constant at the values $y^*=f(k^*)$ and $c^*=(1-s)f(k^*)$[16] respectively, the **per capita** quantities, $k$, $y$ and $c$, do not grow in the steady state. However, changes in the level of savings, $s$; in the rate of population growth, $n$; and in the depreciation rate, $\delta$, all have effects on economic growth and the per capita levels of the various quantities in the steady state.[17] This conclusion, which differentiates between the level and growth rate of the various variables (s, n and δ) is fundamental to the understanding of the growth process over time. Moreover, it suggests that differences in the levels of growth variables, saving or population as identified here, may account for differences in income and may identify and explain regional disparity as discussed in section 2.2.

Furthermore, the fact that the steady state growth rate is equal to zero ($k$=0) implies that the model as currently specified does not explain the determinants of long-run per capita growth rates.[18] The

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production are used at all times.

[16] Since output/income per head is either consumed (c) or invested (I) and savings equal investment.

[17] This is illustrated in Appendix A, section A.4.

[18] Criticism of this finding formed the basis for the alternative growth theories discussed in the previous sections and has more recently formed the basis for endogenous growth theory, discussed in Appendix A, section A5.

only way that growth can increase is through an increase in exogenous elements, such as technology.

The model does however have important consequences for the **behaviour** of growth rates in the long run. Transitional dynamics show that an economy's per capita income converges towards to its own steady-state value and moreover, closed economies with similar structural characteristics will converge to the same steady state. This latter point is relevant to regional disparity as it suggests that, in the long run, growth rates converge across economies. Regional disparity is not expected to persist according to the neo-classical framework. The following paragraphs show how this convergence comes about.

Dividing equation 2.3.4b above by $k$, the growth rate of $k$, i.e. $\gamma_k$ is given as:

$$\gamma_k = \dot{k}/k = s \cdot f(k)/k - (n+\delta) \qquad \textbf{2.3.4c}$$

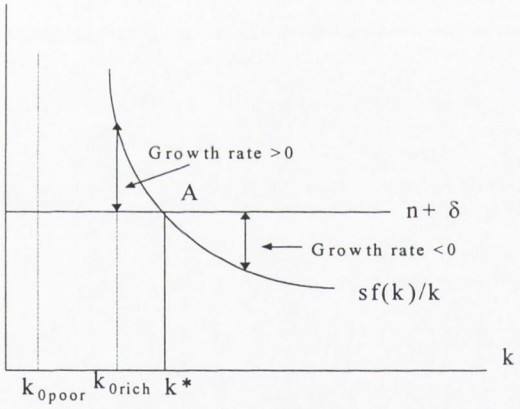


**Figure 2.3.4b Dynamics of the Solow-Swan model**
Source: Barro and Sala-i-Martin (1995, p. 23).

Equation 2.3.4c states that the growth rate of capital is equal to the difference between two terms, $s \cdot f(k)/k$ and n+δ. This is illustrated in Figure 2.3.4b above. The former term is a downward-sloping curve which asymptotes to infinity at $k$=0 and approaches 0 as $k$ tends to infinity (see Barro and Sala-i-Martin, 1995, p. 22). The second term is a horizontal line. The vertical distance between the curve and the line equals the growth rate of capital per person as given by Equation 2.3.4c and the point of intersection (A) corresponds to the steady state, $k^*$. The growth rate of $k$ is positive to the left of A and rises over time. As $k$ increases, $\gamma_k$, declines and approaches 0 as $k$ approaches $k^*$. Similarly, for points to the right of A, the growth rate of $k$ is negative and falls over time. As $k$ decreases, $\gamma_k$, increases and approaches 0 as $k$ approaches $k^*$. As stated in Barro and Sala-i-Martin (1995, p. 23), "the system is globally stable: for any initial value, $k(0) > 0$, the economy converges to its unique steady state, $k^*>0$."

The above diagram also illustrates how convergence occurs across economies. From the preceding, smaller values of $k$ were associated with larger values of $\gamma_k$. Assuming a group of closed economies with similar structural characteristics, defined by the same values of the parameters, $s$, $n$ and $\delta$ and the same production function, $f(\bullet)$, then the economies have the same steady state values of $k^*$ and $y^*$. Supposing that the only difference between the economies is the initial quantity of capital per person, $k(0)$, then the economy with the lower level of $k(0)$ would experience higher growth rates of $k$. This is illustrated in Figure 2.3.4b by comparing $k$(poor) and $k$(rich). The former economy begins with a lower level of capital per person than the latter. Given the common production function and values of the parameters, $s$, $n$ and $\delta$, the transition dynamics of $k$ is determined by the same $s \cdot f(k)/k$ and n+$\delta$ curves. The growth rate, $\gamma_k$, for $k$(poor) is therefore larger than that that for $k$(rich). Thus, the poorer economy grows at a faster rate than the richer economy and therefore catches up or converges to the richer economy.

The underlying assumption of the neo-classical model is that economic growth rates of different economies will converge over time, as illustrated by Figure 2.3.4b above, based upon the assumptions of: common production functions, exogenous technology and savings, and mobile factors of production. Perhaps unsurprisingly, the evidence suggests that the neo-classical growth theory and its strong predictions have, at best, limited explanatory power for regional disparity.

Several studies of regional disparity have, however, used this framework to explain regional differences. These studies employ an essentially short-term interpretation of regional disparity by focusing on the transition of regional economies towards their steady state.

### 2.3.5 Regional Neo-classical Growth Models

McCombie (1988) outlines three disequilibrium factors that account for "a **temporary** divergence of the growth of the regional capital labour ratio from its steady state value" (p.270). These factors comprise an **initial** misallocation of resources at the (i) inter-regional and (ii) intra-regional level and (iii) the spatial diffusion of technology. These three factors as well as the familiar rate of exogenous technical progress and the steady state growth of capital deepening determine productivity growth. This is shown in the following equation taken from McCombie (1988, p. 270).

$$\overset{0}{P}_i = \mu_i + \pi_i + \phi_i' + \phi + \alpha(\overset{0}{K}_i - \overset{0}{L}_i) \qquad \textbf{2.3.5a}$$

$\overset{0}{P}_i$ is the growth rate of productivity; $\mu_i$ is the growth of productivity due to the improved inter-regional allocation of resources; $\pi_i$ is the growth of productivity due to the improved intra-regional allocation of resources, which is due to the improved allocation of resources between industries

within a region; $\phi$ is the rate of technical progress while $\phi_i'$ is the rate of technical progress in addition to $\phi$, which is due to the diffusion of innovations caused by differences in the level of technology to which the regions have access and $(\overset{0}{K}_i - \overset{0}{L}_i)$ refers to the steady state growth rate of capital deepening.

Both technical progress and capital deepening are assumed the same for all regions. There may, however, be an initial sub-optimal use of the factors of production at the inter-regional level resulting in regional differences in profits and wages. As improvements take place, facilitated by the integration and greater efficiency of factor markets, the initial advantages in productivity in a given region will diminish and the resources will be allocated to achieve their Pareto-optimal level. McCombie (1988) identifies the "intersectoral movement of labour, especially from agriculture to industry" (p. 271) as an important contributor to the reallocation of resources within an economy. Predominantly agricultural regions have been characterised by low productivity and the movement toward industrial activity has increased overall productivity and economic growth of the underlying economy.[19]

For McCombie (1988) and others, regional disparity should be corrected over time by the reallocation of resources thereby ensuring convergence in the long run to the steady state growth rate.

Armstrong and Taylor (1993) also examined the role of inter-regional factor mobility in regional economic growth by employing a neo-classical growth framework. The neo-classical approach, which assumes constant returns, would ensure a post-shock equalisation of both wages and profits across two types of region. The less favoured region would be subject to inflows of capital and outflows of labour, thus increasing wages and reducing profits, while the more favoured region would experience an inflow of labour and an outflow of capital. The wage rate and rate of profit would equalise across both types of region and equilibrium would ensue. However, they argue that this result may not hold for the two-sector growth model. Two sector growth models isolate the major sectors of a region and are designed to project the output of various sectors, e.g. between agriculture and industry. An understanding of structural relations within and between the sectors is necessary to determine output. Unlike the one sector model, this model indicated that both labour and capital may flow towards high wage regions in some circumstances (see McCombie, 1988, Armstrong and Taylor, 1993) resulting in persisting regional differences in the levels of capital and labour. These may arise for three reasons:

- technical progress may vary between regions;
- the growth of the capital stock may vary between regions;
- the growth of the labour force may vary between regions.

This is seen in the following equations taken from Armstrong and Taylor (1993, p. 64).

Writing the regional growth equation as

$$y_r = g_r + \alpha k_r + (1-\alpha) l_r \qquad \textbf{2.3.5b}$$

where $y_r$ is output growth; $g_r$ is the rate of technical progress; $k_r$ is capital growth and $l_r$ is labour force growth and the subscript r denotes the region. Subtracting the growth of the labour force, lr, from both sides of Equation 2.3.5b results in:

$$y_r - l_r = g_r + \alpha(k_r - l_r) \qquad \textbf{2.3.5c}$$

Thus regional disparities in the growth of output per worker are explained by regional differences in the rate of technical progress and by regional differences in the growth of the capital/labour ratio. Hulten and Schwab (1984) have carried out tests of this model for nine regions in the US over the period 1951 to 1978. Their results are given in Table 2.3.5a below.

**Table 2.3.5a Results from Hulten and Schwab (1984)**

| | | Growth of output due to: | | | | Growth of output per worker due to: | |
|---|---|---|---|---|---|---|---|
| Region | Output growth | Capital stock growth | Labour-force growth | Other factors | Growth of output per worker | Growth of capital/labour ratio | Other factors |
| Middle Atlantic | 1.78 | 0.44 | -0.35 | 0.70 | 2.25 | 0.56 | 1.70 |
| New England | 2.24 | 0.48 | -0.06 | 1.82 | 2.26 | 0.45 | 1.82 |
| East North Central | 2.62 | 0.68 | 0.14 | 1.79 | 2.34 | 0.55 | 1.79 |
| West North Central | 4.19 | 1.20 | 0.97 | 2.02 | 2.70 | 0.68 | 2.02 |
| *Snowbelt regions* | 2.45 | 0.62 | 0.03 | 1.80 | 2.36 | 0.56 | 1.80 |
| South Atlantic | 4.49 | 1.42 | 1.39 | 1.69 | 2.31 | 0.62 | 1.69 |
| Pacific | 4.76 | 1.26 | 1.84 | 1.67 | 2.15 | 0.48 | 1.67 |
| East South Central | 5.09 | 1.90 | 1.58 | 1.61 | 2.45 | 0.83 | 1.61 |
| West South Central | 5.59 | 2.40 | 1.77 | 1.42 | 2.45 | 1.03 | 1.42 |
| Mountain | 5.87 | 1.90 | 2.58 | 1.39 | 1.91 | 0.52 | 1.39 |
| *Sunbelt regions* | 4.94 | 1.63 | 1.69 | 1.61 | 2.31 | 0.70 | 1.61 |

Output growth - real value added in manufacturing; 'Other factors' - 'total factor productivity'.
Source: Armstrong and Taylor, 1993, p. 65.

Output growth in manufacturing is attributed to labour force growth, capital stock growth and a residual component that includes technical progress. There was a marked difference between the Snowbelt and Sunbelt regions in terms of output growth, i.e. 2.45 percent per annum versus 4.94 percent per annum respectively. However, the differences in output growth **per worker** between

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[19] Over time, as labour moves away from the agricultural sector, it in turn becomes increasingly efficient. This can be seen in the cases of the UK and US where agriculture has become highly commercialised and

both regions were minimal, as seen in Table 2.3.5a. This suggests that the difference between the two sets of regions was primarily due to differences in the growth of the labour force.

In conclusion, regional growth models from the neo-classical perspective have concentrated on a short-run interpretation of the theory. The models have focused on the reasons why a region may be off its steady-state growth path. Although neo-classical growth theory suggests that countries will only grow at different rates to the extent that they are away from their steady state, poorer countries will grow faster than richer countries until the growth rates of both converge to the steady state. While the levels of growth-promoting variables may suggest disparities between countries, it may prove more difficult to argue this for regions within a country. These issues are examined in more detail in subsequent sections of this chapter when the more recent research on convergence is examined.

## 2.4 NEW GROWTH LITERATURE

New growth literature, which has gained prominence following recent theoretical insights and the availability of large cross-country data sets containing a wide variety of explanatory variables, is flexible enough to be compatible with convergence or divergence outcomes. The new growth literature is characterised by Barro and Sala-i-Martin (1995) as paying "close attention to empirical implications and to the relation between theory and data" (p. 11). The new growth literature has developed along two lines that are not always mutually exclusive.[20] So-called endogenous growth theory, which is described briefly in appendix A, section A.5 arose from dissatisfaction with the assumptions and predictions of the neo-classical growth model that seemed to clash with the cross-country empirical evidence that indicated that both divergence and convergence patterns could persist. At the same time, a significant amount of work emerged that focused on the extension of the neo-classical model to demonstrate the empirical implications of convergence for cross-country and cross regional data sets. This literature is relevant in particular to the existence and persistence of regional disparity as previously discussed and will be examined in greater detail below in sections 2.4.1 and 2.4.2.

### 2.4.1 Convergence Revisited

Barro and Sala-i-Martin are the two authors most often associated with the revival of the convergence implication of the neo-classical growth model. Their work has concentrated largely

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productive.

[20] One example is the empirical observation that convergence and divergence exist simultaneously. Baumol (1986) refers to convergence clubs whereby a group of countries may have diverged in economic growth

on the empirical aspects of convergence for cross-country data sets in particular, but they have also analysed regional data sets. Barro and Sala-i-Martin show that once certain variables are controlled for (so-called "control variables" or "ancillary variables") in growth regressions, that convergence will hold in the long run. This concept of convergence is termed "conditional convergence" and occurs when a negative relationship is found between the growth rate and the initial level of income, holding constant a number of explanatory or control variables. On the other hand, "absolute convergence" occurs when there is a negative univariate relationship between growth rates and initial income (in other words, there is no need to hold control variables constant to uncover convergence). Barro (1991) and Sala-i-Martin (1994) argue that conditional convergence is relevant to cross country studies where explanatory variables are likely to differ significantly while the stronger form of convergence, absolute convergence, holds for regional data sets.

The outcome from the Solow model outlined in section 2.3.4 represents conditional convergence. It will be recalled that factor mobility and diminishing returns resulted in similar long-run steady states of capital and output per worker across economies. Thus the economy that started out below its steady state caught up or converged on the richer economy. Convergence was conditional because the savings rate, growth rate of population and the position of the production function that determined the steady state, which were assumed to be identical across countries, could realistically differ across countries.[21] Taking saving rate differentials across countries into account, such models would admit persistent regional differences as a possibility, although the scope for this is less across regions within a country where savings rates are likely to be very similar.

Barro (1991) and Sala-i-Martin (1994) argue that conditional convergence is relevant to cross-country studies where explanatory variables are likely to differ significantly, thereby generating different steady state growth rates. Holding such variables constant implies that the further an economy is from its steady state the faster it will grow.

In order to estimate the speed of convergence, Barro and Sala-i-Martin (1995) employ an augmented Cobb-Douglas production function embodying technical progress ($A$), Equation 2.4.1a.

$$Y = AK^{\alpha}L^{1-\alpha} \qquad \textbf{2.4.1a}$$

Rewriting this in intensive form, i.e. per capita factors of output and capital gives:

$$y = Ak^{\alpha} \qquad \textbf{2.4.1b}$$

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rates over time, but certain countries within that group may have converged together, see Quah, 1996, 1993; Bernard and Durlauf, 1991.

[21] Furthermore, conditional convergence also characterises the neo-classical growth models of Cass (1965), Koopmans (1965) and Ramsey (1928). The former two theorists incorporated Ramsey's analysis of

Given that *A(t)* grows at the rate *x*, and adopting the same derivation as for the neo-classical growth model without technical progress in section 2.3.4, the dynamic equation for $k$[22] is given as:

$$\gamma_{\hat{k}} = s \cdot f(\hat{k}) / \hat{k} = (x + n + \delta) \qquad \textbf{2.4.1c}$$

The only difference between this and Equation 2.3.4c from section 2.3.4 is that *x* is included in the last term on the right hand side. The term (x+n+δ) is now the effective depreciation rate for *k=K/L*.

Figure 2.4.1a represents Equation 2.4.1c where the growth rate of capital per effective worker (*k=K/LA*) is given by the vertical distance between the $s \cdot f(\hat{k}) / \hat{k}$ curve and the effective depreciation line, x+n+δ. The economy is at a steady state when *k* is constant.

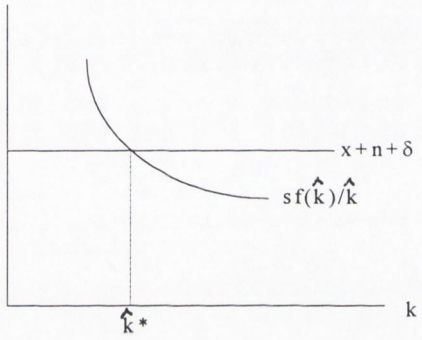


**Figure 2.4.1a The Solow-Swan model with technological progress**
Source: Barro and Sala-i-Martin, 1995; p. 36.

The growth rate of *k* in the Cobb-Douglas case is:

$$\gamma_{\hat{k}} = sA(\hat{k})^{-(1-\alpha)} - (x + n + \delta) \qquad \textbf{2.4.1d}$$

Considering a log-linear approximation of Equation 2.4.1d in the neighbourhood of the steady state gives:

$$\gamma_{\hat{k}} = d[\log(\hat{k})] / dt \cong -\beta \cdot [\log(\hat{k} / \hat{k}^*)], \quad \beta = (1-\alpha) \cdot (x + n + \delta) \qquad \textbf{2.4.1e}$$

The coefficient β comes from the log-linearisation of Equation 2.4.1d around the steady state and determines the speed of convergence from *k* to *k**. Equation 2.4.1e also applies to the growth rate of *y*. For a Cobb-Douglas production function (Equation 2.4.1a):

$$\gamma_{\hat{y}} = \alpha \cdot \gamma_{\hat{k}},$$

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consumer optimisation in their neo-classical growth model and thereby provided for an endogenous determination of the savings rate (Barro and Sala-i-Martin (1995).

[22] Note that the hats (^) denote quantity per *effective* amount of labour which is the physical quantity of labour multiplied by its efficiency, A(*t*). The variable *k* is then the quantity of capital per unit of effective labour.

$$\log(\hat{y}/\hat{y}^*) = \alpha \cdot \log(\hat{k}/\hat{k}^*)$$

and substituting the formulas into Equation 2.4.1e gives

$$\gamma_{\hat{y}} \cong -(1-\alpha)\cdot(x+n+\delta)\cdot[\log(\hat{y}/\hat{y}^*)] \qquad \textbf{2.4.1f}$$

which as noted by Barro and Sala-i-Martin (1995, p. 37) has the same form as Equation 2.4.1e and therefore the convergence coefficient, β, for $y$ is the same as for $k$. The term $\beta = (1-\alpha)\cdot(x+n+\delta)$ in Equation 2.4.1e indicates how rapidly an economy's output per effective worker, $y$ approaches its steady-state value, $y^*$. If β=0.05 per year as given in Barro and Sala-i-Martin (1995, p. 37) then "5 percent of the gap between $y$ and $y^*$ vanishes in 1 year". Equation 2.4.1f is a differential equation in $\log[y(t)]$ with the solution

$$\log[\hat{y}(t)] = (1-e^{-\beta t})\cdot\log(\hat{y}^*) + e^{-\beta t}\cdot\log[\hat{y}(0)]$$

The time t for which log[$y$(t)] is halfway between log$y$(0) and log($y^*$) satisfies the condition, $e^{-\beta t} = ½$.

For given values of the parameters, $x$, $n$ and δ, the convergence coefficient in Equation 2.4.1e is determined by the capital share parameter, α (Barro and Sala-i-Martin, 1995; p. 38). Suggested values for the parameters have been; $x$=0.02, $n$=0.01, δ=0.05 and α=1/3. However these parameters suggest fairly rapid speeds of convergence. Barro and Sala-i-Martin (1995) show that this rapid speed of convergence does not accord with the empirical evidence. Empirical evidence suggests a beta coefficient of 2 percent per year. This necessitates a higher value for α (i.e. capital share), somewhere in the region of 0.75. This value makes sense only when a broad concept of capital is assumed, i.e. a capital share coefficient that also includes human capital. The inclusion of human capital in studies of convergence has been one of the hallmarks of the new growth literature. It is one of a number of variables that have been used in studies of conditional convergence.

Sala-i-Martin (1996) refers to "more than 50 variables" (p. 1028) that have been used in convergence studies and "that have been found to be significant in at least one regression".[23] The following table, Table 2.4.1a examines a selection of convergence studies by identifying the ancillary/control/explanatory factors. Details on the individual studies are given in Appendix A, sectionA.6.

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[23] See chapter 12 in Barro and Sala-i-Martin (1995).

**Table 2.4.1a Summary Table of Cross-Country Convergence Studies.**

| Author(s) | Sample | Period | Dependent Variable | Independent Variable(s) | Estimation Technique | Human Capital | Technology | Investment | Employment Structure | Other | β | $R^2$/ Adj. $R^2$ |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Evans & Karras (1996) | 48 US States<br><br>54 Countries | 1929-1991<br><br>1950-1990 | Growth rates in Per capita output<br><br>(per worker) | Real per capita personal Income<br><br>Real GDP per worker | OLS | <br><br>✓ | | <br><br>✓ | | <br><br>✓ | -0.111 (0.000)<br><br>-0.012 (0.002) | n/a |
| De la Fuente (1995) | OECD | 1963-1988 | Growth rate of Income per capita | Income per capita | NLLS | ✓ | ✓ | ✓ | | ✓ | 0.02 | |
| Button & Pentecost (1995) | 51 EU regions | 1975-1988 | GDP growth rates Per capita | GDP per head relative to EU average | OLS | | | | ✓ | ✓ | 0.019 (2.295) | 0.88 0.85 |
| Neven & Guoyette (1995) | 73 EU regions | 1975-1989 | Growth rates in Output per head | Output per head | SUR | ✓ | | | ✓ | ✓ | 2.71 | 0.65 |
| Barro & Lee (1994) | 46 countries | 1965-1985 | Per capita growth rate | Real per capita GDP; Schooling per person; Life expectancy | SUR + | | | ✓ | ✓ | ✓ | -0.026 (.0030) | 0.58 |
| Helliwell (1992) | Global<br>OECD<br>Asia | 1960-1985 | Growth rate of GDP per Adult | GDP per adult | OLS | ✓ | ✓ | ✓ | | ✓ | -0.343 (5.60)<br>-0.442 (7.29)<br>0.175 (0.66) | 0.49<br>0.75<br>0.56 |
| Barro & Sala-i-Martin (1992) | 48 US States | 1880-1988<br>1840-1988<br><br>1963-1986 | Growth rates in: Personal income<br><br>GSP | Real per capita personal Income | NLLS | | | | ✓ | ✓ | .0175 (.005)<br>.0180 (.006) | 0.92<br><br>0.48 |
| Mankiw, Romer & Weil (1992) | Non oil<br><br>Intermediate<br><br>OECD | 1960-1985 | Growth rates in Real GDP | Real GDP | OLS | ✓ | | ✓ | | ✓ | | 0.78<br><br>0.77<br><br>0.28 |
| Barro & Sala-i-Martin (1991) | 73 European Regions | 1950-1960<br><br>1960-1970<br><br>1970-1980<br><br>1980-1985 | Growth rates in GDP per capita | Real GDP per capita | OLS | | | | ✓ | ✓ | 0.020 (0.008)<br>0.024 (0.006)<br>0.014 (0.008)<br>0.011 (0.006) | 0.80<br>0.92<br>0.44<br>0.96 |
| Dowrick & Nguyen (1989) | OECD | 1950-1985 | Growth rate in Real GDP | Per capita GDP | OLS | | | ✓ | ✓ | | | 0.83 |
| Bradford De Long (1988) | 22 countries | 1870-1979 | Growth rate in Income | Initial level of income | MLE | | | | | ✓<br><br>✓ | 0.16<br>0.45<br>-0.47 (0.25) | N/a |
| Baumol (1986) | 16 countries | 1870-1979 | Growth rate in GDP per work hour | Initial level of GDP per Work hour | OLS | | | | | | -0.75 | 0.88 |

*t-statistics in parentheses.*

Although these studies were not conceived in a regional disparity framework i.e. the identification of leading and lagging countries, the convergence outcome from the studies is dependent on various control variables being held constant. These control variables therefore can be said to account for the disparities between countries -- if they are not held constant convergence is not found -- and thus represent the causes of regional disparity. By implication, the levels of these variables can be held to account for the growth differences between countries over time.

Table 2.4.1a is primarily concerned with cross-country studies on convergence,[24] with convergence studies for regions within a country being examined in the subsequent section. The dependent variable used is primarily income or GDP per head, although some convergence studies have employed productivity measures (see Bernard and Durlauf, 1991; Baumol, Nelson and Wolff, 1994; Paci and Pigliaru; 1997)) and manufacturing output as the dependent variable (see Hulten and Schwab, 1993). The models constructed rely for the most part on the Barro regression described above, whereby the growth rate of a variable is a function of the initial level of that variable and a vector of control variables.[25] The most common control variables from Table 2.4.1a are human capital, investment, technology, savings, the role of government, employment structure and an 'other' category. The contribution that these variables have made to studies of conditional convergence and to a deeper understanding of economic growth in particular is examined in the following paragraphs.

*Human Capital*

The human capital variable plays a central role in the new economic growth models. It is usually measured either as the secondary school enrolment rate, as in the empirical studies of Evans and Karras, 1996; and Neven and Gouyette, 1994, or as the proportion of the population in schooling, see Mankiw, Romer and Weil, 1992 (Table 2.4.1a). The human capital variable also features as investment in human capital in models of economic growth, see De la Fuente, 1995 and Helliwell, 1992 above. Berry and Kasserman (1993) develop a diffusion model of long-run economic development, which has as an explanatory variable the spending on higher education. The hypothesis is that spending on higher education tends to influence the location decisions of outside firms and enhances the competitiveness of indigenous firms and world markets. These authors find that per capita spending on higher education fosters economic growth. It is interesting to note that one of the primary variables held responsible for the recent improvement in Ireland's growth performance is the greater investment in human capital that has been taking place (see for example, Leddin and Walsh, 1997, Barry and Hannan, 1998). Similarly, Bradley and Taylor (1996) examine

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[24] A separate literature examines convergence from a time-series perspective, see for example: Canning, Dunne and Moore, 1995; Carlino and Mills, 1994, 1993; Quah, 1993; Friedman, 1992; Bernard and Durlauf, 1991; DeLong, 1988.

human capital formation and local economic performance for the UK economy. They find a direct correlation between the education, training system and the local economy whereby the outputs from the local education and training system determine and are in turn determined by the local economy's stock of high skilled workers, who in turn determine the competitiveness of the local economy. Recent research (O' Hagan, 1995) on the Irish economy shows that the incidence of unemployment is higher among those with low levels of education.[26]

The broader interpretation of capital in models of economic growth, both in endogenous theory, (see appendix A, section A.5), and as referenced above, relies on the inclusion of human capital. The Mankiw, Romer and Weil (1992) model (see appendix A, section A.7), which is referenced throughout the literature, provides empirical justification for a broader interpretation of capital in a model of economic growth while demonstrating its role for convergence.

The results strongly support the augmented Solow model that includes human capital as an explanatory variable (Mankiw, Romer and Weil, 1992). The $R^2$s are far higher when human capital is included and the human capital variable is highly significant for each of the sample regressions. Furthermore, the implied alpha and beta coefficients are much closer to the values predicted by the model when human capital is included (see appendix A, section A.7).

*Investment*

The rate of investment in a country has a direct effect on economic growth through the increase in the capital stock. The role of physical capital in the growth process has been well documented in the literature. From the Solow model to the endogenous growth models developed by Romer 1986 and Lucas, 1988, physical capital has played a key role in explaining the growth of economies. It has featured strongly in the economic growth studies of Baumol, Nelson and Wolff, 1994; Dollar and Wolff, 1993, who attribute the convergence in labour productivity in the US since 1973 to capital accumulation. Mankiw, Romer and Weil, 1992 and Dowrick and Nguyen, 1989 – Table 2.4.1a above - also illustrate the impact of capital accumulation on the convergence of income per capita. The rate of investment in a country has a direct effect on economic growth through the increase in the capital stock. Studies (e.g. Dowrick and Nguyen, 1989) refer to the fact that poor countries tend to have low levels of saving and investment and that this is one of the factors holding them back from rapid growth and convergence. However, it is also the case that economic growth has a direct effect on investment, in that the richer the country, the more it can afford to invest (see, for example, Barro and Sala-i-Martin, 1995).

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[25] The initial level of variable(s) is shown in the independent variable(s) column of Table2.4.1a.

Differences in investment rates are a key source of income growth differentials across countries. The empirical convergence studies examined in Table 2.4.1a show this by holding the investment variable constant. Capital growth is proxied by the share of investment in output (see, for example, Dowrick and Nguyen, 1989; Barro and Lee, 1993; Table 2.4.1a above and Levine and Renelt, 1992; Cho, 1994) or by gross investment (see, for example, Evans and Karras, 1996; De la Fuente, 1995, Helliwell, 1992 and Mankiw, Romer and Weil, 1992).

With the advances made by the new growth literature, investment has also taken on a broader focus. Investment in earlier models of economic growth was understood to comprise solely investment in physical capital. As the concept of capital has widened to include human capital, so too has the concept of investment itself. Empirical and theoretical studies (most notably that of Lucas, 1988) embody investment in education as an explanatory factor for economic growth. Investment in education is heavily dependent on government policy; the impact of the latter for economic growth is discussed below.

In summary, the approach adopted in the new growth literature has been the consideration of a broader concept of investment that includes investment in education as well as in physical capital.

*Technology*

Technology plays a significant role in economic growth. Although treated as exogenous in the Solow growth model, the new growth literature has sought to endogenise the role of technology (see for example Romer, 1987, 1990; Grossman and Helpman, 1991; Aghion and Howitt, 1992). It also plays an important part in empirical convergence studies (see for example Helliwell, 1992; de la Fuente, 1995; Barro and Sala-i-Martin, 1997) through technological diffusion and technology transfer. De Long (1988) writes of nineteenth century economists like John Stuart Mill [1884] (1970) and Karl Marx [1853] (1973) who were extremely optimistic about future convergence. Technology diffusion from leader (inventor) countries to follower (imitator) countries depends on the discovery of new products and processes in a few leader economies, that, because it is cheaper to imitate than innovate, follower countries will emulate to also benefit from higher growth. Twentieth century historians like Alexander Gerschenkron (1952) stressed the extremely rapid growth possible for a latecomer to development which "can accomplish in one generation what took earlier developers four"(p. 1138). However, Baumol (1986) after examining post-World War 11 data, argued "the poorer less developed countries are still largely barred from the homogenisation process...[P]art of the explanation may well be related to the product mix and education. A less developed country that produces no cars cannot benefit from the invention of... a

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[26] Data to support this were given in footnote 4.

better car-producing robot...[or] from the factor-price equalisation effects of the accompanying investments". Be that as it may, an economy's alertness to technological change depends on its flexibility, specialisation and entrepreneurial ability and the presence of these factors in a region will enable it to catch-up more quickly to the leader economy.

*Savings*

The rate of savings was also assumed exogenous in the Solow growth model. Empirical evidence suggested however, that those countries that saved more enjoyed higher growth rates. The savings rate was thus one of the first variables to be endogenised in the neo-classical growth model. Cass (1965) and Koopmans (1965) incorporated Ramsey's (1928) analysis of consumer optimisation in their neo-classical growth model, thereby incorporating an endogenous determination of the savings rate. Taking savings rate differentials across countries into account, such models would admit persistent regional differences as a possibility, although this scope is less across regions within a country where savings rates are likely to be very similar, given greater similarities in saving incentives within countries. Of course the rate of savings should play a central role in determining a country's investment rate.[27]

*The Role of Government*

Government plays both an indirect and direct role in economic growth. With regard to the former, securing a stable environment through supervision and regulation for investment and enterprise will impact positively on the factors for economic growth, while Government distortions will impact negatively on economic growth. The Government plays a direct role in economic growth through its own consumption of goods and services. Certain convergence studies view a low level of Government consumption, measured by the ratio of government consumption to GDP, as impacting positively on economic growth. Barro and Sala-i-Martin (1995) list other variables that have been used in convergence studies to capture the influence of Government on economic growth,[28] such as the Gastil (1987) indices for political rights and civil liberties. Knack and Keefer (1994) develop a "rule of law" variable that attempts to "gauge the extent to which institutions allow for implementation of laws, adjudication of disputes, and an orderly succession of power.

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[27] A country with a high savings rate may also choose to run large current account surpluses, rather than investing the resources within the country. However, to the extent that these resources are invested wisely abroad, such current account surpluses should also be associated with higher economic welfare over time.

[28] These variables include political rights, civil liberties, and rule of law.

*Employment Structure*

An economy's structural make-up in terms of its employment mix (agriculture, industry and services) will have implications for its long-run growth. Cho (1994) finds, for example, that "drastic industrialisation" is a key factor in explaining the growth of middle income countries. In a similar vein, Dollar and Wolff (1993) attributed the catch up in productivity by Japan and the other nations to the US to industrial composition. Kim (1997) shows that "while the long-run trends in US regional industrial structures do not explain all the variations in regional income per capita, they played an important role in causing US regional incomes to diverge and then converge between the nineteenth and the twentieth centuries". Earlier sections in this chapter identified the employment variable and discussed its relevance to regional economic growth. It was shown that a region's structure in terms of its employment could explain its growth performance. A predominantly agricultural region would tend to have a lower growth rate than a primarily industrial region, for example. A number of conditional growth equations have included employment, see, for example, Button and Pentecost, 1995; Neven and Guoyette, 1994, Barro and Lee, 1993; Barro and Sala-i-Martin, 1992, 1991 and Dowrick and Nguyen, 1989 (Table 2.4.1a). Paci and Pigliaru (1997) stress the importance of evaluating the contribution of employment composition change across regions (which can vary dramatically over time across different regions) to aggregate convergence.

*Other Variables*

The above list of ancillary or control variables is by no means exhaustive; attention has been focused on those variables that appear most frequently in studies of convergence. Other variables include dummy variables, 'openness' variables and migration.

Dummy variables have been used in several of the studies quoted in Table 2.4.1a, see Evans and Karras, 1996; De la Fuente, 1995; Button and Pentecost, 1995; Neven and Guoyette, 1994; Helliwell, 1992; Barro and Sala-i-Martin, 1992. These dummy variables were included in the convergence equations to control for country effects, such as country-specific breaks in the data.

Certain new growth theorists, such as Baumol, Nelson and Wolff, 1994; Barro and Lee, 1993; Berry and Kasserman, 1993 and Helliwell, 1992 argue that outward oriented economies develop more rapidly. The earlier work of Dixon and Thirlwall (1975) and Kaldor (1970) in the export-led growth model tradition, discussed earlier, also supports this hypothesis. The exporting history of an economy in promoting that country's growth and convergence is a factor in the work of Cho, 1994; Barro and Lee, 1993; Dollar and Wolff, 1993; Helliwell, 1992; Lee, 1993 and Dollar, 1991. For example, Helliwell (1992) looks at three "openness" variables: the frequency of non-tariff barriers applied to all goods (the faster growing countries had fewer tariff barriers); a black market

exchange premium (that contributed the least to explaining differences in growth rates) and the total import duty collected (this variable had the highest explanatory power). Dollar and Wolff (1993) examined the impact of the operations of foreign multinational firms on the productivity of Mexican manufacturing industries. Their results indicated that the presence of multinational firms in Mexico acted as a catalyst to productivity growth in Mexico and that foreign direct investment sped up the convergence process between Mexico and the United States. Openness takes on a different interpretation with regard to the regional economy. Regions within a country are by their nature open economies. Migration of workers and capital should encounter no economic constraints across regional frontiers. This intuitive argument has been difficult to model empirically, however, and Barro and Sala-i-Martin (1995) note that much work remains to be done on convergence for open economies.

Finally, the role of migration has been examined in several convergence studies. Shioji (1996); Barro and Sala-i-Martin (1991); Persson (1998) among others, examine the role of migration for convergence in Japan, the US and Sweden respectively. Shioji (1996) and Barro and Sala-i-Martin (1991) find that migration is not an important source of convergence. On the other hand, Persson (1998) finds that migration across the Swedish counties has had a positive effect on convergence.

### 2.4.2 Convergence across Regions

Conditional convergence is often referred to as beta conditional convergence, which is different from absolute beta convergence described earlier. Another concept is sigma convergence. Beta convergence is said to occur if poor countries/regions tend to catch up with rich ones in terms of per capita income levels, *holding all ancillary variables constant.* Sigma convergence holds if the dispersion of a variable, per capita income for example, across a group of regions/countries actually declines over time, regardless of the ancillary variables. Beta convergence may lead to sigma convergence, but this is not guaranteed. Even if beta convergence was occurring, shocks to a particular sector, for example, the agricultural sector, may offset the effect of such beta convergence on cross-sectoral income dispersion in that it affects different regions in different ways. Proof that beta and sigma convergence differ is given in Sala-i-Martin (1994) who concludes that "beta convergence is a necessary but not a sufficient condition for sigma convergence" (p. 7). He also argues the importance of examining both types of convergence.

Both beta and sigma convergence are important considerations for regional economic growth. In particular, considerable insight to regional disparity may be gleaned from a study of both these concepts. For example, a study of sigma convergence for underlying regional economies would show whether a narrowing of dispersion of per capita income had occurred while a study of beta convergence would ascertain the speed at which the lagging regions were catching up on the leader

regions. The seminal work on regional convergence by Barro and Sala-i-Martin for which the results are given in their 1995 volume on economic growth has spawned further studies on both beta and sigma convergence. The following examines the empirical results from a number of regional convergence studies, beginning with the contribution of Barro and Sala-i-Martin.

Barro and Sala-i-Martin (1995) test for beta and sigma convergence across US states, Japanese prefectures and European regions. Using data spanning the 1880 to 1990 period for 47 US states, they find that such states converge (in a conditional sense) at a rate of around 2% per annum (i.e. beta convergence takes place at this rate). The hypothesis that the speed of convergence is stable over time cannot be rejected once the ancillary or control variables have been included. They then proceed to demonstrate that sigma convergence also takes place within the period, although some setback occurred in the 1920s and 1970s to mid 1980s.[29] In the case of Japan, beta convergence occurs over the 1930 to 1990 periods at a rate that slightly exceeds that in the US. They find, however, that the speed of convergence has been substantially slower after 1955. They also find that, similar to the US, sigma convergence has occurred in Japan. Finally, analysing convergence for 90 regions in eight European countries, fairly uniform beta convergence is found to hold and, although sigma convergence is also demonstrated, it does not appear to be as strong as for the US or Japan.

Notwithstanding the fact that absolute convergence is generally found to hold across regions,[30] by focusing on the differences in ancillary variables, it is possible to obtain a deeper understanding of those factors contributing to regional convergence. The studies to be discussed are shown in Table 2.4.2a below.

Table 2.4.2a illustrates the importance of both beta and sigma convergence for the cited regional studies. For the most part, these studies have included both forms of convergence in their analyses of regional growth. It is interesting to note that the regional studies in the table below examine conditional convergence although the opinion in the literature would suggest that absolute convergence holds at the regional level and therefore there is no need to examine conditional convergence. However, even if this is the case, a consideration of ancillary variables is useful in identifying the reasons why regional disparity has persisted for so long in various cases.

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[29] The existence of sigma divergence during the 1920s was due in large part to the relative price declines of agricultural commodities over this period, given that agricultural states tended to be poor states. From the mid-1970s, the oil price shocks favoured oil-producing states, that were already relatively rich.

[30] See Barro and Sala-i-Martin, 1995.

**Table 2.4.2a Tests of convergence: regions**

| Author | Country | Region | Time Frame | Estimation | | | |
|---|---|---|---|---|---|---|---|
| | | | | Other | σ | Absolute β | Conditional β |
| Persson (1998) | Sweden | 24 Swedish Counties | 1906-1990 | | ✓ | ✓ | ✓ |
| Austin & Schmidt (1998) | USA | Great Plains Region – 390 Counties | 1969-1971 1992-1994 | | ✓ | | ✓ |
| Paci & Pigliaru (1997) | Italy | Regions | 1970-1992 | | | ✓ | ✓ |
| Kim (1997) | USA | Regions | 1840-1987 | ✓ | | | |
| Sherwood-Call (1996) | USA | 48 States | 1929-1989 1948-1992 | | ✓ | ✓ | ✓ |
| Chen & Fleisher (1996) | China | Provinces | 1978-1993 | | ✓ | ✓ | ✓ |
| Shioji (1996) | Japan | 39 Prefectures | 1955-1990 | | ✓ | | ✓ |
| Coulombe & Lee (1995) | Canada | Canadian Provinces | 1961-1991 | | | ✓ | |
| Chatterji & Dewhurst (1996) | UK | English & Welsh Counties & Scottish Regions | 1977-1991 | ✓ | | | |
| Mauro & Pordecca (1994) | Italy | Regions | 1963-1989 | | ✓ | ✓ | ✓ |
| Mallick & Carayannis (1994) | Mexico | 32 Mexican States | 1970-1985 | ✓ | | | |
| Button & Pentecost (1993) | UK | 10 Regions | 1978-1992 | ✓ | ✓ | | |
| Coughlin & Mandelbaum (1988) | USA | 48 States | 1925-1990 | | ✓ | | |

Beginning with the "other" column, the studies by Button and Pentecost (1993), Mallick and Carayannis (1994), Chatterji and Dewhurst (1996) and Kim (1997) employ various methods of measuring convergence. The prime objective of Kim's 1997 paper is to show that regional integration over time promotes convergence at the industrial structure and income levels. Kim (1997) uses a regional specialisation index,[31] to examine long-run trends in agriculture, manufacturing, wholesale trade, retail trade, services and the overall US economy. The results showed regional specialisation in manufacturing by the northern regions while the southern regions remained specialised in agriculture over the early nineteenth to early twentieth centuries promoted a divergence between these two sets of regions. However, the diminishing importance of agriculture and manufacturing and the increasing importance of services led to a convergence in the US regional economic structures. A second aspect of Kim's paper was to examine the long-run trend in US regional income per capita. This was examined from the trade perspective by using a

[31] $SI_{ij} = \sum_{i=1}^{n} \left| \frac{E_{ij}}{E_j} - \frac{E_{ik}}{E_k} \right|$ where $E_{ij}$ is the level of employment in industry i=1,…,n for region j and $E_j$ is the total industrial employment for region j and similarly for region k (Krugman, 1991).

procedure from Hanna (1957).[32] The results were discussed for three time periods. First, the income divergence noted for the 1840 to 1900 period was due largely to the "relative decline in Southern income per capita caused by the region's growing unfavourable industry-mix and lower wages relative to other regions" (p. 26). Second, an evolving similarity in regional industrial structures and a convergence of regional wage rates at the industry level brought about a convergence of regional incomes between 1900 and 1954. This pattern continued for the final period, 1954 to 1987.

Chatterji and Dewhurst (1996), in contrast to the usual cross section mean reversion equation, examined the gap between the most prosperous county in Great Britain (i.e. Greater London) and the rest for the entire sample period and for subsets of that period. The estimated equation was of the form:

$$G_i^T = \sum_{k=1}^{k} \gamma_k (G_i^B)^k$$

where $G_i^T$ is the difference of logs of GDP per capita in Greater London and any region i; T refers to subsequent year, B refers to the base year, k is a power term and allows for the existence of 2 or more groups of economies and $\gamma$ refers to the convergence coefficient where $\gamma<1$ implies weak convergence and $\gamma>-1$ implies strong convergence.

The results indicated little or no convergence of the other regions/counties of Great Britain on the Greater London County. GDP per capita in most regions showed a tendency to fall over time relative to that of Greater London.

Mallick and Carayannis (1994) examined the Mexican economy for aggregate convergence in GSP across the Mexican states using a simple regression equation, given as:

$$1/T \log \frac{Y^F}{Y^O} = a_0 + a_1 \log Y^O$$

where 0 = original and F = final year and Y refers to gross state product, GSP. The results from the regression show the Mexican states converged significantly during the 1970s, but not during the first half of the 1980s. The authors also examined Mexican industry data for "within industry" convergence. The format remained the same, except that Y now referred to output per capita in agriculture and mining, manufacturing, hotels and transportation and other industries. The results showed convergence in all industrial sectors during the 1970s except in agriculture and mining. Moreover, the service sector (hotels, transportation and other industries) showed the most rapid rate of convergence.

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[32] Two counterfactual estimates of regional income are constructed to separate out income differences due to industry mix and to wage effects.

Three measures of convergence are used by Button and Pentecost (1993) for the share of service sector employment in the UK economy. The first, sigma convergence is discussed below with the other studies from Table 2.4.2a, the second is termed "mean reversion, integration and co-integration" by the authors and the third is termed "time varying parameters". The second measure is the familiar conditional convergence test, although the authors did not test this equation due to lack of data.

$$\Delta X_{it} = \alpha + \beta X_{it-1} + \gamma Z_i + \varepsilon_i$$

where $X_i$ refers to the variable being tested for convergence

$Z_i$ refers to microeconomic heterogeneity

$\varepsilon_i$ refers to a white noise error terms

Instead, the authors used the Dickey Fuller methodology[33] to test this time series equation for stationarity and thus convergence. The results showed at most four co-integrating vectors indicating non-convergence of service sector employment for most regions.

The final test for convergence is the time varying parameter test. Button and Pentecost (1993) examined two versions of this test. The first looked at the share of service sector employment as a proportion of employees in employment for each region. The model was given as:

$$\left\{\left[\frac{SE}{EE}\right]\right\}_{GB} - \left\{\left[\frac{SE}{EE}\right]\right\}_{i} = \alpha'(t) + \beta'(t)\left\{\left[\frac{SE}{EE}\right\}_{GB} - \left[\frac{SE}{EE}\right]_{01}\right\} + v_i \qquad \textbf{Model 1}$$

where SE/EE refers to the share of service sector employment in total employment; i refers to the regions; t refers to the quarters; 01 refers to the base region, London and the South East. Convergence requires that $\alpha'(t)$ tends to a constant and that $\beta'(t)$ tends to zero.[34]

The results showed that the first version indicated "little convergence in the proportion of service sector employment between the regions as a whole" (p. 632), although there was some evidence of convergence between the South West and East Anglia.

The second model examined was given as:

$$(E_{GB} - E_i) = \alpha(t) + \beta(t)[E_{GB} - E_{01}] + \varepsilon_i \qquad \textbf{Model 2}$$

where E refers to the percentage change in service sector employment and the other variables are as for model 1. Convergence takes place if:

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[33] "If a time series is stationary, that is, the mean and variance are constant over time, while the value of the covariance between two periods is independent of the periods at which it is computed, then the time series may be convergent" (Button and Pentecost, 1993; p. 630).

[34] As long as $\beta'(t) \geq 1$ the share of service sector employment moves towards that of the base region (i.e. London and the South East). If $\beta'(t) \geq 0$ then the share of service sector employment converges on the British average.

$$\beta(t) \geq 0 \rightarrow E_{GB} \geq E_i \qquad \textbf{(a)}^{35}$$

$$\beta(t) \geq 1 \rightarrow E_i \geq E_{01} \qquad \textbf{(b)}$$

The results indicated "strong signs of convergence by the late 1980s" (p. 633).

A consideration of Table 2.4.2a shows that sigma convergence is the most popular form of convergence at the regional level. All but four of the studies cited examined sigma convergence, although the attention given to it varied from paper to paper, occupying the whole focus for Couglin and Mandelbaum (1988) to a single paragraph in Persson (1998).

A graph of the standard deviation of the log of per capita income is most often used to check for sigma convergence, see Dunford, 1990; Mauro and Pordecca, 1994 and Austin and Schmidt, 1998. Sherwood-Call (1996) examined the weighted standard deviation and Chen and Fleisher (1996) and Coughlin and Mandelbaum (1988) examined the coefficient of variation. Williamson's (1965) study on regional inequality used weighted coefficients of variation, unweighted coefficients of variation and weighted mean absolute deviations. Maxwell (1994) noted the popularity of such measures in Canadian, US and Australian studies of regional inequality. He remarked on the "penchant" for the use of the unweighted coefficient of variation in Canadian studies, the equal use of weighted and unweighted coefficients of variation in US studies[36] and the use of all three measures in Australian studies.[37] These statistical measures of dispersion provide an efficient and illustrative picture of whether convergence is occurring or not. While sigma convergence may be criticised as descriptive rather than explanatory, it does help to identify periods of convergence and divergence. It beholds the researcher to then explain these patterns, perhaps by extending the analysis to include ancillary or control variables. This approach is common to the studies cited above. Some authors such as Austin and Schmidt, 1998 examine different measures of income other than per capita income while others, most notably Chatterji and Dewhurst, 1996 examined the effect of different measures of dispersion (mean, variance and standard deviation) on the log of per capita income.[38] Table 2.4.2b below examines the results for sigma convergence.

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[35] If (a) holds then region i's service employment grows at the same rate as the country's growth in service sector employment; if (b) holds then region i's service employment grows at the same rate as the base region.

[36] Maxwell (1994) references Amos, 1988, 1989; Rowley, Redman, and Angle (1991).

[37] Ferry (1991) and Harris and Harris (1991) have both used unweighted coefficients of variation while Maxwell and Hite (1992, 1993) have used weighted coefficients of variation and mean absolute deviation (Maxwell, 1994).

[38] Austin and Schmidt (1988) find that using different measures of income affects the variability of the coefficient. No noticeable difference in results is found by Chatterji and Dewhurst (1996) for the mean, variance or standard deviation.

**Table 2.4.2b Sigma Convergence**

| Study | Author | Time Period | Overall Pattern | Convergence | Divergence |
|---|---|---|---|---|---|
| 24 Swedish Counties | Persson (1998) | 1906-1990 | Convergence | | 1920s and 1980s |
| 390 Counties in Great Plains | Austin & Schmidt (1998) | 1969-1971 to 1992-1994 | Weak Convergence | 2 definite periods – early 1970s and late 1970s | |
| 48 US States | Sherwood-Call (1996) | 1929-1989 1948-1992 | Convergence | Especially evident up to 1978 | 1978 to 1988 |
| Chinese Provinces | Chen & Fleisher (1996) | 1978-1993. | No definite pattern | Following inception of reform | Especially when comparing 1980s with 1950s and again in 1990s |
| English & Welsh Counties & Scottish Regions | Chatterji & Dewhurst (1996) | 1977-1991 | No overall pattern | | |
| Italian regions | Mauro & Pordecca (1994) | 1963-1989 | Convergence | 1963-1970 weak 1980-1989 | |
| 48 States | Coughlin & Mandelbaum (1988) | 1925-1990 | Convergence | 1932-1978 | 1978 onwards |

Among the studies cited in Table 2.4.2b, an overall pattern of convergence was attributed to an ending value of the standard deviation being lower than the starting value, see Persson, 1998; Austin and Schmidt, 1998. The findings for an overall pattern of convergence among the studies cited above are somewhat weak. An exception is the scenario for the US States where there is agreement that a definite pattern of convergence characterised the period from the beginning of the century to 1978 (see Coughlin and Mandelbaum, 1988, Barro and Sala-i-Martin, 1992, 1994, 1995 and also, Sherwood-Call, 1996). Both convergence and divergence were identified for different periods in the data sets used by Chen and Fleisher, 1996 and Chatterji and Dewhurst, 1996. Mauro and Pordecca, 1994 used three different data sets and if these were combined, an overall pattern of convergence was suggested. However, the authors felt that this owed more to the jumps and breaks in the data than any strong pattern of convergence.

The explanation of the sigma convergence patterns has varied from study to study. With the exception of Coughlin and Mandlebaum (1988),[39] the studies have examined the data for beta convergence with the aim of better understanding the growth process among the various regions.

Using the methodology introduced by Barro and Sala-i-Martin described in earlier sections, we note that six studies examined data for absolute beta convergence by regressing the growth rate of the dependent variable on its initial level. The most common dependent variable was per capita

[39] Coughlin and Mandelbaum (1988) viewed the divergence that had occurred among the US states since the late 1970s as best described as a bi-coastal economy whereby the coastal regions were outperforming the interior due to the falling energy prices and agricultural crisis taking place in the latter.

income, although the majority of the studies also considered other measures of income (see Austin and Schmidt, 1998; Paci and Pigliaru, 1997; Shoiji, 1996 and Coulombe and Lee, 1995). Absolute convergence was found in four of these six studies, see Coulombe and Lee, 1995, Chen and Fleisher, 1996; Paci and Pigliaru, 1997; Persson, 1998.[40] Sherwood-Call (1996) found convergence for the period 1929 to 1992, but not for the sub-period, 1978 to 1988.[41]

These six studies, with the exception of Coulombe and Lee (1995) then examined conditional beta convergence. Austin and Schmidt (1998) and Shioji (1996) join these in examining conditional beta convergence also. Common to all estimated equations are control variables that account for differences across the regions in question. Table 2.4.2c examines these control variables as well as the dependent and independent variables and the resulting values of the beta coefficient and the $R^2$.

**Table 2.4.2c Regional Beta Convergence Studies**

| Study | Variables: | | | Estimation | β | $R^2$ | Period |
|---|---|---|---|---|---|---|---|
| | Dependent | Independent | Control | | | | |
| Persson (1998) | Growth rate in per capita income | Initial level of per capita income | Migration Agricultural Share | NL2SLS | 0.02 (2.5) | 0.98 | 1911-1990 |
| Austin & Schmidt (1998) | Growth rate in per capita income | Initial level of per capita income | Dummy variable/industry mix/population change/ agriculture & mining shares of income/% high school & % college graduates in population | NLLS | 0.01785 (4.096) | N/A | 1969-1994 |
| Paci & Pigliaru (1997) | Growth rate in labour productivity | Initial level of labour productivity | Structural change/dummy variable | OLS | 0.0058 (0.66) | 0.49 | 1970-1992 |
| Sherwood-Call (1996) | Growth rate in per capita income | Initial level of per capita income | Population growth/college education | OLS | -0.181 (-1.94) | 0.065 | 1972-1992 |
| Chen & Fleisher (1996) | Growth rate production per capita | Initial level production per capita | Accumulation in: fixed assets; investment in human capital/annual growth rate of labour force/technology growth/market reforms | OLS | -0.038 (5.55) | 0.721 | 1978-1993 |
| Shioji (1996) | Growth rate prefectural income | Initial level prefectural income | Initial shares of primary & secondary industries | NLLS | 0.014 (2.20) | 0.48 | 1960-1990 |
| Coulombe & Lee (1995) | Growth rate in personal income per capita | Initial level of gross income per capita | None | Pooled cross section & time series | 0.0241 (3.105) | 0.29 | 1961-1991 |
| Mauro & Pordecca (1994) | Growth rate of per capita GDP | Initial level of per capita GDP | Investment/population growth rate/secondary school enrolment rate | OLS | 0.0003 (0.11) | 0.10 | 1963-1989 |

*t-statistics in parentheses.*

[40] The beta values with t statistics in parentheses were 0.41 (8.1), 0.011 (2.13), -0.008 (1.54) and 0.0241 (3.105) respectively.

[41] The beta values with t statistics in parentheses for 1929-1992 were –0.694 (19.25) and for 1978-1988 were 0.023 (0.19).

The control variables used are similar to those used in the cross-country studies of convergence examined in the previous section. Variables measuring structural change, population growth and human capital are the most common control variables used. The results indicate conditional beta convergence in all of the studies. The results reported by Mauro and Pordecca (1994) were insignificant, paralleling their findings of no absolute convergence.

The central question remains whether conditional convergence is less applicable than absolute convergence at the regional level as argued by Barro and Sala-i-Martin (1995). A comparison of the beta coefficient and the explanatory power of both regressions, absolute and conditional may shed some light on this question. Table 2.4.2d below identifies five studies that compares the results of absolute and conditional convergence – Persson, 1998; Paci and Pigliaru, 1997; Sherwood-Call, 1996; Chen and Fleisher, 1996 and Mauro and Pordecca, 1994.

First, because of the difference in time frame, it is not possible to reliably compare the study by Sherwood-Call (1996) or Chen and Fleisher (1996). Moreover, it would be misleading to comment on the respective studies by Paci and Pigliaru (1997) and Mauro and Pordecca (1994) as the results are insignificant in both studies. This leaves the study by Persson (1998) which shows that absolute convergence is marginally stronger than conditional convergence for the Swedish regions. However, there appears to be no strong grounds for accepting absolute convergence or conditional convergence as best describing the long-run growth experience of regional economies. Given that regional studies continue to include control variables and that these same variables were previously identified as explanatory factors leading to an interpretation of a changing regional problem suggests that any study of regional disparity would benefit from the inclusion of some such variables, Table 2.4.2d.

**Table 2.4.2d Comparison of Absolute and Conditional Convergence**

| Author | Country | Time Frame | Absolute β | $R^2$ | Conditional β | $R^2$ |
|---|---|---|---|---|---|---|
| Persson (1998) | Sweden | 1911-1990 | 0.037<br>(8.4) | 99.2 | 0.020<br>(2.5) | 98.8 |
| Paci & Pigliaru (1997) | Italy | 1970-1992 | -0.011<br>(2.13) | 0.15 | 0.0058<br>(0.66) | 0.49 |
| Sherwood-Call (1996) | USA | 1929-1992<br><br>1972-1992 | -0.694<br>(19.25) | 0.887 | <br><br>-0.181<br>(-1.94) | <br><br>0.065 |
| Chen & Fleisher (1996) | China | 1952-1992<br><br>1978-1993 | 0.005<br>(1.47) | 0.046 | <br><br>-0.038<br>(5.55) | <br><br>0.721 |
| Mauro & Pordecca (1994) | Italy | 1963-1989 | 0.00076<br>(0.33) | 0.006 | 0.0003<br>(0.11) | 0.10 |

*t-statistics in parentheses.*

## 2.5 CONCLUSION

The chapter examined the nature and causes of regional disparity. First, the long-standing incidence of regional disparity was identified for a range of countries and an extended time period. Disparity in income levels was the principal indicator for this cross section. The causal factors identified were discussed under the headings of structure and location. The former considered demographic and employment variables, among others in describing the overall structure of a region while a region's geographical location examined urban and rural and core and periphery considerations. It was noted that indicators of disparity and factors contributing to this disparity were essentially static concepts describing the relative position of the region at any one point in time. However, the outcome of disparity is a dynamic concept and the examples considered indicated a variety of outcomes from the presence of leading and lagging regions on the one hand, oftentimes described as a "duality" to a convergence among regions on the other.

In order to understand the dynamic outcome of regional disparity, the analysis turned to a consideration of the economic growth process. First, the process of circular and cumulative causation was examined. Although initially suggested to account for the growth experience of developing economies, circular and cumulative causation featured strongly in the literature in explaining the persistence of regional disparity. It provided a clear explanation by the presence of spread and backwash effects of how the agglomeration economies emanating from a growth centre could maintain its favourable economic position. The export led theory of economic growth was also considered in explaining how a region could initiate a competitive advantage on other regions that would be maintained by the process of circular and cumulative causation. However, the recent empirical evidence considered in the text questioned these conclusions and argued for a reconsideration of the convergence issue.

Convergence is the principal outcome from the neo-classical growth model and so a reconsideration of the neo-classical growth model showed that regional disparity could only be a short-term phenomenon that arose when regions were not at their steady-state positions. A number of regional economists had suggested reasons why this might occur. These related to differences in regional economic growth variables.

Although certain economists hold that differences in regional economic growth variables are difficult to uphold at the regional level, recent studies of convergence at the regional level hold constant these variables in explaining the pattern of disparity between regions over time. This approach to explaining convergence is a principal feature of the new economic growth literature.

The chapter concluded with an examination of the convergence aspect of this literature. In so doing, it first identified a range of variables (termed ancillary, control or explanatory variables) that

represent an extension of the variables considered in the earlier growth literature capable of explaining economic growth differentials across regions and countries. A summary table of cross-country convergence studies identified seven ancillary variables - human capital, investment, technology, savings, the role of government, employment structure and an 'other' category (migration, openness of economy and country dummy variables) - and these were discussed in the text. Second, a number of regional convergence studies were examined. Three tests of convergence were discussed, sigma, absolute and conditional convergence and their relevance to the issue of regional disparity was stressed. For example, the presence of sigma convergence indicated whether there was a narrowing (convergence) or widening (divergence) of per capita income across countries. Absolute convergence indicated whether the gap between the lagging and leading region was closing and the speed at which this was occurring while conditional convergence examined the variables responsible for this.

# Chapter Three

# LITERATURE REVIEW: REGIONAL DISPARITY IN THE REPUBLIC OF IRELAND

## 3.1 INTRODUCTION

This chapter reviews a number of past studies of Irish regional disparity, which inform on the level of disparity. It will become evident as the discussion proceeds that these studies do not generally consider regional disparity in the wider context of the growth literature, discussed in the previous chapter. Therefore, the studies tend to ignore the underlying causes of regional disparity and its evolution over time by confining their analysis to the identification of disparities using various socio-economic indicators.[1] The studies considered here date from the 1960s although the presence of regional disparity within the Republic was acknowledged before this. For example, regional disparity formed the catalyst for the work of the Congested Districts Board in the late 19th century. Regional disparity has been evident at a number of spatial divisions of the country and we examine these in section 3.2. Section 3.3 concludes.

## 3.2 REGIONAL DIVISIONS AND REGIONAL DISPARITY: A REVIEW

The Congested Districts Board[2] was established under the Land Purchase Act of 1891 to deal with the problems of the "congested districts" in the western part of Ireland.[3] It was independent of Treasury, the Castle and any Departments in its expenditure, "providing its own estimates of expenditure did not exceed the funds at its disposal" (Micks, 1925; p. 13). In existence for 32 years, the CDB had the objective of promoting agricultural, forestry, fisheries and industrial development in the western congested districts. Following its closure in 1923, functions of the Board were transferred to the then Department of Fisheries and Rural Industries.

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[1] For the most part, these studies are associated either directly or indirectly with Government policy for the regions. The terms of reference for most of these studies did not call for in-depth analysis of the type that will be undertaken in this thesis.

[2] No final repot exists on its work. The main reference, and the reference, upon which this paragraph is based, is a report by Micks (1925) who served on the CDB.

[3] The original congested districts were Poor Law Electoral Divisions (i.e. areas in which the total ratable value when divided by the number of the population gave a sum of less than 1 pound ten shillings for each individual (Micks, 1925)) in the counties of Donegal, Leitrim, Sligo, Roscommon, Mayo, Galway, Kerry and west Cork.

Micks (1925) refers to the increase in money deposited in local Post Office Savings banks as an indicator of the improved financial position of the population (p. 211) over the lifecycle of the Board. However, when the Board was disbanded in 1923 the western regions continued to lag behind those of the east. The 1926 Census, which is the starting point in our empirical analysis in the following chapters, provides data on a number of indicators that demonstrate the disparity between the east and west of the country at this time. Table 3.2a displays the east-west divide for population, net migration, agricultural, industrial and service employment variables for two divisions of the country- the 'congested districts' and the 'remainder of the country'. .

**Table 3.2a Regional disparity in the Republic of Ireland, 1926.**

| | Population share | Net Migration (1926-1936) share | Total Employment share | Agricultural Employment share | Industrial Employment share | Service Employment share |
|---|---|---|---|---|---|---|
| Congested Districts | 28.8 | 53.0 | 30.0 | 42.3 | 14.0 | 16.4 |
| Remainder of Country* | 71.2 | 47.0 | 70.0 | 57.7 | 86.0 | 83.6 |

*All of County Cork is included in remainder of country. It was not possible to extract west Cork from the data to include in the Congested Districts.
Congested districts: counties of Donegal, Leitrim, Roscommon, Sligo, Mayo, Galway and Kerry.

In 1926, the "congested districts" accounted for just 30% of the population. Between 1926 and 1936 a total of 169,316 persons migrated from Ireland. While all counties except Dublin experienced net outward migration, the congested districts accounted for 53% of this out migration, much higher than its share of the population would suggest. Table 3.2a also illustrates the very heavy dependence on agriculture by the congested districts counties and the correspondingly low share of industrial and service employment.

In the last four decades a range of studies have noted a significant difference between the "prosperous" east and "poorer" west of the country. The work by Attwood and Geary (1963), followed by Ross (1969) examined disparity at the county level and concluded with divisions of the country that resulted in an east-west divide in the former and a six-fold division in the latter.

The personal income study by Attwood and Geary (1963) sought to provide basic data for local taxation purposes. Preceding the national income series compiled by the Central Statistics Office, it was in effect a "pioneering study designed to demonstrate the feasibility of estimating county incomes" (Ross, 1969; p. 1). The study consisted of a 'compilation of basic statistics' (p.1) and featured twelve tables of regional data for the purposes of income estimation. The main text of the report described the income estimates in terms of how these were compiled and the associated difficulties involved. No analysis of the data was undertaken. Two concepts of personal income were used. The first, "income arising," which referred to the income created within the borders of each county in 1960 and included cash income as well as income in kind, the most important constituent of which was consumption of own produce by farm households, valued at farm gate

prices. The second measure, "personal income", referred to the income arising from all other sources, whether earned or not. Elements such as emigrants' remittances, social welfare payments, dividends receivable were added to income arising while corporate allocations to reserves and dividends payable were deducted. Table B.1a, appendix B, section B1 shows income arising and the contribution of emigrants' remittances, social security & other transfer payments and other adjustments to personal income. Population and personal income per head are also given in this table.

The distribution of personal income per head suggested a divide between the eastern and western counties. The national average of £200 was exceeded by Dublin, Kildare, Meath, Kilkenny, Waterford, Carlow, Tipperary, Limerick, Laois, Westmeath, Wicklow and matched bv Offaly, most of which lie in the east of the country, and with the exception of Limerick, no western county was represented in this group. The remainder of the counties had levels of income lower than this and except for Cork (£199) and Wexford (£185), the remainder had personal incomes below £185. These counties were primarily the congested districts referred to above. Further disparity was evident in the components of personal income. For example, the western counties accounted for a much higher proportion of emigrants' remittances. The average share of 2 percent was exceeded by all of the counties in Connacht,[4] Kerry in Munster and the Ulster counties of Donegal, Monaghan and Cavan. Leitrim accounted for the highest share, deriving 8 percent of its personal income from emigrants' remittances. A similar divide was evident when examining the share of personal income due to social security and other payments. The counties of Connacht, Kerry in Munster,[5] the Ulster[6] counties and Longford, Wexford, Westmeath and Louth from Leinster all showed proportions greater than the national average of 8 percent. Income arising, which on average accounted for 91 percent of personal income was again below average in the western counties and the three Ulster counties, while Dublin, Louth and Cork were the only three counties with proportions greater than average. A middle bloc of counties, Waterford, Kildare, Limerick, Offaly, Kilkenny, Sligo, Carlow, Laoghis, Wexford and Tipperary showed shares between 80 and 90 percent (Table B.1a, appendix B, section B.1). Thus it would appear that there existed a clear east-west divide within the country based on income returns for 1960.

Using the new CSO national income estimates, Ross (1969) included the same variables as defined by Attwood and Geary (1963) in his study of personal income per head in 1965. Personal income and its components (income arising, emigrants' remittances and transfers from public authorities) are given in Table B.1b, appendix B, Section B.1). Ross categorised the counties into six classes in the main text of the report. The relative position of the counties was determined first by the level of

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[4] i.e. Galway, Mayo, Roscommon, Sligo and Leitrim.
[5] i.e. Clare, Cork, Kerry, Limerick, Tipperary and Waterford.
[6] i.e. part of Ulster, comprising the counties of Cavan, Donegal and Monaghan.

personal income per head and then by the make-up of this income, the direction of population change between 1961 and 1966 and the transition made by the counties in moving from an agricultural to an industrial base. Dublin was ranked first as it recorded the highest level of personal income per head. Furthermore, the make-up of personal income was different to that in the other counties, arising predominantly from non-agricultural employees, interest, rent and dividends. The second classification was termed the Munster Bloc incorporating the counties of Waterford, Cork, Limerick and Clare. The inclusion of the latter county was debatable but it had achieved the highest national increase in the non-agricultural wage and the highest rate of increase in income per head. Counties in the Dublin hinterland - Wicklow, Kildare, Louth and Meath - were ranked third in terms of personal income per head.[7] These counties, with the exception of Meath[8] were less dependent on agriculture as a source of income and were thus similar to Dublin in economic make-up. They also experienced population increases and the highest rate of increase in non-agricultural jobs and the lowest rate of decline in the farm labour force. The counties that ranked fourth in the survey were labeled by Ross as the "transition counties". These included Westmeath, Wexford, Offaly, Longford, Laoghis and Kerry and were so termed because they fell between the relatively prosperous counties already discussed and the poorer western counties. These counties were classified together because of their shedding of agricultural employment, although having failed to generate sufficient non-agricultural employment. The agriculturally rich counties of Tipperary, Kilkenny and Carlow formed the fifth group. Although tillage yields and farm income had declined in Carlow in 1965, its 1960-income parity with Tipperary and Kilkenny and all three counties reliance on tillage and dairying suggested its inclusion in this fifth grouping. The final grouping was 12 western counties, referred to by Ross as 'a customary twelve counties where demographic and economic structures have been such as to call for special attention' (p. 9). The twelve refer to the counties of Connacht: Galway, Mayo, Roscommon, Leitrim and Sligo; Longford in Leinster, Donegal, Cavan and Monaghan in Ulster and Clare, Kerry and West Cork[9] in Munster. Galway and Monaghan were outliers based on the composition of their income being different to 'areas remote from any growth point such as parts of Mayo, Roscommon and Leitrim' (p.9). These western counties had the lowest income per head in the State and the highest rate of population decline (appendix B, section B.2). They were heavily dependent on agriculture as a source of income, while at the same time experiencing the greatest outflows from agriculture and the smallest rates of growth in non-agricultural employment. Moreover, a considerable proportion of their income originated as current transfer payments or as emigrants' remittances and pensions.

Two principal conclusions emerge from the study by Ross. First, there continued to be large divergences between agricultural and non-agricultural income, with non-agricultural employment

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[7] The position of these counties may well have been different had a different survey year been chosen. Tillage yields in Leinster were low in 1965.

[8] In 1960 over 44% of the income in Meath was derived from agriculture.

tending to generate more income than farming. Second, those counties with relatively large towns fared best in the 1965 study. Ross believed that Athlone and Mullingar in Westmeath also had a role to play in developing the neighbouring counties of Longford, Roscommon and Offaly.

Differentiating between rural and urban areas in the discussion of regional disparities was a common feature of a number of Irish regional studies. Although an examination of regional disparity was not the prime objective of the Buchanan Report (1968), it did highlight certain socio-economic disparities between rural and urban areas within the Irish economy. For example, activity rates (those gainfully occupied as a proportion of the population) and employment levels were two such indicators of disparity considered. The former was examined for four county boroughs (Dublin, Waterford, Cork and Limerick) and the counties of Louth, Wicklow, Clare, Longford, Roscommon and Kerry[10] (see Table B.1c and Table B.1d, appendix B, section B.1) and also for 34 towns (Table B.1e, appendix B, section B.1). Employment levels were examined for Dublin, Cork and Limerick including Shannon and Ennis and then for towns over 10,000 population, towns between 5,000 and 10,000 and towns under 5,000 population. The results are shown in Table B.1f, appendix B, section B.1.

Male activity rates were below average for the four county boroughs, Louth and Wickow and above average for the remaining, more rural counties (TableB.1c, appendix B, section B.1). This finding was not true for all age groups in the four county boroughs, Louth and Wicklow. The younger age groups (14-19 and 20-24) showed higher average rates, but these had been offset by the below average rates for the 55-64 and 65 plus age group. The converse was true for the rural counties - below average rates in the 14-19 and 20-24 age group and above average rates in the 55-64 and 65 plus age group resulting in above average rates overall. The reasons for the above average activity rates in the 14-19 group in the county boroughs, Louth and Wicklow (urban counties) was due to the below average numbers in education and in those awaiting their first job. The situation for the 20-24 age group was different, with the below average rate gainfully occupied in Dublin (88.4) due to the above average proportion of the population in education. The above average rate in those gainfully occupied in the other counties was due to the below average proportion of the population in education in those counties. Finally, the big differences between the urban and rural counties in the older age groups was due to the tendency of people in rural areas, particularly farmers, to retire much later than people in towns.

The activity rates for females showed higher than average rates in the urban areas, especially Dublin and lower rates in the rural areas (Table B.1d, appendix B, section B.1). Again, this hid differences across the age categories. Activity rates were above average in the 14-19 age group in

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[9] Classifying west Cork as a county.
[10] The four county boroughs were considered 'urban' while the other listed counties were considered 'rural'.

the county boroughs, but at 55-64 and 65 plus groups, all but Dublin had below average activity rates. Once more, the opposite was true for the rural counties. The high activity rates in the county boroughs in the 14-19 age group was due to below average education participation in these counties and also to below average proportions on home duties and waiting for first jobs. The below average female activity rates in the rural counties were due to above average participation in education. For the other age groups, the difference between the urban and rural counties was due to the proportions engaged in home duties. In the rural counties the higher proportion of females on home duties accounted for the lower activity rate.

The Buchanan Report then considered the activity rates for all towns with excess of 5,000 population in 1961. Activity rates for males and females in 34 towns[11] were examined. The spread relative to the national average was greater for the towns than for the counties. In general, the male activity rate was below the national average in all towns, while in the 13 largest towns, the female activity rate was above average. Female activity rates tended to be above average in the smaller towns also. Considering both female and male activity rates together, these were above average in Dublin, Dundalk, Drogheda and Navan and below average in all other towns. Differences when both male and female rates were combined were less marked than when analysed individually. However, in a number of towns, the difference between the town and national average was substantial.[12] It was not possible to examine the reason for these differences by age or marital status, but the number in institutions provided some explanation. The high institutional population in some of these towns, due to the institutions serving the rural hinterlands as well as the towns, tended to depress town activity rates.

The report also presented the findings from a 1967 survey of Irish employers employing at least 100 people in 1961 and foreign owned firms employing at least 50 people. The questions posed in the survey-included employment by: location (town/county); size of firm; industry group; gender; and overseas firms. Questions were also posed in relation to commuting patterns of employees; factors limiting expansion; and factors affecting choice of location (see Table B.1f, appendix B, section B.1). Employment increased by 7.7% between 1962 and 1967 and was forecast to increase by 8.6 percent between 1967 and 1972 (columns 3 and 6 respectively in Table B.1f). The largest increase in employment in the 1962 to 1967 period came from Dublin and Cork and Limerick-Shannon-Ennis. Employment increased by 10.9 percent for this group as a whole in the 1962 to 1967 period. This performance was not expected to persist, however; the projected employment increase over the 1967 to 1972 period was below the average projected for the other areas (see column 6, row 4, Table B.1f). Across the other groups, the towns of between 5 and 10 thousand

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[11] These towns are listed in Table B.1e, appendix B, section B.1.

[12] All of these towns were below average - Kilkenny (by 5%), Clonmel (5%), Ennis (6%), Mullingar (9%), Ballinasloe (11%), Castlebar (9%).

population fared least well in the 1962 to 1967 period, and such under performance was forecast to continue in the 1967 to 1972 period.

Towns of over 10,000 population performed worse than average over the 1962 to 1967 period and were expected to perform better than average from 1967 to 1972. Small towns, those with less than 5,000 population "seemed somewhat more optimistic than the rest" (p. 94) in the forecast of future employment over the 1967 to 1972 period, Table B.1f, appendix B, section B.1.

While the Buchanan Report did not concentrate on regional disparity per se, its consideration of a range of socio-economic variables, including activity rates and employment as discussed above, showed a clear divide between the urban and rural areas of the country. These areas, however, correspond loosely to an east-west divide, where the urban areas lay predominantly in the East and South of the country while the rural areas were concentrated in the lesser developed West. The report is more famous for its policy recommendations, however, and these will be discussed in chapter 8.

The urban-rural division formed part of a study by O'Farrell (1980) that examined the locational pattern of 'new'[13] multinational enterprises (MNEs) and indigenous manufacturing plants over the 1960 to 1973 period. Three types of regions were considered and the first two corresponded to the urban-rural classification. These included the core Dublin region and the rest of the country, the Designated Areas and Non-Designated Areas[14] and the nine planning regions. One of the principal findings of the study was the proclivity of indigenous firms to locate in the core, largely urban or the non-designated areas while the foreign owned firms were more likely to locate in the peripheral, largely rural, designated areas. For example, 59.1 percent of foreign owned projects located in the designated areas between 1960 and 1973 compared to 42.8 percent of indigenous projects.

More recently and continuing with the urban-rural classification, Drudy (1991)[15] examined regional disparity in the distribution of firms and employment between core (urban) and peripheral (rural) areas. The periphery was labeled the "western periphery" and included the counties of Mayo, Galway, Donegal, Leitrim, Sligo, Limerick, Clare, Cork and Kerry while the core was termed the "eastern core" and included the remaining counties. Based on this classification, the data[16] indicated (see Table B.1g, appendix B, section B.1) that there had been a reduction of firms in the

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[13] 'New' refers to the total population of foreign-owned and indigenous Irish plants established under the new Industry Programme of the Industrial Development Authority.

[14] This classification will be discussed in the policy chapter, chapter 8.

[15] Drudy (1991) also examines the regional distribution of firms and employment at the planning region level.

[16] The data refers to manufacturing employment in foreign owned and indigenous firms from the Industrial Development Authority.

core area, while the periphery increased its share of firms.[17] This was true especially of the East region that included the counties of Dublin, Wicklow, Meath and Kildare. The region accounted for 46.5 percent of the country's manufacturing establishments in 1973, a proportion that had fallen to 34.6 percent in 1989. The proportionate gains experienced by the periphery were not concentrated in a particular area. In line with the dispersal policy at the time, they were distributed throughout the country. The periphery also performed better and in particular in the 1973 to 1980 period with respect to net job increase (see Table B.1h, appendix B, section B.1). The core region had experienced a 'dramatic decline in indigenous employment'.[18] Although foreign owned firms also recorded less job losses than their indigenous counterparts over the second period, 1981 to 1989, the periphery still fared relatively better than the core (see Table B.1i, appendix B, section B.1).

Killen and Ruane (1998),[19] using the same western periphery and eastern core classification of Drudy (1991) examined the changes that took place in industrial employment between 1981 and 1995/1996. The data[20] indicated that there continued to be an improvement in the position of the western periphery relative to the eastern core. The share of industrial jobs in the western periphery increased from 41.6 percent to 45.6 percent over the 15-year period and at a time when industrial employment decreased by almost 3 percent nationally. The authors also examined the survival rate in 1995 of projects that had begun operation in the 1980-82 (see Table B.1k, appendix B, section B.1) and found that the survival rate of foreign-owned firms was higher in the western periphery compared to the eastern core.[21]

The other regional division used in Irish regional studies, which was first defined for policy purposes was that of the planning region. This was used in most of the regional studies carried out over the 1970 to 1990 period and official statistics recognised this unit in the reporting of data until it was replaced by the Regional Authority division in 1994.

The IDA Regional Industrial Plans, which will be discussed in chapter 8 examined a number of socio-economic indicators at the level of the planning region. These included; population change, income per capita, proportion of workforce in industry, services and agriculture; unemployment; and proportion of industrial grants and industrial estate expenditure received by a region. The

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[17] The proportion of Irish owned and foreign owned industrial establishments in the core area fell from 57.5 percent in 1973 to 49.2 percent in 1989.

[18] Drudy (1991) identifies a number of possible reasons for this including an increasingly competitive environment arising out of EC membership, changes in the demand for older industrial products and the economic incentives that favoured areas outside the core region.

[19] The planning region is also used as the spatial unit for industrial employment and the economically active population.

[20] The data is industrial employment data from Forfás. See Table B.1j, appendix B, section B.1.

regions were ranked according to each indicator, see Table B.1l, appendix B, section B.1. Donegal, Midlands, West and North West planning regions came in the final four rankings for each of the chosen indicators, with the exception of the unemployment indicator, where the North West and Midlands ranked joint fifth (with the North East region) and second respectively. A consideration of these indicators and, in particular, the population indicator suggested that regional disparity encompassed three groupings:

- the County Dublin area, which is the dominant centre of population and employment in the State;
- Counties Donegal, Leitrim, Sligo, Mayo, Roscommon, Longford and Cavan; and
- The Gaeltacht areas

The NESC report of 1982 examined the outcome from the regional industrial plans. The data organised by employment sector and featuring the actual change between 1971 and 1977 and the IDA estimates for the eight planning regions is given in Tables B.1m to B.1q (appendix B, section B.1).[22] The report indicates that the actual employment gains in manufacturing, were less than the forecasted 38,223 jobs. The Annual Survey of Employment (ASE) data showed that actual manufacturing jobs increased by just 14,267 over the period, or 37.3 percent of the projected increase, while the Labour Force Survey indicated an increase of 7,647 jobs or 20% of the projected increase. Among the regions, and using the ASE data, the West, South West and Mid-West fared better than the IDA estimates, while the LFS data showed the West and South West out-performing the IDA estimates (115% and 109% respectively). The East region suffered the largest fall in manufacturing employment according to both the ASE and LFS estimates (see Table B.1m, appendix B, section B.1). Ranking the regions according to the proportion of the workforce employed in manufacturing indicates a continuing divide between the high ranking East and North East regions and the low ranking West and Donegal/North West regions. The same was true of the proportion of the workforce employed in industry, see Table B.1n, appendix B, section B.1. Continuing with industrial employment (Table B.1o, appendix B, section B.1), the forecasted increase of 47,111 jobs overshot the actual outcome of 10,351 jobs. Across the regions, the West fared best achieving an increase of 123 percent of the IDA estimate. Once again, the East and North East fared worst.

The actual decline for agricultural employment (Table B.1p, appendix B, section B.1) was much greater than that estimated by the IDA for all regions with the exception of the South West. According to the NESC, the highest actual percentage declines occurred in the Mid-West, North

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[21] Possible reasons for this may be the higher survival rate of modern type establishments that had become more prevalent among foreign-owned firms coupled with their footloose capacity so that they can 'distribute themselves successfully more easily across regions' (Killen and Ruane, 1998; p. 18).

[22] Quite large disparities characterised the actual and estimated data. It will be recalled however that the forecast period was one of recession and a freeing of trade following Ireland's 1973 entry to the EEC.

West, Midlands and East. This contrasted sharply with the IDA estimate for the East, which was expected to experience the lowest percentage decline over the period (NESC, 1982; p. 49). Despite the large reduction in agricultural employment, the ranking of the regions using the percentage of the workforce employed in agriculture showed that the less developed regions continued to have the highest proportion of their workforce employed in agriculture, a ranking that had changed little over the period (p. 50). The majority of the regions performed poorly with regard to their estimates of service employment (Table B.1q, appendix B, section B.1). Only three regions, the West, Mid-West and East, had actual service employment levels greater than the IDA estimates, with the actual increase in the East region being particularly strong, at more than double the IDA estimate. The percentage of the workforce employed in services illustrated a divide between the East, the middle ranking Mid-West, South West, South East and North East and the lowest ranking West, Midlands and Donegal/North West regions.

Accordingly, by 1977 regional disparity in the composition of employment identified a threefold division of the eight planning regions- the high ranking East, the middle ranking Mid-West, South West, South East and North East and the low ranking West, Midlands and Donegal/North West.

Acknowledgement of this disparity formed the basis for the study by An Foras Forbartha (1979). The objective of the study was to "demonstrate statistically the relationship between investment and socio-economic development in the standard regions during the period 1958 to 1972 and to assess the feasibility of setting up a regional monitoring system" (p. i). The methodology, which involved the collection of a large number of socio-economic indicators from which the relative well being of each region was assessed, provided a direct comment on regional disparity over this time-period. Investment, employment, output[23] and 55 other indicators of 'quality of life' (p. 5, vol. 3) were compiled for nine planning regions. The study identified two hypotheses:

Hypothesis 1: There are structural differences between the regions of the State, with the Eastern region being "most developed" and all other regions being relatively less developed.
Hypothesis 2: The disparity in the "quality of life" is narrowing because of the success of policies, which have the objective of creating employment" (p. 55, vol. 1).

The first hypothesis was clear in meaning and the results from factor analysis, the statistical methodology employed, indicated that the East region continued to occupy a leader position over the 1958-1972 period. This is a similar finding to the previous studies discussed. On the other hand, the second hypothesis was broader in scope and the separate investigation of a number of

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However, "it is difficult to attribute the pronounced regional disparities in industrial employment entirely to those factors" (NESC, 1982; p. 46).

[23] Due to reasons of confidentiality, only agricultural output was made available for each region.

different hypotheses was needed before a conclusion could be reached as to whether a narrowing had taken place between the regions with respect to "quality of life". The second hypothesis required an examination of three separate but related points, see Table B.1r, appendix B, section B.1. First, what interpretation should be given to the concept of 'narrowing'? Second, to examine whether there had been an improvement in the absolute and relative position of the West and North West regions and finally to examine the relative position of the East region with the other regions over the study period. The results are summarised here. First, agreement was needed on an acceptable time frame for the narrowing of disparity to occur. Second, there was no evidence to suggest that the absolute position of the West and North West regions had improved for investment and socio-economic factors when comparing 1961 and 1971. In fact, deteriorating agricultural sectors and failure to generate substitute employment maintained their absolute position. Furthermore, there had been no improvement in the relative position of these two regions and the other regions for the same socio-economic and investment factors. Finally, although the gap between the East and other regions was narrowing for the socio-economic variables, the continuing and expanding divide between this region and the others for the investment variable precluded any conclusive response.

Drudy (1982) also made use of the planning region in examining regional disparity primarily in agriculture. Discussion focused on land use, holding size and land tenure and the demographic structure of the farming population and regional employment change over the 1961 to 1979 period. The analysis served to highlight the 'problem' areas of the West, North West and Donegal regions. A summary table (Table B.1s, appendix B, section B.1) illustrated the regional differences that existed between the planning regions over the 1971 to 1979 period. These included unemployment, deviations from national employment, share of national employment growth, share of national population growth and deviations of per capita incomes from the national average (1977). Significant disparity existed between the East and the other regions. The North East, North West/Donegal and Midlands were furthest from national employment growth; had the lowest share of national employment growth and the lowest share of national population growth, while the Midlands, West and Donegal/North West had the lowest per capita incomes. The share of unemployment was highest in the North West/Donegal, South East and Mid-West regions. Thus at the end of 1979, serious regional disparities existed in Ireland that were summarised by an east-west divide. However, changes had taken place in the position of these western regions, especially with regard to industrial employment see for example, Drudy (1991) and Killen and Ruane (1998).

In studies from 1994, the Regional Authority has been used as the preferred regional unit. Furthermore, official statistics now use this unit for the reporting of data. Walsh (1996) provided inter-regional comparisons for a number of variables at the regional authority level over various periods between 1977 and 1994. These variables included demographic, employment, education,

size of agricultural holding, unemployment, investment, tourism, regional incomes and public spending from the government and EU. Walsh (1996) notes that the principal contrasts are between the largest cities and the remainder of the country. Generally the more remote an area is, the larger the disparity between it and another area. While Walsh notes a decline in the level of disparity between the regional authority areas from 1960 using migration, unemployment and income as indicators, regional disparity continues to exist at different spatial scales. Drudy and MacLaran (1994), Drudy and MacLaran (1996) and Drudy and Punch (1998 and 1999) have been instrumental in highlighting and analysing the economic and social trends, not all of them positive that are taking place in the Dublin regional authority. The studies show that although population increase is significant compared to the other regions; it has slowed since the 1980s. Moreover, inner-city areas have suffered severe population losses while areas on the periphery have had to cope with large increases, mostly in the younger age groups. The region has also suffered the largest decreases in industrial employment in the State since 1971 (although some improvement was recorded in the 1991 to 1995 period). On the other hand, service employment has been highest in this region, accounting for almost 40 percent of the national total (1995). Against this the unemployment situation has deteriorated significantly from 1971[24] and the region accounts for the largest share of long-term unemployment in the state. Moreover, the analysis by Drudy *et al.*, which covers the period to 1997, raises the issue of 'unemployment blackspots' in the region. In these areas, where unemployment rates are as high as 60 percent, a low-quality physical environment is coupled with a low educational attainment rate and there are high proportions of lone parent families and unskilled and/or semi-skilled workers in the labour force (Drudy and Punch, 1998).[25]

Boyle, McCarthy and Walsh (1999) examined regional disparity in output and income for the eight regional authorities between 1991 and 1996 and between 1973 and 1994 respectively. This was a principal part of their paper on regional equalisation in Ireland and their findings are given here.[26] Using Gross Value Added at basic prices, the authors noted a three-fold classification of the country that recognised Dublin and the Mid-East in one group, the South West, South East and Mid-West in a second group and a final group that included the West, Midlands and Border regions. The authors found no convergence between the regions over the 1991 to 1996 period. Income measures from the Household Budget Survey were then considered. There was no correspondence between the ranking of the regions for three income measures (gross income, direct

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[24] The improvement since 1991 "is probably due in part to the significant increase in the level of employment and training schemes, largely of a short-term nature"(Drudy and Punch, 1998; p. 82).

[25] By early 2000, Dublin's position had improved significantly in relation to unemployment (Quarterly National Household Survey).

[26] Two further aspects of their paper which are not discussed here were first, the decomposition of the disparity in economic welfare (output and income) relating to participation, employment, dependency and productivity on the one hand and to urbanisation and agglomeration economies on the other. Second,

income and disposable income) and GVA. Using the 1994 data, the South East was ranked second lowest after the Border region and the West and Midlands were close to the economy wide average. Convergence was evident over the 1973 to 1987 period but not from 1987 to 1994. Examining the dispersion of the three income measures across a rural and urban classification suggested three 'stylised facts' (p. 15). First, disparity in direct income was widest in rural non-farm households. Second, there had been a convergence in gross and disposable income for rural non-farm, rural farm and urban households. Finally, the coefficient of variation, which was the measure of dispersion used, was stable over time for the urban and rural non-farm households.

The following chapters examine a much longer period of regional performance than discussed here. The regions will be ranked according to several socio-economic variables that have been suggested by the literature review in chapter 2, and by the studies in this chapter, within the constraints of data availability. This approach will demonstrate whether any appreciable shifts have occurred in the nature of regional disparity over time. It will also serve as a precursor to the empirical analysis that examines regional disparity in an economic growth context by considering the pattern of disparity over time and examining the reasons for this pattern. The consideration of regional disparity in such a framework contrasts, but also complements the previous studies on regional performance in the Republic of Ireland.

## 3.3 CONCLUSION

The chapter demonstrated the omnipresence of regional disparity in the Republic of Ireland by considering past regional studies. The discussion of previous regional studies provides a useful starting point from which to consider the more in depth analysis to be undertaken later in the thesis.

Regional disparity has been examined in the Irish regional literature for a number of regional divisions including the county, core-periphery, urban-rural, planning region and regional authority level and for many variables. Variables have included population and its components, employment and its components, unemployment, industrial establishments, income and output. The regional studies examined dated from the 1960s to the present.

The earlier studies in particular demonstrated the existence of an east-west divide within the country with the east occupying the leader position and the west occupying the lagging position. Personal income was considered as an indicator of disparity for two of the studies carried out in the early and mid-1960s respectively and these showed a clear divide between the prosperous eastern counties and poorer western counties. The studies undertaken during the 1970s expanded the list

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consideration was given to a policy direction that combined "targets with respect to regional income differentials, growth and urban development" (p.31).

of indicators to include investment, employment, output, other 'quality of life' indicators, population, unemployment, proportion at work in industry and percentage of IDA expenditure in each region. Moreover the analysis was undertaken for the planning regions, which had been set up by the Industrial Development Act of 1969. The conclusions continued to identify a divide between the East, which encompassed the counties of Meath, Kildare, Wicklow and Dublin and the rest of the country. This was evident especially with regard to industrial base, industrial employment and investment, but was less true of agricultural employment where some narrowing of the disparity between the regions had taken place. Further studies in the 1980s continued to recognise the leader position of the East region but also indicated a narrowing in industrial employment with the western 'periphery' performing better than the eastern core. The regional authority was the preferred spatial unit for more recent studies. The recognition of Dublin as a region in its own right has also enabled researchers to examine its economic and social trends.

# Chapter Four

# METHODOLOGY ISSUES

## 4.1 INTRODUCTION

This chapter discusses various methodological issues pertaining to the study of regional disparity in the Republic of Ireland. Three major issues require examination. First, it is necessary to determine the appropriate spatial unit. Second a discussion of available data is required, and, finally, consideration needs to be given to the most appropriate econometric or modelling technique.

These issues are interrelated – once the spatial unit is decided this will determine the choice of data and the available data will determine the possible econometric techniques. Thus the chapter begins with a discussion on defining the region for the Irish republic in section 4.2. Changes[1] that have taken place in the Irish regional unit in more recent times offer a number of spatial units from which to choose. The chapter continues with a discussion of the available regional data in section 4.3. Section 4.4 examines the variables that can be constructed from regional data sources and discusses discrepancies that arise from using different sources. The analysis from section 4.3 and 4.4 will be used in section 4.5 to develop a framework for the study of regional disparity in the Republic of Ireland. The appropriate statistical and econometric techniques will be discussed and the methodology to be followed in analysing regional disparity at the inter-regional and intra-regional level will be presented.

## 4.2 THE REGIONAL UNIT IN THE IRISH CONTEXT

Regions are defined for various purposes based on several criteria[2] and the spatial unit used, whether in the form of a national sub-unit or, alternatively, as a nation in the context of cross-country studies, will depend on these purposes/criteria. The definition of a region for the purposes of this study is to enable a comparison of the economic and social disparities between spatial units within a country. The first criterion is that the region must be economically meaningful, i.e. combining places of work and residency as suggested by Cheshire and Evans (1991). Under such an approach, some form of economic homogeneity within each region is implied. Richardson

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[1] These changes will be discussed in detail in Chapter eight.

[2] Natural factors such as geography (natural physical conditions) and/or culture (common spirit/language) may define a region. Regions may also be delineated by reference to one or more specific functions (e.g. travel to work zones, retail service regions) or they may include designated political and administrative boundaries.

(1979) cites similar per capita income levels, a dominant common industry and a uniform employment situation as likely factors promoting homogeneity or economic cohesion (p.6). The region must also be of an adequate size. Size may be measured by reference to territory, population or economic power. Definitions of the appropriate size of a region may have a strong impact on disparity indicators. For instance, Dunford (1990) argues that the "number of areas and choice of boundaries affect the measure of disparity, just as the delimitation of electoral districts shapes the outcome of elections" (p.732). Moreover in his study of the regional disparities in the European Community, Dunford (1990) shows that "the inequality increases as the number of regional units increase and as the size (measured by population and GDP) of the regional unit decreases".

The Republic of Ireland has traditionally been divided into planning regions[3] comprising counties. This division of the Republic satisfied the three related objectives of physical planning, industrial development and regional policy. The regional authorities replaced the planning regions following the Local Government Act of 1991. The regional authority structure within the Republic recognised eight regional authorities and these are listed in Table 4.2a. Such regional authorities were considered to represent more concisely and clearly the 'true' regional divisions in the Irish context. However, this approach did not represent a complete break with the previous regime in that the spatial coverage of the regional authorities remained broadly similar to that of the planning regions (see Table 4.2a). The principal difference is the recognition of the capital city Dublin as a region in its own right.

The most recent regional division of the Republic has been the introduction of the two new group Regional Authorities, which represent a new regional structure within the Republic. The country will now be divided into two regions. The first region, the Border, Midlands and Western Group Regional Authority, see Table 4.2a, will continue to have Objective 1 status for the purpose of EU Structural Funds. The second region is the Southern and Eastern Group Regional Authority. The new group regional authorities, which will be based on the existing regional authority structure, will have responsibility for:

- promoting co-ordination of the provision of public services in their areas;
- advising the Government on the regional dimension of the National Development Plan;
- monitoring the general impact of all EU programmes of assistance under the Community Support Framework (CSF) in their areas; and
- managing regional programmes in the next CSF. (Department of Finance, 1999).

[3] 9 planning regions were defined in 1964 following the publication of the Local Government Act in 1962, see chapter eight.

**Table 4.2a Regional Planning Units and Regional Authorities**

| Group Regional Authorities (1999) | Counties | Regional Authorities (1991) | Counties | Planning Regions (1964) | Counties |
|---|---|---|---|---|---|
| Border, Midlands & Western Group | Cavan, Donegal, Leitrim, Louth, Monaghan, Sligo Laoighis, Longford, Offaly, Westmeath Galway, Roscommon, Mayo | Border | Cavan, Donegal, Leitrim, Louth, Monaghan, Sligo | North-East | Cavan, Louth, Monaghan |
| | | Mid-East | Kildare, Meath, Wicklow | East | Dublin, Kildare, Meath, Wicklow |
| | | Midlands | Laoighis, Longford, Offaly, Westmeath | Midlands | Laoighis, Longford, Westmeath, Offaly, Roscommon |
| | | Mid-West | Clare, Limerick, Tipperary North | Mid-West | Clare, Limerick, Tipperary North |
| | | South-East | Carlow, Kilkenny, Tipperary South, Waterford, Wexford | South East | Carlow, Kilkenny, Tipperary South, Wexford, Waterford |
| | | South-West | Cork, Kerry | South West | Cork, Kerry |
| | | Dublin | Dublin | Donegal | Donegal |
| | | West | Galway, Roscommon, Mayo | West | Galway, Mayo |
| Southern & Eastern Group | Kildare, Meath, Wicklow Limerick, Tipperary North Carlow, Kilkenny, Tipperary South, Waterford, Wexford Cork, Kerry, Clare | | | North West | Sligo, Leitrim |

In an Irish context, however, the regions are not generally identified with the taking of political and/or economic decisions, although this has changed somewhat in recent years. While the underlying counties do have a system of local government, they are largely controlled from the centre, as the system of local government in the Republic of Ireland is rather weak by international standards. Three main reasons lie behind this. First, for over sixty years since independence in 1922, powers relating to agricultural matters, health services, physical planning control, social services, transport development, environmental protection and other functions, which are primarily the business of local government in other countries, were progressively removed and conferred either on central government or on non-elected regional bodies. Second, those services that did remain under local government such as the provision of public housing and sanitation facilities were subject to very tight procedural and standards controls from the centre. Third, the link between taxation and representation in local authorities was progressively attenuated after 1922, with central government funding a higher and higher proportion of local authority spending and

assuming a concomitantly higher degree of control. This trend reached its zenith with the abolition of local domestic rates in 1977. However, in more recent years there has been some movement towards freeing local government from undue central control. Local authorities have been given the right to charge for certain services such as refuse collection and water provision, although a few have chosen not to do so. They have also been granted more discretion in how they undertake their responsibilities and have been given a statutory right to contribute to economic development (Department of the Environment, 1996). Furthermore, all political parties are now committed to a further loosening of central government control.

The regional division itself remains largely an artificial construct, defined in the case of the planning units for the implementation of industrial policy and development and in the more recent group regional authority level for the administration of EU structural funds. Regions have also been defined for tourism purposes and health administration purposes. Boundaries do not coincide for any of these three purposes, however. Thus, it is largely at the discretion of the researcher as to which regional definitions to use. For the purposes of this study, a choice needs to be made between the regional authorities and the regional planning units.

The planning regions will be used as the principal spatial unit in the following empirical studies of Irish regional disparity. The planning regions have been in existence for a longer period of time compared to their regional authority counterparts and have formed the basis of previous regional studies in the Irish context.[4] Second, they were so named in order to delineate industrial policy, the main conduit of regional policy in Ireland, which will be discussed in chapter eight.

## 4.3 AVAILABLE DATA

There are three sources of data that facilitate regional comparison: the Central Statistics Office, Forfás[5] and independent academic regional studies. The main source of data for this study is the Central Statistics Office as it provides the most consistent and comprehensive long-term data set.

The CSO publishes several data sources from which regional data may be compiled. The main CSO sources are outlined in Table 4.3a below. The 'coverage' column outlines those years in which comprehensive sub-national data are available. The following paragraphs explain the broad content of each source and remark on its regional coverage.

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[4] These studies were examined in the previous chapter.

[5]Significant changes have taken place in the operation and administration of industrial policy in the Republic of Ireland. The former Industrial Development Authority (IDA) was split in 1994 into three functional areas for industrial development purposes: Forbairt for the promotion and development of indigenous industry, IDA (Ireland) for the fostering and development of foreign owned industry and Forfás, the planning body.

**Table 4.3a Regional Data Sources**

| Source | Coverage |
|---|---|
| Census of Population | Quennial from 1841 to 1911, 1926, 1936, quinquennial from 1941 to 1971 and from 1981 to 1996 |
| Household Budget Survey | 1973, 1980, 1987, 1994 |
| Regional Accounts | Annually from 1991 to 1996 |
| Labour Force Survey | 1975, 1977, 1979 and annually from 1983 to 1996 |
| Census of Industrial Production | Annually from 1979 to 1993 |

The 1841 Census of Population is the first source of reliable regional data. From 1841 to 1941, the Census was compiled at 10 yearly intervals with one exception.[6] Since 1941, the Census of Population has been compiled on a quinquennial basis on the first and sixth year of each decade.[7] The basic task of the Census is to ascertain the population at a given time, both on a national and at a regional level, and to determine the particulars of these individuals (age, education, occupation, etc.). The Census relates to all persons present within the census area[8] on a particular night and thus excludes members of the defence forces serving with the United Nations, university and secondary school students living away from home, persons living in hospitals, institutions, and others normally resident but living/visiting outside the census area. The date of the Census is however "chosen to coincide with a period when passenger movements are at a minimum and consequently the figures approximate to those for the normally resident population" (Census of Population, 1966, vol. 1, pp. v).

The main purpose of the Household Budget Survey (HBS) is to determine in detail the current pattern of household expenditure for the purposes of updating the weighting basis of the Consumer Price Index.[9] The first Household Budget Survey was carried out in 1951-1952 and was confined solely to urban areas. This was also the case for 1965-66. Random samples of households from urban and rural areas have been surveyed at seven-year intervals since then (1973, 1980, 1987 and 1994). The results are based on the data collected from these households using survey procedures and are therefore "estimates of the values, which would have been obtained if all households in the State had been perfectly surveyed" (HBS, 1987; p. 10).

Regional accounts were first published in 1996 using 1991 data for the eight regional authorities. The accounts include a measure of regional income - gross value added (GVA), which is "a measure of the value of goods and services produced in a region at the value which the producers received minus any taxes payable and plus any subsidies receivable as a consequence of their production or sale" (CSO, 1998). GVA is first calculated at factor cost and includes all subsidies

[6] There was a 15-year gap between the 1911 and 1926 Census.
[7] The enumeration of 1941 and 1956 were limited in scope compared with earlier years. The 1976 Census did not take place; a limited Census took place in 1979 instead.
[8] The smallest territorial unit is the DED (District Electoral Division); other areas are urban districts, towns, rural districts, register's districts, superintendent registrars' districts, county electoral areas, borough electoral areas, constituencies, counties, county boroughs and provinces.

and excludes all taxes. Second, GVA at basic prices is calculated by subtracting overhead subsidies and adding overhead taxes. Basic price data are used in all tables in the accounts, although tables using market price GVA (i.e. adding product taxes and subtracting product subsidies from basic price data) are also included.

The fourth data source is the Labour Force Survey (LFS). The first official Labour Force Survey was conducted in 1975, and was subsequently held bi-annually to 1979 and annually from 1983, in accordance with a consistent EU-wide basis.[10] The Irish LFS is a large sample household survey carried out by specially trained interviewers in April/May and covering approximately 45,000 households (Garvey, 1988; p. 187). The LFS produces labour force estimates using two different approaches. Firstly, it categorises people on a Principal Economic Status basis. This classification is based on responses to the "usual" situation with regard to employment and, secondly, it produces labour force estimates based on a person's situation pertaining in the week prior to the survey.

The final major data source is the Census of Industrial Production. The CIP dates back to 1926 while the next Censuses took place in 1929 and in 1931 and were repeated annually from 1932. The coverage was limited in the early years and information on location of industrial establishments was minimal due to the desire to maintain confidentiality.[11] From 1953 to 1973, the industry classification used was that of the United Nations International Standard Industrial Classification of all Economic Activities (ISIC). From 1973, the General Industrial Classification of Economic Activities within the European Communities (NACE) was introduced. The CIP comprises two separate but closely related annual inquiries: the Census of Industrial Establishments which covers all industrial establishments[12] with three or more persons engaged, and the Census of Industrial Enterprises (first surveyed in 1975) which covers industrial enterprises with 20 or more persons engaged. The latter survey is required under EC Directives 64/475 and 72/221. Since 1979, the CIP has featured industrial data for county and planning regions on a consistent basis.

Details on industrial activity and firm size[13] for grant-aided and grant-approved industrial establishments are available from the annual reports of the former IDA. However, no consistent format for the reporting of the data was implemented and the range and scope of the reported data differ from year to year making it practically unusable in any long-run study of regional disparity.

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[9] Index weights were updated in 1968, 1975, 1982 and 1989 following Household Budget Surveys.
[10] The annual Labour Force Survey has been replaced since 1998 by the National Quarterly Household Survey.
[11] Detailed analyses by size and location were published in respect of 1958, 1963, 1968 and 1975 as special supplements to the December 1962, March 1968, March 1973 and September 1971 issues, respectively. For 1979 and later years, these analyses are being incorporated in the annual Reports (CIP, 1988; p. 217).
[12] An establishment is defined as a single economic activity conducted at a particular location, e.g. a factory, mine, etc. whereas an enterprise is defined as the smallest legally separate unit. In practice, an enterprise comprising one or more establishments is equivalent to a company or firm (CIP, 1988; p. 5).
[13] Size as measured by employment.

Furthermore, the use of this type of data in describing Irish regional disparity is problematic in that the firms covered represent those that have benefited (or that have been approved to benefit) from industrial aid in the form of grants or other benefits. As industrial policy has been the main conduit of regional policy in the Irish context, examining such firms would, to a certain extent, be analysing the problem after rather than before regional disparity had been addressed. However, Forfás, the planning and policy unit has made available data on capital expenditure and this will be used to proxy regional policy in the empirical study in chapter six.

## 4.4 List of Variables

This section examines the variables to be used in the study of Irish regional disparity. A number of issues are relevant in defining this list of variables. First, the aim of the study should inform the choice of variables to be used. This point is relevant in differentiating between the various data sources and in choosing a measure of Irish regional performance. Second, data should not be collected in a vacuum but with a view to the analytical technique to be employed. For example, An Foras Forbartha (1979) argued that "data collection and analysis are integral parts of a whole and cannot be rigorously separated ... otherwise they merely become data for their own sakes". Third, in order to facilitate cross-regional comparison, which is central to the examination of regional disparity, the variables should be standardised. The standardising of variables in order to assess regional disparity is common in regional analyses. A number of variables may be used for standardisation purposes - the level of population, the active age population and/or the labour force. The sources of data as described in the previous section and the literature review from chapter 2 suggest the use of the following variables, which are listed in Table 4.4a.

**Table 4.4a Variable list and data sources**

| Variable | Source | Time Period |
|---|---|---|
| Population | Census of Population | 1926, 1936, quinquennial from 1941 to 1971 and from 1981 to 1996 |
| | Labour Force Survey | 1975, 1979, 1983-1996 |
| Urban/Rural Population | Census of Population | as above |
| Components of Population: Migration/Natural Increase | Census of Population | as above |
| Age and Gender Details | Census of Population | as above |
| | Labour Force Survey | as above |
| Employment - total and sectoral | Census of Population | as above |
| | Labour Force Survey | as above |
| | Census of Industrial Production (industrial data only) | 1979-1996 |
| Unemployment | Census of Population | 1971, 1981 and quinquennial to 1996 |
| | Labour Force Survey | as above |
| | Live Register | 1946, 1951, 1961, 1966, 1971, 1981, 1986, 1991, 1996 |
| Education | Census of Population | 1966, 1971, 1981, 1986, 1991, 1996 |
| | Labour Force Survey | as above |
| Industrial Output | Census of Industrial Production | as above |
| Industrial Composition | Census of Industrial Production | as above |
| Investment | Census of Industrial Production | as above |
| Income | Regional Accounts | Annually from 1991 to 1996 |
| | Household Budget Survey | 1973, 1980, 1987, 1994 |
| Policy | Forfás | 1973, 1980, 1987, 1994 |

It is evident from Table 4.4a that a number of variables are replicated in different sources. In order to choose a variable list coinciding with the aims of the study, as noted above, it is necessary to examine these differences. Subsequent paragraphs highlight the disparities and examine the scale of the differences between these reported sources. The data used in this discussion refer to 1996. The sources of data are compared at the regional level as county boundary alterations over time make it difficult to compare county totals with accuracy.

### 4.4.1 Data Discrepancies

Table 4.4.1a examines the state population for the eight planning regions and the state. There are two different sources for this information, the Census of Population and the Labour Force Survey. The Census of Population figures exceed those of the Labour Force for all of the regions and the difference between the state total from both sources is almost 5,000. Across the regions, the percentage differences between the Labour Force Survey and the Census of Population range from 0.2 percent in the East region to 0.4 percent in the Donegal/North West region.

The Census surveys households whereas the Labour Force Survey targets a sample of households and then grosses up the figures. In this sense, the Labour Force Survey would be expected to be less reliable than the Census for those years in which the Census is undertaken. The Labour Force Survey is, however, an annual survey and, as such, provides detailed information on year to year

changes in population, whereas the Census does not provide any information on population change that takes place between different Census periods. If the Census source is taken to be more accurate by virtue of the fact that it targets more households, then this should be the prime source of population data with the Labour Force being used to cover the intervening years, where necessary. The Census also provides a longer time frame from which to monitor population changes (see Table 4.4a).

**Table 4.4.1a Population details: data sources compared.**

| | State population, 1996 (000s). | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Source | East | South West | South East | North East | Donegal NW | West | Mid West | Midlands | State |
| Labour Force | 1403.3 | 546.2 | 391.0 | 196.3 | 210.1 | 300.0 | 316.9 | 257.1 | 3621.1 |
| Census of Population | 1405.7 | 546.6 | 391.5 | 196.4 | 210.9 | 300.4 | 317.1 | 257.5 | 3626.1 |

Source: Labour Force Survey and Census of Population, 1996.

Age data are discussed in the following paragraphs and should provide information on those particular groups contributing to overall population changes. Examining the state totals for the three age groups in Table 4.4.1b, we note that the Census figures are 4,800 less than the Labour Force in the youngest 0-14 age group and 10,800 greater than the Survey for the middle, 15-64 age group. In the older 65+ age group, the statewide differences are minimal. In the 0-14 age group, the East region is the main contributor to the 4,800 difference between the two sources. In the middle age group, the Midlands, East and Donegal/NW regions are the main contributors to the 4,300 difference. Examining the proportions, rather than the raw numbers, in each age group (Table C.1a, appendix C, section C.1), the difference is not that marked however.

**Table 4.4.1b Age structure details: data sources compared.**

| Source | East | South West | South East | North East | Donegal NW | West | Mid West | Midlands | State |
|---|---|---|---|---|---|---|---|---|---|
| | **Number of 0-14 year olds, 1996 (000s)** | | | | | | | | |
| Labour Force | 326.6 | 127.4 | 95.2 | 48.6 | 52.3 | 70.4 | 75.9 | 67.9 | 864.2 |
| Census of Population | 322.7 | 128.0 | 95.6 | 49.1 | 52.0 | 72.1 | 75.9 | 64.2 | 859.4 |
| | **Number of 15-64 year olds, 1996 (000s)** | | | | | | | | |
| | East | South West | South East | North East | Donegal NW | West | Mid West | Midlands | State |
| Labour Force | 944.8 | 351.3 | 248.6 | 123.0 | 126.9 | 189.1 | 203.4 | 154.9 | 2342.0 |
| Census of Population | 947.1 | 352.5 | 249.3 | 123.2 | 129.5 | 187.7 | 203.7 | 159.7 | 2352.8 |
| | **Number of 65+ year olds, 1996 (000s)** | | | | | | | | |
| | East | South West | South East | North East | Donegal NW | West | Mid West | Midlands | State |
| Labour Force | 131.9 | 67.5 | 47.3 | 24.7 | 31.0 | 40.6 | 37.6 | 34.3 | 414.9 |
| Census of Population | 135.9 | 66.1 | 46.6 | 24.2 | 29.4 | 40.6 | 37.5 | 33.6 | 413.9 |

Source: Labour Force Survey and Census of Population, 1996.

The difference between the two data sources for the numbers at work is quite high and stood at 21,900 in 1996, see Table 4.4.1c below. The Census of Population records a total of 1,307,200 at work in 1996 compared with a total of 1,285,300 in the Labour Force Survey. The Census shows a higher number at work in all regions. There is a particularly large discrepancy for the Mid-West, which amounts to 4.5 percent.

**Table 4.4.1c Employment details; total at work (1996), 000s: data sources compared.**

| | East | South West | South East | North East | Donegal NW | West | Mid West | Midlands | State |
|---|---|---|---|---|---|---|---|---|---|
| Labour Force | 536.3 | 188.3 | 132.2 | 66.5 | 65.1 | 99.0 | 109.1 | 88.8 | 1285.3 |
| Census of Population | 537.4 | 191.3 | 134.6 | 68.2 | 68.5 | 104.1 | 114.0 | 89.2 | 1307.2 |

Source: Labour Force Survey and Census of Population, 1996.

As Table C.1b, appendix C, section C.1 demonstrates, the relative regional shares of total employment are, however, fairly close under both sources, thus suggesting no undue cause for concern. The Census of Population targets a much greater base than the Labour Force. Furthermore, the latter allows respondents a much greater choice in their response to the

employment question than does the Census of Population. This factor may contribute to the larger employment totals shown by the Census returns.

Sectoral employment details are examined in Table 4.41d below. The most noteworthy aspect of these figures is that they present even more disturbing discrepancies. Although the difference between the two figures for agricultural employment in the state amounts to only 2,500 (which nevertheless, represents a sizeable 1.9 percent discrepancy), this masks a much more disturbing picture at the regional level. The Labour Force Survey reports a figure for the South West's agricultural employment which is 2,400 greater than that contained in the Census, representing a difference of 9.4 percent and the Survey's agricultural employment for the Mid-West is 13.5 percent less than the Census figure. These discrepancies are so large that they are also reflected in regional shares of agricultural employment. For example, the regional share of agricultural employment displays a full two-percentage point difference between the Census and the Labour Force (Table C.1c, appendix C, section C.1) in the case of the Mid-West region, while the South West region shows a one-percentage point difference between the Labour Force and the Census.

Industrial employment is reported in the Census of Population, the Labour Force Survey and the Census of Industrial Production. The difference between the state industrial employment figures reported by the Census of Population and the Labour Force Survey amounts to 3,200 with the Census figure being 1% higher than that reported by the Survey. The differences at the regional level are even more marked. For example, the Labour Force figures overstate employment relative to the Census figures by 2.1 percent in the South West and understate the Census figures by 2 percent in the South East, 3 percent in the Midlands and 12.5 percent in the West. An examination of the proportionate regional shares of industrial employment, Table C.1d, appendix C, section C.1, displays discrepancies in regional employment shares similar in magnitude to the agricultural sector.

We can also see from Table 4.4.1d that there is a very large discrepancy between the Census of Industrial Production on the one hand and the Labour Force Survey and the Census of Population on the other. One reason for such a difference is that the CIP does not record employment details for establishments employing less than three persons or for enterprises with less than 20 persons. Such an omission is significant, as the small and micro firm sectors are important employers in the Irish economy.[14] The Small and Medium Size Enterprise (SME) Task Force reported in 1993 that 90 per cent of all employment in Ireland was in firms with less than 10 employees. Another reason for the differences is that the Census of Industrial Production is not affected by seasonal factors whereas the Census of Population and the Labour Force Survey take place in April and are likely to

[14] Small firms as defined by the SME Task Force, comprise enterprises employing less than 50 employees. Micro firms are defined as those employing less than 10 persons.

be affected by factors occurring at that time of year. Finally, COP data is collected on the basis of residence while CIP data is collected by place of work. Given the differences in the manner, in which the data are collected, it is reasonable to conclude that these three sources are not directly comparable and the choice of source must lie with the researcher and satisfy the functions of the study.

Discrepancies also arise between the Survey and the Census in the case of service sector employment. The Labour Force Survey shows a lower level of service employment across the regions (except for the Midlands) compared to the Census of Population. The extent of the difference varies from a high of 9.9 percent in the Donegal/NW region to a low of 2.9 percent in the South East region. The difference between the state totals from both sources is 21,400 or 2.7 percent.[15] Nevertheless, as Table C.1e, appendix C, section C.1 demonstrates, the regional share of service employment for each source is similar, thus suggesting that the differences mainly relate to coverage rather than any fundamental flaws in the data.

**Table 4.41d Sectoral employment details: data sources compared.**

| | **Agricultural employment, 1996 (000s)** | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Source | East | South West | South East | North East | Donegal NW | West | Mid West | Midlands | State |
| Labour Force | 15.0 | 28.0 | 21.9 | 11.3 | 10.2 | 19.9 | 14.1 | 16.1 | 136.5 |
| Census of Population | 14.7 | 25.6 | 21.7 | 10.7 | 10.4 | 18.4 | 16.3 | 16.4 | 134.0 |
| | **Industrial employment, 1996 (000s)** | | | | | | | | |
| | East | South West | South East | North East | Donegal NW | West | Mid West | Midlands | State |
| Labour Force | 126.8 | 53.9 | 40.6 | 22.7 | 21.5 | 23.7 | 35.7 | 25.8 | 350.9 |
| Census of Population | 126.8 | 53.9 | 41.4 | 22.5 | 21.5 | 27.1 | 35.3 | 26.6 | 354.1 |
| Census of Industrial Production | 83.1 | 34.2 | 27.1 | 16.2 | 14.9 | 17.8 | 25.2 | 14.2 | 232.6 |
| | **Service employment, 1996 (000s)** | | | | | | | | |
| | East | South West | South East | North East | Donegal NW | West | Mid West | Midlands | State |
| Labour Force | 394.3 | 106.4 | 69.6 | 32.5 | 33.4 | 55.5 | 59.3 | 46.8 | 797.8 |
| Census of Population | 395.8 | 112.9 | 71.6 | 35.0 | 36.7 | 58.7 | 62.4 | 46.2 | 819.2 |

Source: Labour Force Survey, Census of Population and Census of Industrial Production, 1991.

[15] The percentage differences in the remaining regions are as follows: East (0.4%), South West (6.1%), North East (7.7%), Mid-West (5.2%), West (5.8%) and Midlands (-1.3%).

Given that the aim of this study is to establish whether the regions have become more equal over time, Census of Population employment data are used. The main reason is that, while an individual may work in a county other than the one in which they reside, it is reasonable to expect that the majority of their expenditure will take place in their county of residence, thus contributing to the overall income and demand for goods and services in that region. Furthermore, the Census of Population provides data for the longest time frame thus facilitating a more comprehensive study of regional disparity in the Republic of Ireland.

The main sources of unemployment statistics are the Labour Force Survey, the Census of Population and the Live Register.[16] One identified weakness with the Labour Force Survey is its subjectivity. Garvey (1988) questions, for example, the interpretation an individual might put on the word "usual"[17] where, for example, they just have become unemployed after a long continuous employment record. Against this, however, it may be considered not to be as subjective as the self-completion approach used in the Census of Population. The Live Register basically consists of claimants for unemployment benefit and unemployment assistance. It does not include small holders and some first time job seekers. On the other hand, it does include black economy workers and certain categories of farmers. It is, however, potentially advantageous from a number of perspectives. For example, Garvey (1988) argues that it has the advantages of "simplicity, frequency and timeliness and a reasonable indicator of short-term trends in unemployment" (p. 236). However, its disadvantages also include being affected by changes in the administrative rules relating to unemployment assistance and unemployment benefit. In recent years, the Live Register figures have differed significantly from the other sources of unemployment data, which prompted a special labour force inquiry. Moreover, the Interdepartmental Study Group on Unemployment Statistics in 1979 agreed that the Labour Force Survey was the "only reliable source" of unemployment data and is generally deemed to be the most reliable source for international unemployment comparisons.

**Table 4.4.1e Unemployment details: data sources compared.**

| | Numbers unemployed 1996 (000s) | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Source | East | South West | South East | North East | Donegal NW | West | Mid West | Midlands | State |
| Live Register | 116.2 | 43.5 | 33.1 | 17.8 | 19.8 | 26.9 | 22.6 | 17.7 | 297.6 |
| Labour Force | 79.5 | 26.7 | 20.7 | 11.0 | 14.6 | 15.9 | 12.4 | 9.1 | 189.9 |
| Census of Population | 93.1 | 31.9 | 25.1 | 12.1 | 15.7 | 18.2 | 17.1 | 13.6 | 226.7 |

Source: Statistical Abstract, Labour Force Survey and Census of Population, 1991.

[16] Live Register Statistics are published in the CSO Statistical Abstract.
[17] This is in reference to Question 11 on the LFS questionnaire on "the usual situation with regard to employment".

Turning to the Live Register, Labour Force Survey and the Census of Population for unemployment totals in 1996, Table 4.41e shows that the Live Register has significantly higher unemployment totals than the Census of Population, which in turn has higher totals in each region than the Labour Force Survey. The percentage differences between the Census and the Labour Force Survey vary from a low of 7 percent in the case of the Donegal/NW region to a high of 33 percent for the Midlands. The Live Register unemployment totals are farther from the Census data and here, the percentage differences range from 24.8 percent in the East to a high of 47.8 percent in the West.

While these percentage differences are disturbing, once again, an examination of the regional shares of unemployment contained in Table C.1f, appendix C. section C.1 shows no appreciable difference between the three sources. This suggests, as before, that the main cause of the difference in the raw figures is the extent of coverage and the caveats associated with the Live Register figures discussed above.

Nevertheless, the Labour Force Survey has been widely acclaimed as a reliable source of unemployment data. The impetus for the Labour Force Survey derived from an international belief that greater clarity was needed on the numbers employed and unemployed across countries. A number of studies took place in various countries, among these, *Counting the Labor* Force (US National Commission on Employment and Unemployment Statistics, 1979); *Report of the Interdepartmental Study Group on Unemployment Statistics* (Ireland, 1979) as well as a number of OECD studies on employment and unemployment statistics. The end result was the publication in 1982, by the International Labour Office, of a resolution *"concerning statistics of the economically active population, employment, unemployment and underemployment."* The main definitional issues of the Resolution are outlined in Garvey (1988). As the findings from the Labour Force are used in international comparisons, and as they provide more detail on the employed and unemployed,[18] this source is used in the thesis. Labour Force Survey data are available annually from 1983 to 1996. The concept of unemployment in the Census of Population is very subjective, relying on the opinion of the respondent. Until 1971, the Census simply categorised persons as either gainfully or ungainfully occupied. The latter included those in hospitals and home help while the former included part-time and seasonal workers. It is not possible to extract the numbers unemployed from these totals with any degree of accuracy. Furthermore, the 1971 Census used just two categories, i.e. those "at work" or "unemployed." It was not until 1981 that Census respondents were presented with a range of Principal Economic Status Options. Live Register data are also included in the thesis. Although there are problems with these data, they nevertheless provide a long-run view of unemployment that is not available from the other sources.

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[18] Garvey (1988) argues that "being just one of the many topics to be covered in a Census, the number of questions devoted to establishing the labour force status is of necessity very limited" (p. 186).

Finally, two sources of regional income, gross value added (GVA) and household income are listed in Table 4.4a. The CSO (1998) notes that "GVA differs from household income in three main respects" (p. 8). First, GVA includes company profits, therefore income will be overstated to the extent that repatriated profits are included; this is a serious flaw given the importance of such profits in certain regions. Second, the workforce that produces GVA in one region may reside (and spend) in another. Finally, GVA does not include social welfare and factor incomes from abroad, items included in the personal income measure. However, difficulties also arise with using the Household Budget Survey income measures. The reliability of the results will depend on the accuracy and consistency of the particulars provided by the respondents. Expenditure data are derived from records kept by households, while income is based on a retrospective reckoning relating to a twelve month period preceding the interview by the responding household. Moreover, income data do not include "receipts of an irregular and non-recurring nature" (HBS, 1987; p. 11). The latter point helps to explain in part the disparity between the income and expenditure returns. Despite the subjectivity of the Household Budget Survey income measures, it provides a rich source of income data over a longer period than the GVA estimates. Weekly household direct and disposable income data are available for the eight planning regions for 1973, 1980 and 1987 and for the eight regional authorities in 1994. Household weekly expenditure, direct taxes and state transfers are also available for these time periods and regions. While both sources of income are examined in the data analysis in chapter five, the income measure used in the empirical study in chapter six is based on disposable income from the Household Budget Survey.

In conclusion, although there are discrepancies among the various data sources, these relate mainly to differences in coverage, thus implying that differences in regional distribution are not generally too severe. The variables identified in Table 4.4a, i.e. population and the components of population, age, employment, unemployment, industrial output and composition, investment, income and education will all be used in the model of regional disparity outlined in the next section and further developed in later chapters.

## 4.5 Empirical Model

This section will set out the methodology for analysing regional disparity in the Republic of Ireland. Regional disparity at the inter-regional and intra-regional level will be examined. The approach adopted is informed by the discussion in the previous chapters and in this chapter. First, the level of disparity among key economic indicators will be examined for the eight planning regions at specific points in time. Second, the pattern of this disparity over time and its underlying causes will be identified and examined.

The first phase, a longitudinal study of Irish regional disparity will focus on the absolute and relative position of the eight planning regions for the variables listed above over an extended time-period, from 1926 to 1996 and for various sub-periods therein. In all 32 indicators of disparity will be examined in profiling the level of regional disparity in the Republic of Ireland.

The second phase will examine the pattern of disparity between the regions and comment on whether the disparity is narrowing (converging) or widening (diverging) over time. It will be necessary to select a variable that will provide a measure of economic welfare for the underlying region over an extended period. The most obvious measure and the one used most often in international studies is that of income per head. A number of income measures are available from the Household Budget Survey as discussed above. Disposable income is chosen as the most suitable measure of regional economic welfare in that it summarises the monies available to households to spend on actual goods and services and therefore reflects the economic wellbeing of a region. The main constraint in using this variable is its short-term availability (seven yearly intervals from 1973 to 1994). However, employment is the only variable available at the regional level for an extended time period. While the pattern of disparity in total and sectoral employment will be examined, by itself however, it is a constrained measure of economic growth. However, it may be 'enhanced' by a productivity index that would include the ratio of industrial and service employment to total employment.[19] This would provide, arguably for a better measure of economic welfare at the regional level.[20] Moreover, it would facilitate a long-run view of regional disparity. While the available data preclude any sophisticated modelling of convergence, it will be possible to provide some basic statistical and econometric analysis[21] that will inform on the pattern of regional disparity over time. Two periods will be considered for the two measures of economic welfare, disposable income and the productivity-enhanced employment rate - 1973 to 1994 and 1926 to 1996 respectively.

The second phase of the methodology, while following that suggested by international regional disparity studies introduces a preliminary test of the data that will ensure greater confidence in the results. The objective of the methodology is to illustrate the pattern of disparity between the regions for the set of economic welfare variables described above. A number of statistical tests

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[19] It is assumed here that industrial and service employment have benefited the most from improvements in productivity.

[20] The productivity-enhanced employment rate is constructed as follows: $\left[\frac{Empl * \left[\frac{Ind + Serv}{Empl}\right]}{Population}\right]$

[21] More sophisticated econometric approaches should mainly be reserved for situations where data constraints are minimal and where there is confidence in the quality of the data.

suggest themselves in charting sigma convergence. The test chosen for this study is the variance.[22] This best characterises the cross-section and time-series nature of the data and follows naturally from the Bartlett test of homogeneity of variance. Although previous studies have simply graphed the statistical measures of dispersion in commenting on sigma convergence, the statistical testing of the data for independence of variance, using Bartlett's test provides greater confidence in the graph and the sigma convergence result. With more than two independent estimates of variance, Bartlett provided the following test. Given *a* estimates of variance, each with the same number of degrees of freedom, *f*, the Bartlett test for homogeneity of variance is given as:

$$M=2.3026 f(a \log s^2 - \sum \log s_i^2)$$

where:

$s^2 = \sum s_i^2 / a$

i = 1...8, an index for each of the planning regions

$2.3026 = \log_e 10$

The null hypothesis is that each $s_i^2$ is an estimate of the same $\sigma^2$, the quantity M/C is distributed as $\chi^2$ with ($a$ - 1) degrees of freedom, where:

$$C = 1 + a + 1 / 3\, a\, f$$

Since C is always slightly greater than 1, it need only be used if M lies close to one of the critical values of $\chi^2$.

Following the application of this test, individual plots of the variance of the natural log[23] of; employment, the employment rate the productivity enhanced employment rate and disposable income[24] are examined for periods of increasing variance (divergence) or decreasing values of variance (convergence). Before embarking on the third phase of the methodology, the pattern of variance of employment, its components and the variance of the employment rate are further elaborated upon with reference to demographic, labour force and employment factors.

The third phase of the methodology embodies two aspects. The first, examines the speed at which the growth rate of a variable (here disposable income and the productivity enhanced employment rate) is converging on its initial level. Referred to as absolute beta convergence in the literature, the regression equation will take the form of:

$$\ln\Delta x=\alpha+\beta \ln x$$

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[22] The reader is also referred to section 2.4.2 (chapter 2) for discussion on alternative dispersion measures.

[23] Using the natural log prevents Galton's Fallacy, i.e. an increasing variance due solely to increases in the mean of the variable over time.

[24] Disparity in disposable income will be examined for seven regions. This ensures compatibility across the time periods of the study. The Dublin and Mid-East regional authorities are amalgamated to arrive at a total for the East region in 1994, while the North East and Donegal/North West planning regions are amalgamated to arrive at a total for the Border region for 1973, 1980 and 1987.

where $ln\Delta x$ refers to the natural log of the growth rate of the economic welfare variable and $x=y$ where $y$ refers to disposable income per person and $x=A$ where $A$ refers to the productivity enhanced employment rate; $\alpha$ refers to a constant, $\beta$ refers to the speed of convergence and $lnx$ refers to initial level of the variable, again $x=y$ (disposable income) and $x=A$ (productivity enhanced employment rate).

Equation 4.5a will be examined for disposable income per person over the 1973 to 1994 period and for productivity enhanced employment over the 1926 to 1996 period.

The second aspect will examine the reasons why convergence is taking place in disposable income per person and in the productivity enhanced employment rate and is referred to as conditional convergence in the literature. In other words, the factors explaining the growth rate in these variables will be included in the regression equation.[25] These factors have been referred to as 'control' and/or 'ancillary' variables in the literature. The regression equation examining the growth rate in disposable income per person will be given as:

$$\ln \Delta y = \alpha + \beta \ln y + a \ln agr + b \ln edu + c \ln inv + d \ln serv + e \ln urb + f \ln une + g \ln pol$$

where: ln$y$, $\alpha$ and $\beta$ are as before; $a$ through $f$ represent the coefficients on the control variables - ln*edu* refers to the natural log of the education rate (the proportion of the population in each region still at school), ln*agr* refers to the natural log of the share of agricultural employment in each region, ln*inv* refers to the natural log of the investment rate (investment divided by industrial employees), ln*serv* refers to the share of service employment in each region, ln*urb* refers to the proportion of the urban population residing in each region; ln*une* refers to the unemployment rate and ln*pol* refers to industrial grant payments (industrial grants divided by population in each region). It will cover the period 1973 to 1994 and the expected *a priori* signs will be discussed in the text in chapter six.

The regression equation examining the growth rate in productivity enhanced employment rate will be given as:

$$\ln \Delta A = \alpha + \beta \ln A + a \ln edu + b \ln agr + c \ln une + d \ln inv + e \ln urb$$

where $ln\Delta A$ refers to the natural log of the growth rate of the productivity-enhanced employment rate and $lnA$ refers to the natural log of the initial level of the productivity-enhanced employment rate, $\alpha$ and $\beta$ are as before and the coefficients a to e are the coefficients on the ancillary or control variables. These include the natural log the education rate (ln*edu*), the natural log of the share of agriculture (ln*agr*), the natural log of the unemployment rate (ln*une*), the natural log of the

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[25] In essence, the study of conditional convergence represents the study of long run economic growth, but with the added advantages of explaining the factors contributing to this growth and its implications (convergence or divergence) for the underlying regions.

investment rate (ln*inv*) and the natural log of the share of urban population (ln*urb*). The time frame will cover the 1966 to 1996 period.[26]

The final phase will involve a description and examination of employment change at the intra-regional level. The methodology, which will be similar to that outlined above for the inter-regional study will focus on identifying the level and pattern of disparity over time within the eight planning regions for employment and the productivity-enhanced employment rate. This analysis will examine whether any convergence tendencies exist at the intra-regional level and will also identify those counties that have been more successful than others over the 1926 to 1996 study period. While data deficiencies preclude the study of explanatory factors leading to convergence, it will be possible to examine absolute beta convergence for both employment and the productivity-enhanced employment rate. Discussion will also focus on the population and employment mix at the county level in contributing to and explaining the results of the disparity studies.

## 4.6 CONCLUSION

This chapter discussed the methodological issues involved in examining regional disparity in the Republic of Ireland. Drawing on the international and Irish literature on the subject, the chapter developed the necessary methodology along three related lines of research.

The first involved the selection of an appropriate spatial unit. The discussion centred on what was meant by "the region" in an Irish context and it was shown that the most meaningful analysis of regional disparity could be carried out at a planning region and county level.

Second, it was necessary to compile a regional data set from which to examine regional disparity. The chapter proceeded to examine data availability issues that had to be confronted in an Irish context. The various data sources were discussed in turn, along with their strengths and weaknesses. An initial examination showed large discrepancies between the various data sources for a number of variables. For the most part it was concluded that, due to differences in reporting and data collection, the data sources were not always strictly comparable. However, it was also shown that many of the differences arose from variations in coverage and that regional distribution discrepancies tended not to be as severe as a first glance at the raw data would suggest. It was decided that a comprehensive set of indicators should be used in the socio-economic profile in the following chapter and these were identified including population and its components, age, urban

[26] Although the productivity-enhanced measure of employment is available from 1926, certain ancillary variables are available only from 1966 and so the conditional convergence study covers the 1966 to 1996 period.

and rural population, employment, unemployment, industrial output, wages and salaries, industrial composition, investment, income and education.

The chapter concluded with an explanation of the statistical and econometric techniques to be used in describing and explaining the nature and causes of regional disparity over time at the inter-regional and intra-regional level. First, a long-run socio-economic profile of the planning regions that identified their absolute and relative position would comment on the level of regional disparity at particular points in time. This would provide an essentially static view of regional disparity. A more dynamic interpretation of regional disparity would be conceived in the second approach, which involved three phases. First, sigma convergence would be examined for four measures of economic welfare using the variance of the natural log of disposable income, employment and the productivity-enhanced employment rate. Second, the speed of convergence between the leading and lagging regions would be examined and third, the reasons for convergence would be explained by the construction and testing of a number of economic growth equations. Finally, the methodology for the study of the intra-regional situation was identified.

# Chapter Five

# A Longitudinal Study of Irish Regional Disparity

# 1926-1996

## 5.1 Introduction

The following sections analyse the demographic, employment, output and income profiles of the eight regional economies in the Republic of Ireland. The aim of this exercise is to analyse regional disparity in Ireland by examining the absolute and relative position of each region over time. Data are obtained from successive Censuses of Population; Censuses of Industrial Production; Household Budget Surveys; and Labour Force Surveys, as discussed in the previous chapter.

## 5.2 Demographics

Beginning with demographics, Table 5.2a below examines the share of population in each region over the study period, 1926 to 1996. Several points emerge from the table. The East region has increased substantially its share of the national population from 23 per cent in 1926 to almost 39 per cent in 1996 and accounts for by far the largest population share of any region. All of the other regions have experienced a declining share over the period. For example, while the population of the East was less than one and a half times the population of the South West in 1926, the ratio had increased to more than 2.5 by the end of the sample.

Another point worth noting is that in recent years, population share has stabilised in several regions, thus stemming the continuous decline that had taken place up to that point. For example, since 1981, the population share of the West region has been kept constant at 8.3 percent. The South East also shows a fairly stable population share of almost 11 percent from 1981. Results from the last two Census reports also show that population share in the South West and Mid West have remained stable at 15.1 and 8.8 percent respectively. In terms of 1996 population share, the East region is the largest followed by the South West, South East, Mid West, West, Midlands, Donegal and North West and the North East, a ranking that has been in effect since 1966. Prior to this, the Western region had a larger population share than the Mid West with a reversal of their relative positions having taken place. There has been no change in the ranking of the other regions.

**Table 5.2a Share of population in each region; 1926-1996.**

| | 1926 | 1936 | 1946 | 1951 | 1956 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| East | 23.0 | 25.8 | 28.0 | 30.0 | 31.0 | 32.2 | 34.3 | 35.7 | 37.5 | 37.7 | 38.3 | 38.8 |
| South East | 12.2 | 11.9 | 11.7 | 11.5 | 11.5 | 11.4 | 11.1 | 11.0 | 10.9 | 10.9 | 10.9 | 10.8 |
| South West | 17.3 | 16.7 | 16.2 | 15.8 | 15.8 | 15.9 | 15.7 | 15.6 | 15.3 | 15.2 | 15.1 | 15.1 |
| Mid-West | 9.9 | 9.8 | 9.7 | 9.4 | 9.3 | 9.3 | 9.2 | 9.1 | 9.0 | 8.9 | 8.8 | 8.8 |
| West | 11.5 | 11.1 | 10.6 | 10.2 | 10. | 9.7 | 9.2 | 8.7 | 8.3 | 8.3 | 8.3 | 8.3 |
| Donegal NW | 9.4 | 8.8 | 8.2 | 7.9 | 7.5 | 7.1 | 6.6 | 6.3 | 6.0 | 6.0 | 5.9 | 5.8 |
| Midlands | 9.6 | 9.1 | 9.0 | 8.7 | 8.6 | 8.5 | 8.1 | 7.8 | 7.5 | 7.4 | 7.2 | 7.1 |
| North East | 7.1 | 6.8 | 6.6 | 6.4 | 6.3 | 6.1 | 5.9 | 5.8 | 5.6 | 5.6 | 5.5 | 5.4 |
| State | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: Census of Population, various years.

Population change is examined in Table 5.2b, and is expressed in terms of change per 1000 population per period. The table confirms that the East region has enjoyed positive population change over the entire study period with the increase being especially large in the 1970s. Population change has been uniformly positive across the remaining regions from 1971 only, although some regions such as the South West and Mid West experienced gains in population from 1961. Population change for the State as a whole was lowest between 1936 and 1946 when it fell by 5 persons per 1000 and highest between 1971 and 1981 when it increased by 161 persons per 1000.

**Table 5.2b Population change per 1000 population, 1926-1996.**

| | 1926-1936 | 1936-1946 | 1946-1956 | 1956-1961 | 1961-1966 | 1966-1971 | 1971-1981 | 1981-1986 | 1986-1991 | 1991-1996 |
|---|---|---|---|---|---|---|---|---|---|---|
| East | 117 | 82 | 71 | 90 | 92 | 81 | 231 | 43 | 56 | 39 |
| South East | -23 | -19 | -17 | -38 | -1 | 28 | 144 | 62 | 31 | 20 |
| South West | -38 | -38 | -20 | -25 | 12 | 29 | 132 | 25 | 18 | 26 |
| Mid-West | -16 | -17 | -21 | -36 | 15 | 19 | 145 | 27 | 15 | 19 |
| West | -38 | -49 | -36 | -51 | -32 | -19 | 106 | 27 | 17 | 30 |
| Donegal NW | -69 | -68 | -41 | -65 | -49 | -17 | 111 | 24 | 0 | 9 |
| Midlands | -47 | -17 | -33 | -41 | -20 | -8 | 103 | 25 | -3 | 9 |
| North East | -39 | -43 | -17 | -63 | -10 | 27 | 116 | 26 | 11 | 8 |
| State | -2 | -5 | 1 | -3 | 23 | 33 | 161 | 33 | 30 | 27 |

Source: Census of Population, various years.

Across the regions, the Donegal North West and West regions stand out for their especially large population losses over the 1926 to 1971 period; moreover, Donegal North West has also experienced relatively anaemic population growth over the 1980s and 1990s. All regions experienced their highest population gains over the 1971 to 1981 inter-censal period.

Table 5.2c examines the first component of overall population change, i.e. net migration for the eight planning regions and the State as a whole. Out-migration has been a dominant feature of Irish population history and its severity for most regions across much of the period under study is immediately obvious from the table. The State has experienced out-migration for all inter-censal years except the 1971 to 1981 period (when all regions experienced in-migration) and again between 1991 and 1996 (which saw more uneven migration experiences between the regions). The

experience of the East region is different to all other regions; it experienced in-migration across all years except the 1936 to 1946 and the 1981 and 1986 inter-censal periods.

**Table 5.2c Net migration per 1000 population, 1926-1996.**

| | 1926-1936 | 1936-1946 | 1946-1956 | 1956-1961 | 1961-1966 | 1966-1971 | 1971-1981 | 1981-1986 | 1986-1991 | 1991-1996 |
|---|---|---|---|---|---|---|---|---|---|---|
| East | 36 | -11 | 12 | 22 | 14 | 0 | 60 | -29 | 11 | 2 |
| South East | -67 | -74 | -58 | -79 | -47 | -21 | 23 | -23 | -5 | -2 |
| South West | -86 | -79 | -52 | -59 | -28 | -13 | 27 | -21 | -9 | 7 |
| Mid-West | -76 | -77 | -66 | -77 | -29 | -27 | 25 | -25 | -15 | -4 |
| West | -100 | -107 | -74 | -84 | -63 | -47 | 22 | -17 | -9 | 15 |
| Donegal NW | -101 | -98 | -69 | -82 | -68 | -36 | 45 | -15 | -22 | -3 |
| Midlands | -87 | -57 | -67 | -79 | -60 | -48 | 14 | -23 | -30 | -9 |
| North East | -74 | -85 | -52 | -98 | -50 | -18 | 3 | -25 | -1 | -12 |
| State | -57 | -64 | -41 | -47 | -28 | -19 | 36 | -24 | -4 | 1 |

Source: Census of Population, various years.

Out-migration has been the norm across all other regions. The severity of this has, however, lessened in recent times, and some regions such as the West and South West experienced healthy inwards migration between 1991 and 1996 (15 and 7 persons per 1000 respectively). Out-migration was at its highest between 1926 and 1936 for the South West, Midlands and Donegal North West regions (86, 87 and 101 persons per 1000 respectively). Between 1936 and 1946 the West region (107 persons per 1000) experienced its highest level of out-migration while the South East, Mid West and North East regions (79, 77 and 98 persons per 1000 respectively) experienced their highest levels between 1956 and 1961.

**Table 5.2d Natural Increase per 1000 population, 1926-1996.**

| | 1926-1936 | 1936-1946 | 1946-1956 | 1956-1961 | 1961-1966 | 1966-1971 | 1971-1981 | 1981-1986 | 1986-1991 | 1991-1996 |
|---|---|---|---|---|---|---|---|---|---|---|
| East | 82 | 93 | 59 | 67 | 78 | 80 | 170 | 72 | 45 | 38 |
| SE | 45 | 55 | 41 | 41 | 46 | 49 | 121 | 55 | 36 | 23 |
| SW | 47 | 41 | 31 | 34 | 40 | 43 | 105 | 46 | 26 | 19 |
| Mid West | 60 | 60 | 45 | 41 | 44 | 46 | 120 | 52 | 31 | 24 |
| West | 63 | 58 | 38 | 33 | 30 | 28 | 84 | 44 | 26 | 15 |
| Donegal NW | 32 | 30 | 28 | 18 | 20 | 19 | 66 | 39 | 22 | 12 |
| Midlands | 40 | 39 | 34 | 38 | 40 | 39 | 89 | 48 | 27 | 17 |
| NE | 36 | 42 | 35 | 35 | 40 | 45 | 112 | 52 | 29 | 20 |
| State | 55 | 59 | 42 | 45 | 50 | 53 | 125 | 57 | 35 | 26 |

Source: Census of Population, various years.

Table 5.2d examines the second component of population change, i.e. natural increase - the excess of births over deaths - across the regions for the period 1926 to 1996. Natural increase per 1000 population was highest for the State between 1971 and 1981 but has declined dramatically since then. Across the regions, the East accounted for the highest level of natural increase over the entire study period while the Donegal/NW region had the lowest level. While there has been little change in the relative positions of the other regions, the West is an exception to this statement. The West region had the second highest level of natural increase in the 1926-1936 period to the second lowest level in 1991-1996 period, Table 5.2d.

The evolution of the regional distribution may be analysed by expressing regional natural increase relative to the state average and grouping the regions into four equal sized intervals (see Mauro and Pordecca, 1994). The data is given in Table D.1a, appendix D, section D.1. A histogram, Figure 5.2a shows the frequency distribution for the initial and terminal year of the study period. A comparison of the shape of the histograms over time will help ascertain whether there has been convergence of natural increase, which would imply a collapsing of the distribution towards the central classes of relative natural increase.

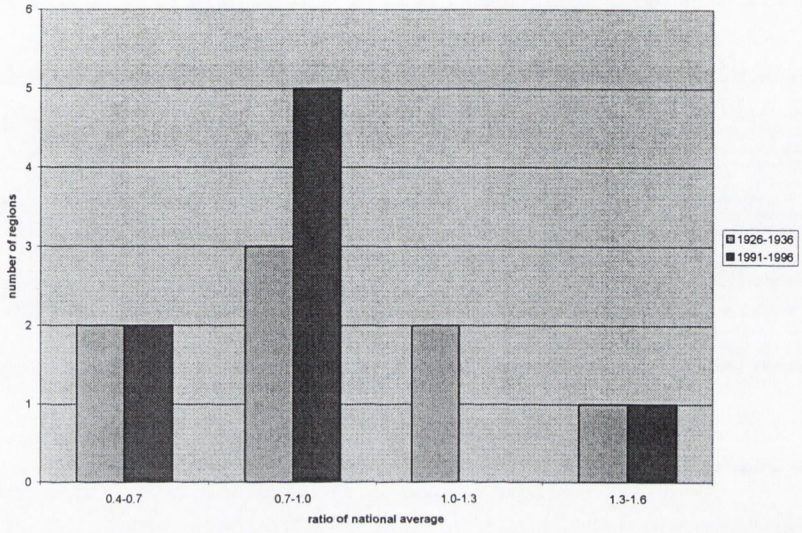


**Figure 5.2a Distribution of natural increase relative to national average, 1926-1996.**

Figure 5.2a shows that there has been relatively little change except in the middle two categories. This is illustrated further by reference to Table 5.2e, which charts the evolution of individual regions over time. In the table, the row index corresponds to the starting relative position and the column index defines the position at the end of the sub-period. The diagonal cells therefore contain the regions whose rate of natural increase relative to the national average occupies the same interval at the beginning and at the end of the same sub-period. The cells off the diagonal to the left indicate a worsening position and the off diagonal cells to the right indicate an improvement.

**Table 5.2e Mobility 1926-1996**

| | **0.4-0.7** | **0.7-1.0** | **1.0-1.3** | **1.3-1.6** |
|---|---|---|---|---|
| **0.4-0.7** | DNW | NE | | |
| **0.7-1.0** | | ML | SE / SW | |
| **1.0-1.3** | West | MW | | |
| **1.3-1.6** | | | | East |

Table 5.2e shows that both the East, Midlands and Donegal/North West regions maintained their relative positions over the study period. The North East, South East and South West improved their relative position, i.e. experienced a higher rate of natural increase while the West experienced a lower rate of natural increase.

### 5.2.1 Urban/Rural Mix

The next issue examined is the urban/rural mix of the regions. The Census of Population has defined aggregate town and aggregate rural areas from 1966 based on a census town size of 1,500. The 1991 census notes that it is not possible to give comparable figures for earlier years due to "the many changes in legally defined boundaries of towns, as well as the practice since the 1961 census of including the suburbs or environs in determining town size" (p. 10). Thus the following tables refer only to data from 1966 in examining the rural/urban mix of the eight planning regions.

Table 5.2.1a examines the aggregate rural share of population over the 1966 to 1996 period. Column two examines the percentage change in the aggregate rural population over the 1966 to 1996 period. The increase was highest in the South East region (12.7%) followed by the East region (11.6%) and lowest in the West (-3%) and Donegal/NW region (-1%).

The share of aggregate rural population for the state as a whole has fallen over the sample period from 50.8 percent in 1966 to 41.9 percent in 1996. The rate of decline has been less rapid in the period from 1981 than from 1966 to 1981, although, the regions all experienced decreases in their share of aggregate rural population. The population mix across all regions except the East and South West remains predominantly rural (i.e. in excess of 50 percent of the population are classified as rural).

**Table 5.2.1a Percentage change and share of aggregate rural population, 1966 to 1996.**

| | Percentage Change | Share of Aggregate Rural Population | | | | | |
|---|---|---|---|---|---|---|---|
| | 1966-1996 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
| East | 11.6 | 17.6 | 16.0 | 14.8 | 14.6 | 14.4 | 13.9 |
| South East | 12.7 | 63.7 | 61.9 | 59.4 | 60.0 | 59.7 | 58.7 |
| South West | 0.30 | 55.8 | 53.4 | 50.6 | 48.3 | 48.0 | 46.4 |
| Mid-West | 6.90 | 64.9 | 61.9 | 58.9 | 58.8 | 58.2 | 58.0 |
| West | -3.0 | 79.3 | 76.4 | 72.7 | 70.9 | 69.6 | 67.7 |
| Donegal/NW | -1.0 | 86.2 | 83.6 | 78.7 | 78.1 | 78.1 | 77.4 |
| Midlands | 2.80 | 65.8 | 62.5 | 59.8 | 58.5 | 58.6 | 58.3 |
| North East | -0.4 | 75.8 | 73.4 | 70.1 | 69.5 | 69.2 | 68.9 |
| State | 3.60 | 50.8 | 47.8 | 44.4 | 43.6 | 43.0 | 41.9 |

Source: Census of Population, various years.

Columns three to seven in Table 5.2.1b - the converse of the previous table shows that all regions experienced an increase in the share of aggregate urban population over the sample period. The share of urban population for the state as a whole increased from 49.2 percent in 1966 to 58.2 percent in 1996. The East region accounts for the highest share of urban population, 86.3 percent in 1996 while the Donegal/NW region accounts for the lowest, 23 percent in 1996. The percentage increase in urban population, column two, has been most remarkable in the Donegal NW (84.5%) and the West region (78.6%). These increases have however, been from a very low base, Table 5.2.1b.

**Table 5.2.1b Percentage change and share of aggregate urban population, 1966 to 1996.**

| | Percentage Change | Share of Aggregate Urban Population | | | | | |
|---|---|---|---|---|---|---|---|
| | 1966-1996 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
| East | 48.6 | 82.4 | 84.0 | 85.2 | 85.4 | 85.6 | 86.3 |
| South East | 39.8 | 36.5 | 38.1 | 40.6 | 40.0 | 40.3 | 41.4 |
| South West | 46.7 | 44.2 | 46.6 | 49.4 | 51.7 | 52.0 | 53.7 |
| Mid-West | 43.6 | 35.1 | 38.1 | 41.1 | 41.2 | 41.8 | 42.1 |
| West | 78.6 | 20.7 | 23.6 | 27.3 | 29.1 | 30.4 | 32.4 |
| Donegal/NW | 84.5 | 13.8 | 16.4 | 21.3 | 21.9 | 21.9 | 23.0 |
| Midlands | 41.6 | 34.1 | 37.4 | 40.2 | 41.5 | 41.4 | 41.7 |
| North East | 41.9 | 24.2 | 26.6 | 29.9 | 30.5 | 30.8 | 31.3 |
| State | 48.5 | 49.2 | 52.2 | 55.6 | 56.4 | 57.0 | 58.2 |

Source: Census of Population, various years.

## 5.2.2 Age

The following paragraphs examine an age profile of regional population at 20-year intervals from 1926 to 1996. Table 5.2.2a examines the proportion of 0-14 year olds for the state as a whole and across the regions.

**Table 5.2.2a Proportion of regional population in the 0-14 age group**

| | 1926 | 1946 | 1966 | 1986 | 1996 |
|---|---|---|---|---|---|
| East | 28.7 | 27.6 | 32.3 | 28.3 | 23.0 |
| South East | 28.7 | 28.5 | 31.9 | 30.0 | 24.4 |
| South West | 29.3 | 26.2 | 30.1 | 28.5 | 23.4 |
| Mid West | 28.9 | 28.0 | 31.0 | 29.6 | 23.9 |
| West | 31.1 | 28.5 | 30.4 | 28.8 | 24.0 |
| Donegal/North West | 29.4 | 27.1 | 28.8 | 29.2 | 24.7 |
| Midlands | 28.7 | 26.5 | 31.6 | 30.0 | 25.0 |
| North East | 29.2 | 27.3 | 30.6 | 29.9 | 25.0 |
| State | 29.2 | 27.5 | 31.2 | 28.9 | 23.7 |

Source: Census of Population.

Over the sample period, the share of 0-14 year olds for the state as a whole was highest in 1966. The proportion of this age group has declined to 23.7 percent in 1996 (the lowest over the entire sample period) from 31.2 percent in 1966. The regional proportion of the population in this age group appears to be quite evenly distributed with the result that the ranking of the regions from the highest to the lowest share varies little from year to year.

The proportion of the population in the 15-64 age group - the economically "active" age group - has been highest for the state as a whole and for all regions in 1996, Table 5.2.2b. It has been lowest in 1966. This pattern is unsurprising in light of the pattern discussed for the 0-14 year olds. The East region has the highest share of its population in this age group for each of the sample years, with the West having the lowest share from 1926 to 1966 and Donegal/North West having the lowest share since then.

**Table 5.2.2b Proportion of regional population in the 15-64 age group**

| | 1926 | 1946 | 1966 | 1986 | 1996 |
|---|---|---|---|---|---|
| East | 64.9 | 59.7 | 59.1 | 62.9 | 67.5 |
| South East | 62.5 | 60.6 | 56.4 | 59.0 | 63.8 |
| South West | 62.0 | 68.2 | 57.9 | 59.5 | 64.5 |
| Mid West | 61.7 | 61.1 | 57.1 | 59.2 | 64.3 |
| West | 57.7 | 58.7 | 55.7 | 57.3 | 62.6 |
| Donegal/North West | 58.7 | 59.7 | 56.6 | 56.5 | 61.6 |
| Midlands | 60.7 | 61.5 | 55.7 | 58.0 | 62.1 |
| North East | 60.4 | 61.3 | 57.4 | 58.6 | 62.7 |
| State | 61.7 | 61.5 | 57.6 | 60.2 | 65.0 |

Source: Census of Population, various years.

The percentage share of the population in the 65 plus age group is examined in Table 5.2.2c. The proportion of the entire state population in this age group increased from 9.1 percent in 1926 to 11.2 percent in 1966 before declining to 10.9 percent in 1986 and subsequently increasing to 11.4 percent in 1996. The East region shows an increase in the proportion of its population in this age category in each year of the study period.

**Table 5.2.2c Proportion of regional population in the 65 plus age group**

| | 1926 | 1946 | 1966 | 1986 | 1996 |
|---|---|---|---|---|---|
| East | 6.4 | 7.3 | 8.6 | 8.8 | 9.7 |
| South East | 8.8 | 10.9 | 11.7 | 11.0 | 11.9 |
| South West | 8.6 | 11.4 | 12.1 | 11.9 | 12.1 |
| Mid West | 9.3 | 10.9 | 11.9 | 11.2 | 11.8 |
| West | 11.2 | 12.7 | 13.9 | 13.8 | 13.5 |
| Donegal/North West | 11.9 | 13.2 | 14.6 | 14.3 | 14.0 |
| Midlands | 10.6 | 12.0 | 12.8 | 12.1 | 13.1 |
| North East | 10.4 | 11.3 | 11.9 | 11.5 | 12.3 |
| State | 9.10 | 10.5 | 11.2 | 10.9 | 11.4 |

Source: Census of Population, various years.

Across the regions, the proportion of the population aged 65 plus was highest in 1996 for all except the Mid West, West, and Donegal/North West, where the 65 plus category was highest in 1966. There is a wide disparity between the proportion of the population in this group across the regions. The East region has by far the lowest proportion of its population aged 65 plus compared to the other regions and especially with reference to the Donegal/North West region where the share of the population in this age group has been highest, exceeding 14 percent since 1966.

## 5.3 EMPLOYMENT

Table 5.3a examines the share of employment in each region over the period 1926 to 1996. The main point to note is that all regions except the East experienced a decline in their share of total employment over the study period; the share of employment in the East region increasing dramatically from 21.6 percent in 1926 to 41.1 percent in 1996.

**Table 5.3a Share of total employment, eight regions.**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| East | 21.6 | 24.7 | 26.3 | 30.1 | 32.7 | 34.8 | 36.8 | 39.8 | 39.8 | 40.3 | 41.1 |
| South East | 12.2 | 11.7 | 11.5 | 11.1 | 10.9 | 10.7 | 10.6 | 10.3 | 10.4 | 10.4 | 10.3 |
| South West | 16.6 | 16.2 | 15.8 | 15.5 | 15.4 | 15.2 | 15.3 | 14.9 | 14.7 | 14.9 | 14.6 |
| Mid-West | 10.0 | 9.5 | 9.5 | 9.2 | 8.9 | 9.0 | 8.8 | 8.8 | 8.9 | 8.8 | 8.7 |
| West | 12.1 | 11.8 | 11.3 | 10.4 | 9.8 | 9.3 | 8.6 | 8.0 | 8.1 | 8.0 | 8.0 |
| Donegal/NW | 10.0 | 9.4 | 8.8 | 8.1 | 7.1 | 6.6 | 6.1 | 5.3 | 5.4 | 5.3 | 5.2 |
| Midlands | 10.1 | 9.5 | 9.9 | 9.0 | 8.8 | 8.3 | 7.7 | 7.3 | 7.3 | 7.0 | 6.8 |
| North East | 7.3 | 7.2 | 7.0 | 6.8 | 6.3 | 6.1 | 6.1 | 5.6 | 5.4 | 5.3 | 5.2 |
| State | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: Census of Population, various years.

This finding is not too surprising given the East's predominant and increasing share of population over the study period. However, the rate of increase of the East's employment share has moderated since 1981 while the employment shares of several other regions have remained steady since then, also reflecting overall population trends discussed earlier. An examination of Table 5.3b further supports this assertion. Table 5.3b examines the percentage change in employment for each of regions for three sample periods, 1926 to 1946, from 1946 to 1971 and from 1971 to 1996.

**Table 5.3b Percentage Change in Total Employment, 1926-1996.**

| | 1926-1946 % | 1946-1971 % | 1971-1996 % |
|---|---|---|---|
| East | 17.5 | 24.9 | 38.3 |
| South East | -9.5 | -17.8 | 20.6 |
| South West | -8.2 | -13.8 | 18.9 |
| Mid-West | -8.0 | -17.7 | 22.5 |
| West | -9.7 | -32.0 | 14.8 |
| Donegal/NW | -15.2 | -38.1 | 6.2 |
| Midlands | -4.5 | -31.5 | 10.5 |
| North East | -7.3 | -21.7 | 5.5 |
| State | -3.2 | -11.0 | 23.9 |

Source: Census of Population, various years.

Table 5.3b shows the large declines in employment experienced by all regions except the East between 1926 and 1946 and, in an even more pronounced manner, over the period, 1946 to 1971. In contrast, the sub-period 1971 to 1996 shows all regions experiencing an increase in employment. And, while the East region experienced the greatest increase in this sub-period, 38.3 percent, the increases in the South East (20.6%), Mid West (22.5%), West (14.8%), and Donegal/North West (6.2%) regions are noteworthy given the large declines recorded in these regions in earlier periods.

### 5.3.1 Agricultural Employment

Table 5.3.1a examines the share of agricultural employment in each region over the period 1926 to 1996. Included in the agricultural total are the numbers employed in agriculture and fishing. The disparity between the East region and the rest of the country is immediately obvious from the table.

**Table 5.3.1a Share of agricultural employment, eight regions.**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| East | 17.1 | 14.4 | 16.5 | 11.0 | 9.2 | 7.6 | 6.2 | 4.1 | 3.9 | 3.9 | 2.7 |
| South East | 54.5 | 52.9 | 53.1 | 47.4 | 43.2 | 38.9 | 33.4 | 23.6 | 22.3 | 20.8 | 16.1 |
| South West | 52.9 | 50.5 | 50.0 | 43.9 | 38.8 | 34.4 | 29.2 | 20.1 | 19.3 | 17.5 | 13.4 |
| Mid-West | 58.1 | 57.9 | 57.0 | 50.8 | 47.1 | 40.0 | 34.5 | 22.8 | 21.1 | 18.9 | 14.3 |
| West | 78.3 | 74.3 | 72.8 | 68.3 | 63.3 | 58.0 | 51.6 | 32.6 | 28.9 | 24.9 | 17.6 |
| Donegal/NW | 74.2 | 72.1 | 69.1 | 62.7 | 57.7 | 53.2 | 45.8 | 28.7 | 24.1 | 20.2 | 15.1 |
| Midlands | 67.9 | 66.9 | 65.6 | 57.4 | 51.7 | 47.3 | 43.2 | 28.8 | 26.5 | 23.9 | 18.3 |
| North East | 64.4 | 59.9 | 57.5 | 49.8 | 44.5 | 39.6 | 32.8 | 23.1 | 21.0 | 19.7 | 15.7 |
| State | 53.4 | 49.6 | 48.5 | 40.7 | 35.6 | 30.9 | 25.9 | 16.6 | 15.3 | 13.8 | 10.2 |

Source: Census of Population, various years.

The share of agricultural employment decreased significantly over the study period across all regions, yet the disparity between the East and the rest of the country and, in particular, the Midlands and West region is still evident in 1996. The decrease for the majority of the regions has been quite dramatic. Agricultural employment has fallen by more than two thirds in every region over the sample period, while the decline exceeded 80 percent for the West, Donegal/North West, Midlands and North East regions, Table 5.3.1b.

**Table 5.3.1b Change and Percentage Change in agricultural employment, 1926-1996.**

| | Change | Percentage Change |
|---|---|---|
| East | -30,615 | -67.6 |
| South East | -59,973 | -73.4 |
| South West | -82,022 | -76.2 |
| Mid-West | -55,147 | -77.2 |
| West | -97,363 | -84.1 |
| Donegal/NW | -80,912 | -88.7 |
| Midlands | -67,449 | -80.5 |
| North East | -46,658 | -81.3 |
| State | -520,139 | -79.5 |

Source: Census of Population, various years.

Despite the large decreases, agricultural employment still accounts for more than 13 percent of total employment in each of the regions except for the East.

## 5.3.2 Manufacturing Employment

The share of manufacturing employment in each region is examined over the period 1926 to 1996, Table 5.3.2a. First, at the beginning of the period, and as in the case of agricultural employment, a large disparity existed between the East region and the other regions, with the East having by far the largest share of employment in the manufacturing sector. By 1996, however, the East showed the lowest share of manufacturing employment. This reversal is quite dramatic and reflects the fact that while the share of manufacturing in the East has declined slightly over the study period, it has more than doubled for the State as a whole. Moreover, while the share of manufacturing employment has continued to increase in most regions since 1971 – and in some cases quite significantly - in the East it has fallen by almost a third over this period. Finally, it can also be

noted that the disparity of manufacturing employment shares between the regions narrows sharply from the beginning to the end of the sample period.

**Table 5.3.2a Share of manufacturing employment, eight regions.**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| East | 17.7 | 20.5 | 21.7 | 24.7 | 26.9 | 26.7 | 26.8 | 21.4 | 18.9 | 17.7 | 16.5 |
| South East | 8.9 | 9.3 | 10.6 | 12.4 | 13.7 | 15.4 | 18.4 | 23.7 | 22.5 | 22.0 | 22.3 |
| South West | 10.2 | 11.2 | 12.5 | 14.9 | 16.6 | 18.5 | 20.0 | 21.1 | 19.8 | 19.7 | 19.3 |
| Mid-West | 8.5 | 8.5 | 9.2 | 10.4 | 11.3 | 15.5 | 17.2 | 20.8 | 22.2 | 20.9 | 22.7 |
| West | 3.9 | 4.3 | 5.1 | 5.8 | 5.6 | 6.6 | 8.3 | 15.4 | 16.1 | 16.0 | 17.6 |
| Donegal/NW | 5.6 | 6.0 | 6.3 | 7.8 | 8.6 | 10.2 | 12.9 | 19.1 | 19.8 | 20.4 | 22.6 |
| Midlands | 7.8 | 5.8 | 6.3 | 8.0 | 8.1 | 8.6 | 10.6 | 17.3 | 17.1 | 17.6 | 19.0 |
| North East | 8.0 | 10.9 | 13.8 | 15.9 | 17.8 | 20.6 | 25.2 | 26.6 | 25.0 | 23.7 | 24.9 |
| State | 9.9 | 11.2 | 12.5 | 15.1 | 16.9 | 18.4 | 20.3 | 20.9 | 19.7 | 19.0 | 19.1 |

Source: Census of Population, various years.

Table 5.3.2b shows the percentage change in manufacturing employment over the period. The catch-up experienced by the West, Mid-West, North East, South East and Donegal/North West regions is more than evident with percentage increases of 221, 146, 140, 124 and 123 percent respectively. These increases reflect much larger increases than in the East, despite much lower overall employment gains in each of these regions over the period, see Table 5.3a.

**Table 5.3.2b Change and percentage change in manufacturing employment; 1926-1996.**

| | Change | Percentage Change |
|---|---|---|
| East | 41,521 | 88.3 |
| South East | 16,618 | 124.2 |
| South West | 16,231 | 78.2 |
| Mid-West | 15,370 | 146.4 |
| West | 12,629 | 220.9 |
| Donegal/NW | 8,537 | 123.0 |
| Midlands | 7,313 | 76.2 |
| North East | 9,917 | 139.7 |
| State | 128,136 | 105.9 |

Source: Census of Population, various years.

### 5.3.3 Industrial Employment

Table 5.3.3a examines the share of industrial employment in each region from 1926 to 1996. Industrial employment includes manufacturing employment plus employment in mining, building, electricity and gas sectors. As would be expected, given the large overlap with manufacturing employment, the industrial employment performance of the regions over time is similar to that found for manufacturing employment. At the beginning of the period, the East region had the highest share in industrial employment (23.6 percent), but by 1996 its position had slipped to having the lowest share of industrial employment, despite this percentage share remaining unchanged over the period. Furthermore, as in the case of manufacturing, less disparity across the regions in employment shares is evident in 1996 compared to the beginning of the period. Similar to the situation for manufacturing, the share of industrial employment has increased from 1971 for most regions except the East, where the share has decreased significantly.

Drudy and MacLaran (1994) attribute the decline in industrial employment in Dublin, which is the dominant county in the East region, to a combination of "market" and "policy induced" factors. The former refers to changing patterns of national and international demand for products and services, advances in technology and increasing internal and external competition. Furthermore, "market" factors such as high land prices, expansion constraints and congestion costs, resulted in the changed pattern of industrial location away from the Dublin area. Among "policy induced" factors, they cite the preoccupation of successive Governments with economic growth without due heed to employment growth, the capital bias of industrial grants and the strong regional orientation of industrial policy (Drudy and MacLaran, 1994).[1]

**Table 5.3.3a Share of industrial employment; eight regions.**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| East | 23.6 | 28.2 | 28.5 | 35.6 | 36.38 | 38.1 | 38.1 | 32.6 | 27.7 | 25.6 | 23.6 |
| South East | 12.7 | 14.8 | 15.6 | 20.7 | 213.4 | 24.5 | 28.1 | 34.4 | 31.1 | 30.1 | 30.7 |
| South West | 13.0 | 15.9 | 17.2 | 22.3 | 24.5 | 27.6 | 30.2 | 32.9 | 29.0 | 28.6 | 27.6 |
| Mid-West | 13.3 | 13.7 | 15.1 | 19.3 | 18.9 | 24.8 | 27.5 | 33.3 | 31.1 | 28.9 | 31.0 |
| West | 5.1 | 7.4 | 7.7 | 10.8 | 11.4 | 14.1 | 16.7 | 25.5 | 24.7 | 24.4 | 26.0 |
| Donegal/NW | 7.1 | 8.8 | 10.4 | 14.6 | 15.3 | 17.7 | 21.4 | 28.3 | 29.0 | 28.7 | 31.3 |
| Midlands | 10.1 | 10.3 | 11.2 | 18.3 | 21.5 | 23.6 | 23.4 | 31.4 | 29.4 | 27.2 | 29.8 |
| North East | 9.7 | 14.6 | 17.8 | 22.9 | 24.0 | 28.2 | 33.3 | 35.5 | 33.3 | 31.0 | 33.0 |
| State | 13.2 | 16.3 | 17.6 | 23.7 | 25.5 | 28.5 | 30.6 | 32.2 | 28.8 | 27.3 | 27.1 |

Source: Census of Population, various years.

Table 5.3.3b examines the actual and percentage change in industrial employment over the 1926 to 1996 period. Industrial employment in the State as a whole increased by 192,232 or by almost 119%. The highest percentage change took place in the West region (259%) and the lowest in the South West (99.7%). Although the percentage increase in industrial employment is quite significant across a number of regions, the actual change shows that this reflects a very low base in 1926.

**Table 5.3.3b Change and percentage change in industrial employment; 1926-1996.**

| | Change | Percentage Change |
|---|---|---|
| East | 64,283 | 102.7 |
| South East | 22,302 | 99.7 |
| South West | 26,373 | 99.7 |
| Mid-West | 19,023 | 116.6 |
| West | 19,522 | 259.0 |
| Donegal/NW | 12,780 | 147.2 |
| Midlands | 14,072 | 112.5 |
| North East | 13,877 | 160.2 |
| State | 192,232 | 118.8 |

Source: Census of Population, various years.

[1] Drudy and MacLaran (1994) note that in more recent times, Government policy has recognised the importance of employment creation.

### 5.3.4 Service Employment

Service sector employment, which includes employment in commerce, insurance, transport, public administration, professions, personal services, entertainment and other is examined in Table 5.3.4a. Table 5.3.4a indicates the increasing dominant role of service sector employment in each region. This is particularly obvious in the East region where almost 74 percent of total employment was located in the services sector in 1996. Furthermore, service sector employment accounts for more than half of all employment in each of the remaining regions. Service sector employment has increased steadily from 1971 for the East region, while the increase for the remaining regions began much earlier in the sample period, albeit from a much lower base. Nevertheless, a significant disparity remains between the East region and the rest in terms of the proportion employed in services. This pattern could be of concern given the critical role that services can play in Ireland (see Bannon and Ward, 1985; O'Farrell, 1996).

**Table 5.3.4a Share of service employment; eight regions.**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| East | 59.3 | 57.4 | 55.0 | 53.4 | 54.0 | 54.3 | 55.7 | 63.4 | 68.4 | 70.6 | 73.7 |
| South East | 32.8 | 32.3 | 31.3 | 31.9 | 35.4 | 36.6 | 38.5 | 42.0 | 46.6 | 49.1 | 53.2 |
| South West | 34.1 | 33.6 | 32.8 | 33.8 | 36.7 | 38.0 | 40.6 | 47.0 | 51.7 | 54.0 | 59.0 |
| Mid-West | 28.7 | 28.4 | 27.9 | 29.9 | 34.0 | 35.2 | 38.1 | 43.9 | 47.7 | 52.2 | 54.7 |
| West | 16.6 | 18.3 | 19.5 | 21.0 | 25.2 | 27.8 | 31.7 | 41.9 | 46.4 | 50.7 | 56.4 |
| Donegal/NW | 18.7 | 19.1 | 20.5 | 22.7 | 27.0 | 29.1 | 32.8 | 43.0 | 46.9 | 51.1 | 53.6 |
| Midlands | 22.0 | 22.8 | 23.2 | 24.3 | 26.8 | 29.2 | 33.3 | 39.9 | 44.2 | 48.9 | 51.8 |
| North East | 25.8 | 25.4 | 24.7 | 27.3 | 31.5 | 32.2 | 33.9 | 41.4 | 45.7 | 49.4 | 51.3 |
| State | 33.4 | 34.0 | 33.9 | 35.6 | 39.0 | 40.6 | 43.5 | 51.3 | 55.9 | 59.0 | 62.7 |

Source: Census of Population, various years.

Table 5.3.4b examines the actual and percentage change in service employment between 1926 and 1996.

**Table 5.3.4b Change and percentage change in service employment; 1926-1996.**

| | Change | Percentage Change |
|---|---|---|
| East | 238,821 | 152.2 |
| South East | 22,350 | 45.4 |
| South West | 43,555 | 62.8 |
| Mid-West | 27,122 | 77.0 |
| West | 34,192 | 139.7 |
| Donegal/NW | 13,704 | 59.6 |
| Midlands | 19,081 | 70.3 |
| North East | 11,973 | 52.1 |
| State | 410,798 | 100.6 |

Source: Census of Population, various years.

The total number of service workers grew by 410,798 between 1926 and 1996, an increase of 100.6 percent. Across the regions, the increase was most marked in the East (152%) and the West (140%). We note that the increase in the West is due to the low base in 1926, when service employment accounted for just 16.6 percent of overall employment - the lowest share compared to all the other regions. On the other hand, the increase in the East region reflects its dominant share of overall service employment, accounting for over 48 percent of the national total in 1996.

## 5.4 UNEMPLOYMENT

Three sources of unemployment data were identified in the previous chapter, the Live Register, Census of Population and the Labour Force Survey. Two of these sources; the Live Register and Labour Force Survey are considered here[2] and the unemployment rate from both of these sources across the eight planning regions is discussed in the following paragraphs. The Live Register returns have the advantage of providing a longer run view of unemployment for the planning regions, although as previously discussed, the Labour Force Survey is considered the more accurate source.

Table 5.4a shows the rate of unemployment for each of the planning regions and the state as a whole for the Census years 1946 to 1996.[3] Despite some caveats with the data,[4] Table 5.4a provides a useful long-run view of regional unemployment rates over the 1946 to 1996 period.

**Table 5.4a Regional unemployment rates, Live Register figures.**

| | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|
| East | 5.5 | 3.7 | 3.3 | 3.5 | 4.7 | 9.1 | 17.7 | 17.6 | 17.8 |
| South East | 3.8 | 2.8 | 2.9 | 3.7 | 4.9 | 10.3 | 18.2 | 19.5 | 19.7 |
| South West | 5.5 | 4.9 | 4.1 | 4.1 | 5.1 | 10.0 | 17.3 | 17.5 | 18.5 |
| Mid-West | 4.4 | 3.6 | 3.9 | 4.4 | 5.7 | 9.5 | 16.9 | 17.2 | 16.6 |
| West | 5.6 | 5.5 | 6.7 | 5.7 | 7.5 | 12.5 | 18.0 | 18.2 | 20.6 |
| Donegal/NW | 7.3 | 7.4 | 8.9 | 7.8 | 10.5 | 16.1 | 21.7 | 21.8 | 22.4 |
| Midlands | 2.0 | 1.6 | 2.7 | 3.6 | 5.2 | 8.2 | 15.6 | 16.1 | 16.6 |
| North East | 2.7 | 2.4 | 3.7 | 4.7 | 5.4 | 10.8 | 19.0 | 20.5 | 20.6 |
| State | 4.8 | 4.0 | 4.2 | 4.3 | 5.6 | 10.1 | 17.8 | 18.1 | 18.5 |

Source: Statistical Abstract, various years.

Using this source, the unemployment rate for the state as a whole in 1946 was just 4.8 percent; the unemployment rate remained quite steady until 1971 but had doubled to 10 percent by 1981. The rate increased dramatically to almost 18 percent by 1986 and rose further to 18.5 percent by 1996. Donegal/NW region had the highest unemployment rate for all years of the study period, while the Midlands generally experienced the lowest unemployment rates.

Expressing the regional totals as a proportion of the overall state total and grouping the regions into four equal sized intervals enables a comparison of the relative regional position over time. Figure

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[2] These data sources provide a larger number of data points than the Census of Population.

[3] In order to arrive at an unemployment rate, i.e. the number unemployed divided by the addition of those employed and unemployed, it was necessary to use the employment data from the Census. This restricted the unemployment rate to the Census years only, even though unemployment totals are available annually from the Live Register. The relatively high values of the unemployment rates have been commented upon in the previous chapter.

[4] Along with the caveats pointed out in chapter 4, the IDA (1972) points out that the live register data for 1961-65 are not strictly comparable with post 1966 data due to a revision in the method of compiling figures. Furthermore, the 1971 data are influenced by the operation of "Employment Period Orders" from 14 April to 16 November 1971.

5.4a illustrates a histogram of the distribution of regions for 1946 and 1996 using these data.[5] A comparison of the shape of the histogram over time helps ascertain whether there has been a convergence of the unemployment rates, across the regions, which would imply a collapse of the distribution towards the central classes of the relative unemployment rate. The histogram does indeed show a convergence of the unemployment position of the regions over the 1946 to 1996 period. The regions are distributed across the middle two intervals. In contrast, the eight regions were distributed across the four frequency intervals in 1946.

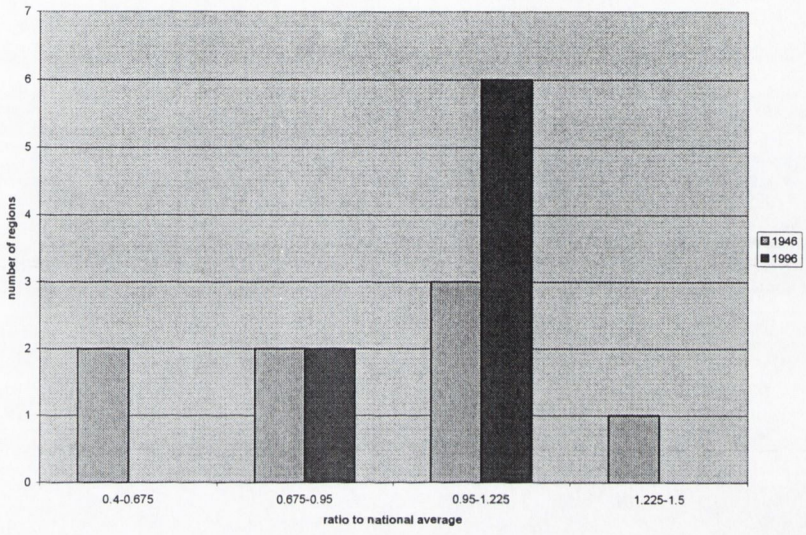


**Figure 5.4a Distribution of unemployment rates relative to national average; 1946-1996.**

The changing relative position of the regions is further illustrated in Table 5.4b below. This charts the evolution of the relative unemployment rates for each of the regions between 1946 and 1996. The table shows that four regions, the Mid-West and the East, West and South West have all maintained their position relative to the national average over the 1946 to 1996 period, while the Midlands, North East and South East have increased their rates of unemployment relative to the national average. Donegal/NW is the only region to have improved its relative position by moving from the fourth to third quartile indicating a decrease in its unemployment rate relative to the national average, Table 5.4b.

**Table 5.4b Mobility table for unemployment rate, 1946-1996.**

| | **0.4-0.675** | **0.675-0.95** | **0.95-1.225** | **1.225-1.5** |
|---|---|---|---|---|
| **0.4-0.675** | | ML | NE | |
| **0.675-0.95** | | MW | SE | |
| **0.95-1.225** | | | E / SW / W | |
| **1.225-1.5** | | | DNW | |

[5] The compiled data is shown in Table D.1b, appendix D, section D.1.

The Labour Force Survey provides a more recent comprehensive account of regional unemployment rates. Published annually from 1983, the following table shows the annual regional unemployment rates from 1983, together with the returns from 1975, 1977 and 1979.

**Table 5.4c Regional unemployment rates, Labour Force figures.**

| | '75 | '77 | '79 | '83 | '84 | '85 | '86 | '87 | '88 | '89 | '90 | '91 | '92 | '93 | '94 | '95 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| E | 9.1 | 9.2 | 6.8 | 14.4 | 15.9 | 18.4 | 18.6 | 18.6 | 17.3 | 16.0 | 14.5 | 16.7 | 16.8 | 17.4 | 15.1 | 14.4 |
| SE | 8.7 | 10.3 | 7.6 | 14.8 | 17.1 | 19.0 | 17.3 | 17.7 | 18.5 | 15.8 | 13.9 | 16.2 | 19.0 | 17.0 | 18.8 | 15.0 |
| SW | 8.9 | 6.6 | 6.2 | 13.3 | 14.7 | 14.6 | 17.3 | 16.8 | 16.2 | 15.1 | 12.7 | 14.0 | 14.1 | 15.0 | 15.6 | 12.9 |
| MW | 9.2 | 9.0 | 6.8 | 14.5 | 13.2 | 14.9 | 14.9 | 16.1 | 13.9 | 14.3 | 13.2 | 14.1 | 14.3 | 15.8 | 14.6 | 10.6 |
| W | 9.0 | 6.8 | 5.3 | 11.0 | 13.6 | 16.4 | 12.9 | 12.7 | 12.1 | 12.4 | 10.0 | 12.4 | 13.9 | 16.1 | 15.5 | 11.8 |
| DNW | 13.1 | 12.5 | 13.1 | 19.9 | 21.8 | 22.6 | 20.7 | 23.7 | 21.9 | 21.4 | 18.3 | 19.7 | 17.8 | 17.6 | 18.4 | 14.6 |
| ML | 7.6 | 7.5 | 3.8 | 10.8 | 11.9 | 15.2 | 14.9 | 14.1 | 13.5 | 14.9 | 12.1 | 14.0 | 16.5 | 16.0 | 13.5 | 10.8 |
| NE | 10.6 | 8.3 | 4.9 | 13.6 | 17.1 | 16.3 | 19.4 | 19.5 | 19.5 | 16.5 | 14.1 | 15.8 | 17.0 | 17.6 | 14.0 | 12.0 |
| Tot | 9.3 | 8.8 | 6.9 | 14.0 | 15.5 | 17.4 | 17.4 | 17.6 | 16.7 | 15.6 | 13.7 | 15.6 | 16.2 | 16.7 | 15.6 | 13.3 |

Source: Labour Force Survey, various years.

The first point to note is that, for the years in which both Live Register and Labour Force Survey data are available, the differences between the two sources can be seen quite clearly. While overall unemployment rates are similar for 1986, the regional breakdown of these rates are very different according to the two sources. Furthermore, in 1991 and 1996, the two other years for which data are available from both sources, the overall unemployment totals are not even close.

Turning to the Labour Force data, it can be seen that while overall unemployment rates declined in the latter part of the 1970s, the rate had escalated dramatically by the mid-1980s. Despite some temporary downturns in the rate, the high overall levels were maintained until 1993. However, between 1993 and 1996 the unemployment rate had fallen to below 13 percent from almost 17 percent. As for the regional breakdown, similar to the Live Register data, it can be seen that the Donegal North-West region has seen the highest unemployment rates for each of the years covered, while the Midlands, once again, generally experienced the lowest rates. More generally, the overall rankings of the regions did not change much during the sample period with Donegal North-West and the North East having the two highest unemployment rates at the beginning and end of the sample, with the Midlands and Mid-West enjoying low rates throughout the sample.

## 5.5 INDUSTRIAL COMPOSITION

Eleven industrial sectors[6] have been combined to arrive at three broad industrial groups, traditional, modern and natural resource industrial establishments for the eight planning regions. Table 5.5a

[6] See Appendix D, section D.3 for a list of these sectors, Table D.3a.

examines traditional establishments as a proportion of total establishments for various years between 1979 and 1996.

**Table 5.5a Traditional establishments as a proportion of total establishments**

| | 1979 | 1981 | 1984 | 1987 | 1990 | 1993 | 1996 |
|---|---|---|---|---|---|---|---|
| East | 55.9 | 53.0 | 51.3 | 50.6 | 48.3 | 48.7 | 47.9 |
| South East | 55.2 | 52.3 | 50.3 | 48.3 | 47.9 | 47.2 | 45.7 |
| South West | 56.3 | 52.3 | 49.4 | 47.9 | 46.6 | 45.7 | 43.6 |
| Mid-West | 49.9 | 45.6 | 44.0 | 44.7 | 42.0 | 34.4 | 33.4 |
| West | 56.3 | 53.0 | 53.1 | 50.3 | 48.3 | 46.6 | 44.4 |
| Donegal/NW | 61.6 | 64.7 | 62.4 | 57.8 | 55.8 | 56.6 | 56.5 |
| Midlands | 55.0 | 53.5 | 51.7 | 50.3 | 49.7 | 46.8 | 46.4 |
| North East | 57.4 | 53.9 | 53.8 | 52.8 | 51.6 | 47.2 | 44.6 |
| State | 55.8 | 53.0 | 51.3 | 50.0 | 48.2 | 46.9 | 45.5 |

Source: Census of Industrial Production, various years.

Traditional industries include the industrial sectors of food, drink and tobacco, paper and paper products, timber and wooden furniture, clothing, footwear and leather and textiles. The decline in the share of the traditional sector over the sample period has been remarkable. In 1979, these industries accounted for at least half of all industrial establishments in each region with the highest concentration in the Donegal/NW region, followed by the North East and the lowest concentration in the Mid-West region. By 1996, just the Donegal/NW region had more than half of its industrial establishments in the traditional industries, while the Mid-West saw its share of such establishments fall to just a third. Overall, the traditiona! sector fell from accounting for almost 56 percent of all industrial establishments in 1979 to under 46 percent of establishments by 1996, less than 20 years later. As for the overall disparity between the regions, this has increased over the sample period, with the percentage gap between the highest ranked and lowest ranked regions increasing from less than 12 percent to 23 percent over the sample period.

**Table 5.5b Modern industrial establishments as a proportion of total establishments**

| | 1979 | 1981 | 1984 | 1987 | 1990 | 1993 | 1996 |
|---|---|---|---|---|---|---|---|
| East | 42.2 | 45.3 | 47.2 | 48.1 | 50.1 | 49.2 | 49.7 |
| South East | 39.3 | 43.1 | 45.0 | 47.8 | 47.9 | 49.2 | 49.9 |
| South West | 39.4 | 44.1 | 47.5 | 49.1 | 50.4 | 50.2 | 51.5 |
| Mid-West | 45.8 | 50.7 | 52.8 | 52.5 | 55.3 | 62.3 | 62.6 |
| West | 38.5 | 42.9 | 43.8 | 46.3 | 48.3 | 50.5 | 51.9 |
| Donegal/NW | 36.0 | 33.2 | 35.8 | 39.7 | 41.9 | 41.2 | 40.8 |
| Midlands | 39.0 | 41.5 | 43.9 | 44.8 | 45.7 | 48.7 | 48.1 |
| North East | 36.9 | 41.1 | 41.2 | 42.6 | 44.6 | 47.6 | 49.4 |
| State | 40.5 | 43.9 | 45.9 | 47.3 | 49.1 | 50.0 | 50.7 |

Source: Census of Industrial Production, various years.

Table 5.5b examines the share of modern industries for the eight regions for various years over the 1979 to 1996 period. Modern industrial establishments comprise chemicals, non-metallic mineral products, metals and engineering and miscellaneous industries. Reflecting the decline in the traditional sector, the share of modern industrial establishments has increased in all regions over the sample period. As also would be expected, from the discussion of the traditional sector, the Mid-West region had the highest share of modern industrial establishments throughout the sample, while Donegal/NW had the lowest share. The disparity between the regions has also increased in

the case of modern establishments throughout the sample, although the West has improved its ranking from last to second from the top over this period.

Natural resource industrial establishments comprise the industrial sectors of mining and quarrying and electricity; these are examined in Table 5.5c below. The share of such establishments is very low for each of the regions and the overall share of such establishments has remained at less than 4 percent at the beginning and end of the sample period, with this share falling below 3 percent in the 1980s. The Midlands and North East have consistently had the highest share of natural resource based establishments, while the East has consistently had the lowest share.

**Table 5.5c Natural resource establishments as a proportion of total industrial establishments**

| | 1979 | 1981 | 1984 | 1987 | 1990 | 1993 | 1996 |
|---|---|---|---|---|---|---|---|
| East | 1.9 | 1.6 | 1.4 | 1.3 | 1.5 | 2.1 | 2.4 |
| South East | 5.5 | 4.6 | 4.7 | 3.9 | 4.1 | 3.6 | 4.4 |
| South West | 4.3 | 3.6 | 3.1 | 2.9 | 3.0 | 4.1 | 4.9 |
| Mid-West | 4.3 | 3.7 | 3.2 | 2.8 | 2.8 | 3.3 | 4.0 |
| West | 5.2 | 4.1 | 3.2 | 3.4 | 3.3 | 2.9 | 3.7 |
| Donegal/NW | 2.3 | 2.0 | 1.8 | 2.5 | 2.3 | 2.2 | 2.7 |
| Midlands | 6.0 | 5.1 | 4.5 | 4.9 | 4.6 | 4.5 | 5.5 |
| North East | 5.7 | 5.0 | 4.9 | 4.6 | 3.8 | 5.2 | 6.1 |
| State | 3.7 | 3.1 | 2.9 | 2.7 | 2.7 | 3.1 | 3.8 |

Source: Census of Industrial Production, various years.

The industrial composition variable is based on the proportion of industrial establishments in each category, reflects the significant changes, which have taken place over the 17-year period from 1979 to 1996. As discussed, the proportion of traditional industrial establishments in each region has decreased with Donegal/NW continuing to have the highest concentration, followed by the East region. The modern category has also witnessed significant change. While the Mid-West region continues to have the highest concentration of its industrial establishments in this category and Donegal/NW having the least, the West region has the second highest concentration of this type of establishment when comparing shares in 1996.

## 5.6 Industrial Output and Wages and Salaries

Two measures of industrial output are considered in this section, namely gross output and net output. The section also considers wages and salaries paid to industrial workers. The data are taken from the Census of Industrial Production for the years 1979 to 1996. Gross output is defined as "the net selling value of all goods manufactured in the year, whether sold or not, including work done and capital assets manufactured for own use. Operating subsidies related to the production or sales of the output are included in the value of gross output; excise duty and VAT are excluded" (p. 192, Census of Industrial Production, 1993). Net output refers to the difference between gross output and industrial input, which consists of the industrial materials, industrial services, and fuel and power used in the production of the output. Net output, which represents the value added to

industrial input, is a more appropriate measure of the relative economic importance of the different sectors (p. 192, CIP, 1993). The Census of Industrial Production provides regional (industrial) output data. These data need to be interpreted with care, however, as they are subject to transfer pricing and compositional effects (i.e. the blend of high value added and low value added industries in a region) that may make it difficult to analyse output movements over time. A further and related difficulty with the output measure, as contained in the CIP, is that it is not disaggregated by industry. Nevertheless, regional output data are extremely useful in that they provide at least some proxy of regional performance over time. The following tables examine the actual and percentage change in output and output per employee for all eight regions over the period 1979 to 1996.[7] The data are in real terms adjusted by the CSO wholesale price index with 1979=100 as the base. Gross output is examined in section 5.6.1 while net output is examined in section 5.6.2. Wages and salaries are examined in section 5.6.3.

### 5.6.1 Gross Output

Table 5.6.1a shows the actual and percentage change in real gross output over the 1979 to 1996 period. Gross output in real terms has increased fastest in the North East region (221%) and Mid-West (220%), while Donegal North-West experienced the lowest real increase (111%). Nevertheless, the real increases in all regions have been impressive and the average annual increase for the State as a whole over the sample period has been 6 percent.

**Table 5.6.1a Change and percentage change in gross output; 1979 to 1996.**

| | Actual change (£m 1979) | Percentage change |
|---|---|---|
| East | 4288.8 | 187.5 |
| South East | 1043.9 | 114.2 |
| South West | 2308.4 | 147.8 |
| Mid-West | 1440.4 | 220.4 |
| West | 610.2 | 162.3 |
| Donegal/NW | 256.5 | 111.3 |
| Midlands | 411.9 | 123.3 |
| North East | 1375.1 | 220.9 |
| State | 11735.2 | 168.1 |

Source: Census of Industrial Production, various years.

Table 5.6.1b examines gross output per employee over the 1979 to 1996 period. The table throws up some interesting findings. The North East and South West exhibit by far the highest gross output per employee with Donegal/North West occupying the other extreme. The difference in productivity is also remarkable. For instance, the North East has reported productivity levels more than three times higher than the Donegal/North West region in 1996, although data difficulties such as those arising from transfer pricing should be borne in mind. Besides the strong improvement in

[7] Due to confidentiality requirements, earlier data did not include all industrial activity at the regional level, see chapter four.

the North East's position, the relative productivity levels of the regions does not change very much over the sample period.

**Table 5.6.1b Gross output per employee, various years, 1979 to 1996.**

| | 1979 | 1981 | 1984 | 1987 | 1990 | 1993 | 1996 |
|---|---|---|---|---|---|---|---|
| East | 23.4 | 24.0 | 31.5 | 38.5 | 48.4 | 52.5 | 79.2 |
| South East | 35.3 | 32.9 | 42.9 | 51.6 | 57.4 | 66.2 | 72.3 |
| South West | 44.5 | 45.4 | 65.3 | 73.5 | 86.9 | 97.4 | 113.3 |
| Mid-West | 32.7 | 33.9 | 46.6 | 48.4 | 49.9 | 60.7 | 83.2 |
| West | 25.7 | 35.1 | 62.7 | 71.3 | 68.6 | 65.5 | 55.3 |
| Donegal/NW | 21.2 | 22.3 | 22.6 | 26.0 | 26.5 | 29.2 | 32.8 |
| Midlands | 26.0 | 28.0 | 34.0 | 36.5 | 44.5 | 51.6 | 52.4 |
| North East | 35.9 | 35.5 | 45.5 | 63.8 | 71.3 | 100.6 | 123.7 |
| State | 29.8 | 30.7 | 42.0 | 49.7 | 57.0 | 64.8 | 80.5 |

Source: Census of Industrial Production, various years.

The relative position of the regions may be analysed more thoroughly by expressing regional gross output per employee relative to the state average and then grouping the region's scores into four equal sized intervals.[8] Figure 5.6.1a shows the frequency distribution for 1979 and 1996. It suggests that the relative position of the regions has experienced change over the study period, with the regions evenly distributed across the four intervals in 1996.

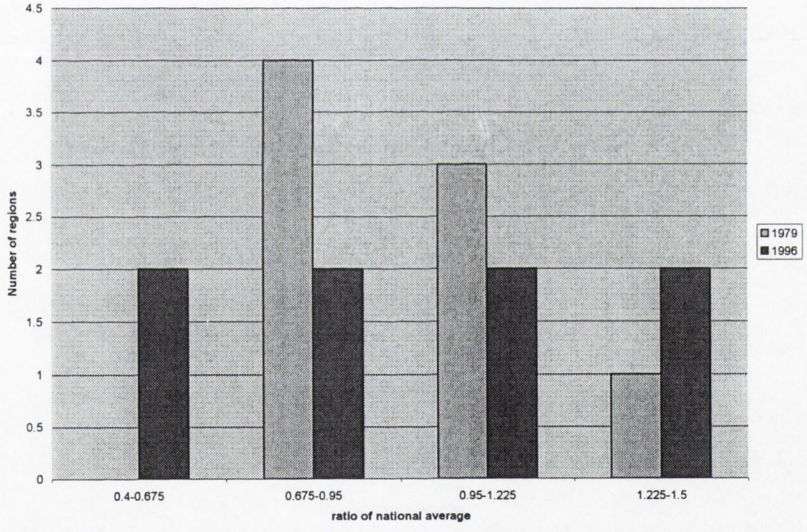


**Figure 5.6.1a Distribution of gross output per employee relative to national average,'79-'96.**

Table 5.6.1c shows the evolution of the regions between 1979 and 1996 relative to the national average. The West and Mid-West maintained their relative position in the second and third quartiles respectively, while the South West maintained its relative position in the fourth quartile. Donegal/NW and the Midlands region have moved from the second to first quartile over the study period and have thus experienced a disimprovement in their position relative to the state average. Similarly, the South East has experienced a disimprovement by moving from the third to second quartile while the East and North East regions have improved their positions by moving from the second and third quartiles to the third and fourth quartiles respectively.

**Table 5.6.1c Mobility table for gross output per employee; eight regions.**

| | 0.4-0.675 | 0.675-0.95 | 0.95-1.225 | 1.225-1.5 |
|---|---|---|---|---|
| **0.4-0.675** | | | | |
| **0.675-0.95** | DNW / ML | W | E | |
| **0.95-1.225** | | SE | MW | NE |
| **1.225-1.5** | | | | SW |

## 5.6.2 Net Output

Table 5.6.2a shows the actual change and percentage change in net output for each region from 1979 to 1996. The table shows that each region has increased the level of net output significantly in real terms over this period. The North East shows the highest increase, almost 400 percent followed by the South West (297%), while the Midlands and Donegal/NW show the lowest increases of 167 percent and 174 percent respectively. Overall, the percentage changes in net output are even higher than in the case of gross output, with an annual average increase of 8 percent over the sample period.

**Table 5.6.2a Change and percentage change in net output; 1979 to 1996.**

| | Actual change (£m, 1979) | Percentage change |
|---|---|---|
| East | 2756.3 | 292.2 |
| South East | 605.8 | 208.9 |
| South West | 1505.8 | 297.4 |
| Mid-West | 604.5 | 275.1 |
| West | 375.1 | 258.0 |
| Donegal/NW | 119.1 | 173.5 |
| Midlands | 168.3 | 166.8 |
| North East | 781.4 | 399.5 |
| State | 6916.3 | 280.0 |

Source: Census of Industrial Production, various years.

Net output per employee is examined in Table 5.6.2b. As might be expected, the relative rankings of net productivity is almost identical to that of gross "productivity". More surprising, perhaps, the gap between the most productive and least productive region is even higher than in the case of gross productivity. Net output per employee is for example, almost five times higher in the North East than in Donegal/North West in 1996.

**Table 5.6.2b Net output per employee, various, 1979 to 1996 - £000.**

| | 1979 | 1981 | 1984 | 1987 | 1990 | 1993 | 1996 |
|---|---|---|---|---|---|---|---|
| East | 9.7 | 10.3 | 14.6 | 18.8 | 25.1 | 27.5 | 44.5 |
| South East | 11.2 | 12.9 | 15.0 | 19.1 | 21.5 | 30.3 | 33.1 |
| South West | 14.4 | 17.2 | 26.8 | 29.9 | 36.9 | 44.4 | 58.9 |
| Mid-West | 11.0 | 12.5 | 17.9 | 18.2 | 19.0 | 23.1 | 32.8 |
| West | 9.9 | 12.6 | 23.1 | 30.7 | 37.5 | 36.9 | 29.2 |
| Donegal/NW | 6.3 | 6.8 | 8.0 | 10.3 | 10.8 | 12.2 | 12.6 |
| Midlands | 7.9 | 8.6 | 10.7 | 12.6 | 14.1 | 17.0 | 18.9 |
| North East | 11.3 | 11.9 | 16.2 | 29.4 | 32.8 | 49.5 | 60.5 |
| State | 10.5 | 11.8 | 16.8 | 21.2 | 25.7 | 30.6 | 40.4 |

Source: Census of Industrial Production, various years.

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[8] The underlying data is given in Appendix D, Section D.1, Table D.1c.

The position of the regions relative to the national average is summarised by Figure 5.6.2a for 1979 and 1996.[9] Figure 5.6.2a shows significant movement of the regions over the 1979 to 1996 period.

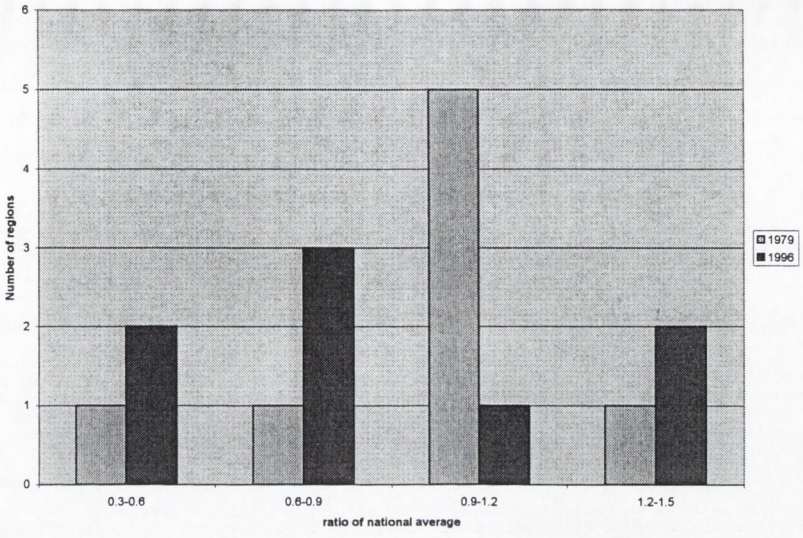


**Figure 5.6.2a Distribution of net output per employee relative to national average, '79-'96.**

More detailed information on the changing relative position of the regions is given in Table 5.6.2c. Donegal/North West and the South West maintained their relative positions in the first and fourth quartile respectively. The East region continues to occupy the third quartile. All of the other regions have experienced a change in their relative position vis-à-vis the national average. Two regions have improved their relative positions, the Midlands (a movement from the first to second quartile) and the North East (a movement from the third to fourth quartile) while the position of the West, Mid-West and South East regions has worsened (a movement from the third to second quartile).

**Table 5.6.2c Mobility table for net output; eight regions.**

| | **0.3-0.6** | **0.6-0.9** | **0.9-1.2** | **1.2-1.5** |
|---|---|---|---|---|
| **0.3-0.6** | DNW | ML | | |
| **0.6-0.9** | | | | |
| **0.9-1.2** | | MW/W/SE | E | NE |
| **1.2-1.5** | | | | SW |

## 5.6.3 Wages and Salaries

The actual and percentage change in real wages and salaries for industrial employment is examined in Table 5.6.3a. The data are from 1979 to 1996 and have been adjusted by the consumer price index with 1979 = 100. Several interesting features emerge from the table. While, the largest increases have taken place in the Mid-West and Donegal/NW regions, these were two of the regions that exhibited the smallest increases in net output per head over the same period (see Table

[9] The underlying data is given in Appendix D, Section D.1, Table D.1d.

5.6.2b). The low rates of increase of real wages in the regions - especially compared with real net output increases - is also noteworthy. Perhaps it is possible to infer from these findings that transfer pricing may have played a large role in the net output increases.[10] Overall, the state saw real wages increases of 24.5 percent over the period – or by just 1.3 percent per annum - with the East region registering the lowest increase of 10.4 percent in its real wage bill.

**Table 5.6.3a Actual and percentage change in wages and salaries; 1979-1996.**

| | Actual change | Percentage change |
|---|---|---|
| East | 48.4 | 10.4 |
| South East | 31.6 | 27.1 |
| South West | 36.8 | 22.5 |
| Mid-West | 56.1 | 63.0 |
| West | 28.0 | 48.8 |
| Donegal/NW | 21.9 | 59.0 |
| Midlands | 18.2 | 38.3 |
| North East | 14.7 | 21.3 |
| State | 255.5 | 24.5 |

Source: Census of Industrial Production, various years.

Table 5.6.3b examines the wages and salaries per employee over the 1979 to 1996 period for each of the planning regions and the state as a whole. It can be seen that average real wages per employee for the state as a whole increased by 24%. This was similar to the wage bill increase, reflecting little change in employment in the industrial sector between 1979 and 1996. The East, North East and Mid-West saw the largest increase in their respective average real wage - some 30 percent – with the South East registering the lowest increase (22 percent). The East region has consistently had the highest average real wages over the sample period, followed by the South West and Donegal North West, while the West has had the lowest wages throughout the sample.

**Table 5.6.3b Wages and salaries per employee; eight regions, £000 (1979)**

| | 1979 | 1981 | 1984 | 1987 | 1990 | 1993 | 1996 |
|---|---|---|---|---|---|---|---|
| East | 4.8 | 4.6 | 4.8 | 5.2 | 5.5 | 5.9 | 6.2 |
| South East | 4.5 | 4.4 | 4.3 | 5.1 | 5.1 | 5.3 | 5.5 |
| South West | 4.7 | 4.6 | 4.8 | 5.2 | 5.3 | 5.7 | 5.9 |
| Mid-West | 4.5 | 4.4 | 4.8 | 5.2 | 5.4 | 5.6 | 5.8 |
| West | 3.9 | 3.9 | 4.0 | 4.5 | 4.6 | 5.0 | 4.8 |
| Donegal/NW | 4.7 | 4.6 | 4.8 | 5.2 | 5.3 | 5.7 | 5.9 |
| Midlands | 4.5 | 4.4 | 4.8 | 5.2 | 5.4 | 5.6 | 5.8 |
| North East | 4.0 | 3.9 | 4.1 | 4.5 | 4.7 | 4.9 | 5.2 |
| State | 4.5 | 4.3 | 4.5 | 4.9 | 5.1 | 5.4 | 5.6 |

Source: Census of Industrial Production, various years.

Figure 5.6.3a shows the distribution of wages and salaries per employee relative to the national average for 1979 and 1996.[11]

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[10] An examination of remainder of net output (net output minus wages and salaries) would therefore show large increases over the sample period.

[11] The underlying data is given in Appendix D, Section D.1, Table D.1e.

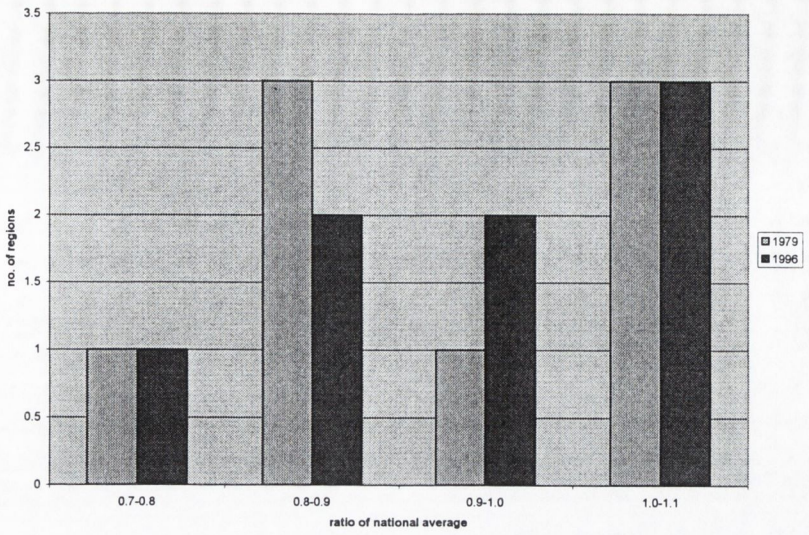


**Figure 5.6.3a Distribution of wages and salaries per employee relative to national average, 1979-1996.**

As suggested by the data in Table 5.6.3b, there has not been much movement in the regional distribution of wages and salaries per employee between 1979 and 1996. The distribution of regions has remained broadly stable as shown in Figure 5.6.3a.. Table 5.6.3c examines the relative position of the regions in greater detail.

**Table 5.6.3c Mobility table for wages and salaries, 1979-1996.**

| | **0.7-0.8** | **0.8-0.9** | **0.9-1.0** | **1.0-1.1** |
|---|---|---|---|---|
| **0.7-0.8** | DNW | | | |
| **0.8-0.9** | | W / ML | NE | |
| **0.9-1.0** | | | | MW |
| **1.0-1.1** | | | SE | E / SE |

This shows that only three regions have changed their position relative to the national average between 1979 and 1993. The Mid-West improved its relative postion by moving from the third to fourth quartile and the North East improved its position by moving from the second to third quartile. On the other hand, the South East worsened its position by falling from the fourth to third quartile. Donegal/NW continues to occupy the bottom quartile while the Midlands and West remain in the second quartile and the East and South West maintained their position in the top quartile.

## 5.7 INVESTMENT

Investment data discussed below relates to industrial investment only. Specifically, the variable discussed comprises the net additions to capital stock as reported in the Census of Industrial

Production. Earlier data are available from An Foras Forbartha,[12] as noted in the previous chapter. However, this section discusses the data from 1979 to 1996 only. Table 5.7a examines real investment per employee for each of the regions and the state as a whole from 1979 to 1996. The data are adjusted by the wholesale price index (1979 = 100).

**Table 5.7a Industrial investment data per employee. 1979-1996.**

| | 1979 | 1981 | 1984 | 1987 | 1990 | 1993 | 1996 |
|---|---|---|---|---|---|---|---|
| East | 13.6 | 13.3 | 13.3 | 14.6 | 22.3 | 41.9 | 46.8 |
| South East | 25.5 | 15.5 | 11.0 | 14.5 | 21.7 | 23.2 | 34.6 |
| South West | 38.4 | 20.4 | 26.1 | 26.4 | 43.4 | 68.3 | 54.1 |
| Mid-West | 22.9 | 30.7 | 19.3 | 17.1 | 26.0 | 24.2 | 43.2 |
| West | 13.0 | 12.4 | 19.5 | 17.0 | 18.4 | 11.4 | 26.3 |
| Donegal/NW | 11.3 | 8.4 | 10.8 | 11.5 | 21.4 | 20.0 | 12.3 |
| Midlands | 28.0 | 13.4 | 10.7 | 12.5 | 18.2 | 16.7 | 19.5 |
| North East | 14.5 | 8.8 | 14.2 | 16.2 | 23.9 | 21.9 | 29.2 |
| State | 20.1 | 15.5 | 15.6 | 16.6 | 25.3 | 35.4 | 39.4 |

Source: Census of Industrial Production, various years.

Overall, for the state as a whole, real investment per employee almost doubled over the sample period. The South West region showed by far the highest level of investment per employee over the period (although the East region in particular has significantly narrowed the gap over the period), while Donegal/NW region displayed the lowest.[13] In addition to the wide spread disparity seen above in investment levels, the rates of change of such investment has varied dramatically across the regions, ranging from an increase of more than 244 percent in the East region to a decline of 30 percent in the Midlands. This is illustrated further by an examination of the following figure. Figure 5.7a shows a distribution of the regions based on their relative position to the national average for 1979 and 1996.[14]

As expected from the discussion of the underlying data, there has not been a convergence of investment per employee between 1979 and 1996. Indeed the relative position for a number of regions has worsened, shown by a movement into the bottom quartile of the distribution.

[12] See Appendix E, Section E.3.
[13] The West recorded particularly low investment levels in 1993, however,
[14] The underlying data is given in Appendix D, Section D.1, Table D.1f.

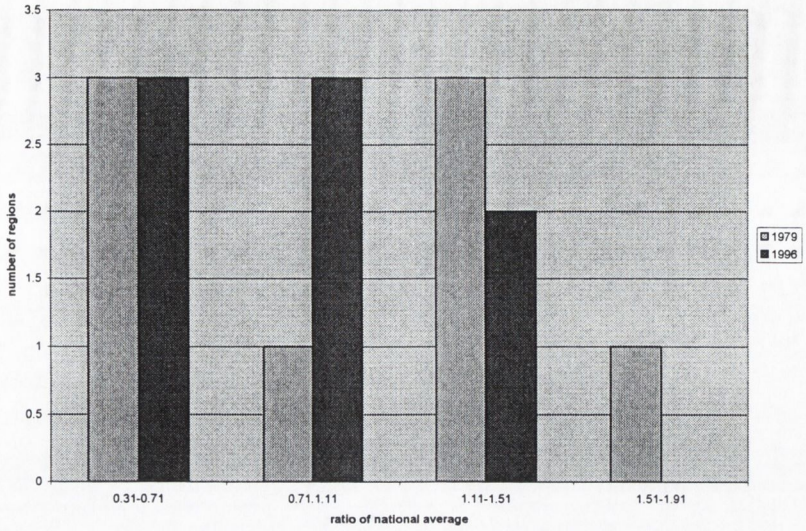


**Figure 5.7a Distribution of investment per employee relative to national average, '79-96**

Table 5.7b makes even more explicit the changing regional position shown by Figure 5.7a. Just three regions, the West, Donegal/NW and North East maintained their relative position between 1979 and 1996. The latter stayed in the second quartile while the former two regions continued to occupy the bottom quartile. The East region improved its relative position by moving from the first to third quartile, while all the other regions worsened their relative positions.

**Table 5.7b Mobility table for investment per employee, 1979-1993.**

| | **0.31-0.71** | **0.71-1.11** | **1.11-1.51** | **1.51-1.91** |
|---|---|---|---|---|
| **0.31-0.71** | W / DNW | | E | |
| **0.71-1.11** | | NE | | |
| **1.11-1.51** | ML | SE / MW | | |
| **1.51-1.91** | | | SW | |

## 5.8 INCOME

The data issues discussion in chapter four suggested two measures of regional income - gross value added and household income. As noted, the former is a recent construct[15] and "is a measure of the value of the goods and services produced in a region priced at the value which the producers received minus any taxes payable and plus any subsidies receivable as a consequence of their production or sale" (CSO, 1998). The latter variable is sourced from the Household Budget Survey, which has been published at seven yearly intervals from 1973.[16] GVA differs from household income as noted in chapter four and is "one of the principal concepts used in deciding eligibility for structural funds" (CSO, 1998). Nevertheless, it is considered here as a precursor to a more detailed analysis of income measures as contained in the Household Budget Survey. Five measures of income/expenditure are examined – direct income, disposable income, expenditure,

[15] Regional accounts were first published in 1996 in respect of 1991. The latest accounts are for 1996.

direct taxation and state transfers. The data have been adjusted for the consumer price index, with 1994=1 and, therefore, represent annual income per person in 1994 prices.

To ensure consistent treatment over the sample period, it was necessary to combine the North East and Donegal/NW planning regions for 1973, 1980 and 1987 from the Household Budget Survey in order to make the data compatible with the 1994 data for the Border regional authority. Second, the Dublin and Mid-East regional authority were combined to arrive at a 1994 figure for the East planning region. It was not possible however, to extricate Roscommon from the West regional authority in 1994.[17] GVA data uses the regional authority as the reporting unit. Once again, the data have been adjusted by the consumer price index with 1994=1.

### 5.8.1 Gross Value Added

Table 5.8.1a examines GVA per person for the period 1991 to 1996. The data are in real terms with 1994=1.

**Table 5.8.1a GVA per person, 1994=1.**

| | % change 1991-1996 | 1991 £ | 1992 £ | 1993 £ | 1994 £ | 1995 £ | 1996 £ |
|---|---|---|---|---|---|---|---|
| East* | 41.1 | 8999 | 9341 | 9826 | 10798 | 11938 | 12695 |
| South East | 34.6 | 6973 | 7350 | 7964 | 8277 | 8628 | 9387 |
| South West | 40.0 | 8003 | 8603 | 9500 | 9635 | 10629 | 11204 |
| Mid-West | 31.5 | 7167 | 7581 | 7841 | 8552 | 9030 | 9425 |
| West | 31.6 | 5875 | 6066 | 6279 | 6375 | 7109 | 7729 |
| Border | 26.3 | 6402 | 6688 | 6910 | 7236 | 7550 | 8087 |
| Midlands | 25.0 | 5625 | 5785 | 6209 | 6266 | 6515 | 7032 |
| State | 36.9 | 7672 | 8035 | 8517 | 9058 | 9854 | 10506 |

* East region includes Dublin and Mid-East regional authorities.
Source: Regional Accounts, 1991-1996.

GVA per person has increased for all the regions over the 1991 to 1996 period. The largest increase took place in the East region (41%), which includes Dublin and the Mid-East regional authorities, while the smallest increase took place in the Midlands region (25%). The ranking of the regions is unchanged between 1991 and 1996, with the East occupying the top position with the Midlands occupying the bottom position throughout the sample period. The relative disparity between the start and end year of the period has also increased. For example, the East region is 80 percent better-off than the Border region in 1996 compared with a 60 percent difference in 1991.

Figure 5.8.1a examines an index of GVA per person relative to the national average for the start and end years of the sample, 1991 and 1996 respectively.[18] The histogram shows no convergence

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[16] The latest data available is for 1994/1995.
[17] As noted in chapter 4, Roscommon is part of the Midlands planning region.
[18] The underlying data is given in Appendix D, section D.1, Table D.1g.

of the regions over this period. The number of regions in each category has remained more or less stable over the period.

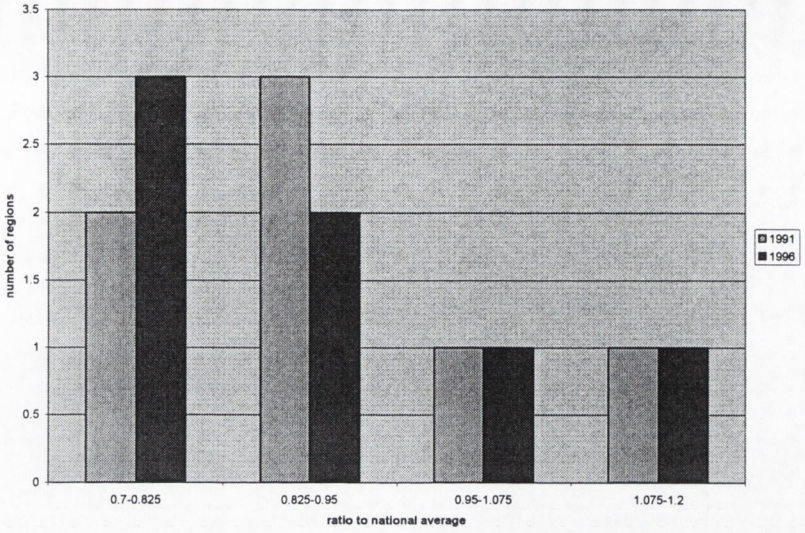


**Figure 5.8.1a Distribution of GVA per person relative to national average, 1991 and 1996.**

Table 5.8.1b summarises in greater detail the results from Figure 5.8.1a. This table shows the start and end position (1991 and 1996 position respectively) of each region. The lack of mobility suggested by Figure 5.8.1a is borne out by this table. The Midlands and West region maintained their relative position in the first quadrant while the Mid-West and South East remained in the second quadrant when comparing the 1996 relative position with that in 1991. Moreover, the South West and East regions retain their relative positions in the third and fourth quadrants respectively. The Border region is the only region to have changed its relative position over time - it has improved its position relative to the national average by moving from the first to second quadrant.

**Table 5.8.1b Mobility table for GVA per person.**

| | 0.7-0.825 | 0.825-0.95 | 0.95-1.075 | 1.075-1.2 |
|---|---|---|---|---|
| **0.7-0.825** | ML / W | Border | | |
| **0.825-0.95** | | MW / SE | | |
| **0.95-1.075** | | | SW | |
| **1.075-1.2** | | | | E |

The lack of convergence in GVA per person suggested by Figure 5.8.1a and illustrated by Table 5.8.1b above has been shown elsewhere using a different methodology, see Boyle, McCarthy and Walsh (1999).[19]

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[19] Boyle and McCarthy (1997, 1999) use two measures of convergence - $\sigma$ = ($varY_{ti}$)/Mean ($Y_{ti}$)/ Var ($Y_{t0}$)/Mean($Y_{t0}$) and $\gamma$ a measure of rank concordance where $\gamma$ = var($RY_{ti}$+$RY_{t0}$)/Var($RY_{t0}$*2). Var(Y) refers to the variance of the particular measure of economic welfare for the cross section of regions; and Var(RY) is the corresponding variance of the ranks; $t_i$ refers to year i and $t_0$ is the base year. The authors find no evidence of $\sigma$ convergence over the six years, 1991 to 1996 but do find some evidence of $\gamma$ convergence in

### 5.8.2 Household Budget Survey Income Measures

Table 5.8.2a examines the percentage change in direct income per person between 1973-1994 and direct income per person for 1973, 1980, 1987 and 1994 for each of the eight regions and the state as a whole.

**Table 5.8.2a Annual Direct Income per person, 1973-1994.**

| | Percentage Change 1973-1994 | 1973 £ | 1980 £ | 1987 £ | 1994 £ |
|---|---|---|---|---|---|
| East | 60.8 | 3575 | 4370 | 4320 | 5748 |
| South East | 16.4 | 3208 | 3066 | 3250 | 3735 |
| South West | 28.0 | 3128 | 3607 | 3532 | 4003 |
| Mid-West | 39.7 | 2797 | 3167 | 3791 | 3906 |
| West | 74.0 | 2343 | 2835 | 3227 | 4078 |
| Border | 55.4 | 2332 | 2591 | 2764 | 3625 |
| Midlands | 66.5 | 2381 | 3247 | 2964 | 3965 |
| State | 49.6 | 3040 | 3577 | 3679 | 4550 |

Source: Household Budget Survey, various years.

Over the 1973-1994 period, direct income per person increased by almost 50 percent for the state as a whole. The percentage change was highest in the West[20] region followed by the Midlands. These two regions along with the Border region had the lowest level of income per person in 1973. Income per person has been consistently highest in the East region and it showed a direct income increase of 60.8 percent over the period, considerably higher than the state average. The lowest increase took place in the South East (16.4%) which has slipped from having the second highest level of income per person in 1973 to the third lowest in 1994. Direct income per person has been consistently lowest in the Border region, but has increased by 55.4 percent over the period, higher than the overall state increase.

The pattern of disparity between the regions may be examined using a histogram and mobility table.[21] Figure 5.8.2a examines a histogram of this data for 1973 and 1994. The regions are spread across the four intervals in 1973 indicating disparity. By 1994, a number of the regions have moved into the second quartile while one region remains in the bottom and top quartile. Thus there has been some narrowing of the disparity between the regions in 1994, but a complete convergence has not taken place.

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1994 and 1995, although this derives from an altering in the ranking of those regions, which were initially the most lowly ranked. Similarly, the authors find no evidence of $\sigma$ convergence or $\gamma$ convergence when using GVA per capita at factor cost.

[20] Note that the West region in 1994 contains Roscommon while the Midlands region does not. It is unlikely that the story would be significantly different were Roscommon to join the Midlands.

[21] The underlying data is given in Appendix D, section D.1, Table D.1h.

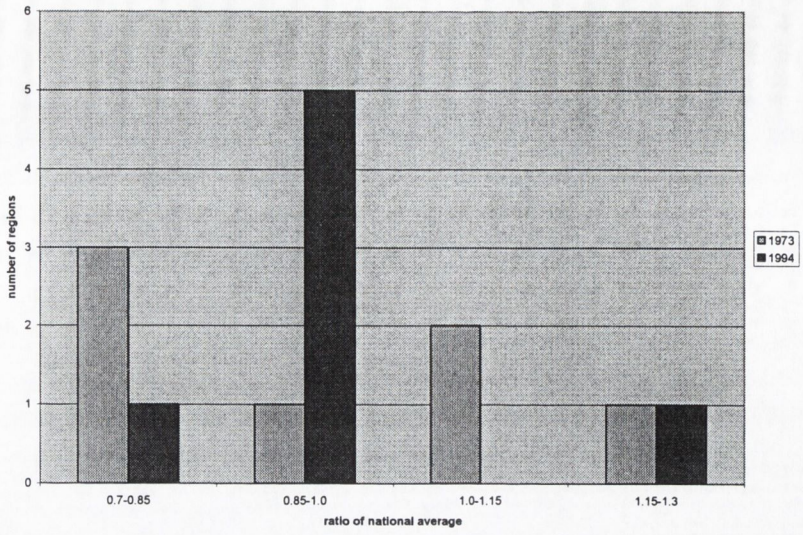


**Figure 5.8.2a Distribution of direct income per person relative to national average, '73-'94.**

Further information on the mobility of the regions is examined in Table 5.8.2b below. Table 5.8.2b shows that the Border region and the East region have maintained their relative position at the bottom and top quartiles respectively. The Mid-West has also maintained its position in the second quartile. The West and Midlands region have significantly improved their relative positions by moving from the bottom to second quartile, indicating a marked increase in direct income per person in these regions relative to the national average. The South East and South West experienced a decline in their direct income per person relative to the national average, having moved from the third to second quartile in Table 5.8.2b.

**Table 5.8.2b Mobility table for direct income, 1973-1994.**

| | **0.7-0.85** | **0.85-1.0** | **1.0-1.15** | **1.15-1.3** |
|---|---|---|---|---|
| **0.7-0.85** | BOR | West / ML | | |
| **0.85-1.0** | | MW | | |
| **1.0-1.15** | | SE / SW | | |
| **1.15-1.3** | | | | East |

Table 5.8.2c examines disposable income per person for the seven regions. We would expect a similar picture to direct income to emerge and indeed this turns out to be the case. First, disposable income per person has increased by 47 percent for the state as a whole over the 1973 to 1994 period, and this is similar to the increase in direct income. The largest increases were again experienced by the West and Midlands regions (62 and 61 percent respectively). The lowest increase was once again recorded in the South East (21 percent). Once again, the percentage increases for the West and Midlands regions come from a low base – both of these regions and the Border region had the lowest levels of disposable income per person in 1973.

**Table 5.8.2c Annual Disposable Income per person, 1973-1994.**

| | Percentage Change 1973-1994 | 1973 £ | 1980 £ | 1987 £ | 1994 £ |
|---|---|---|---|---|---|
| East | 56.4 | 3332 | 3861 | 3948 | 5211 |
| South East | 20.9 | 3280 | 3171 | 3399 | 3967 |
| South West | 31.1 | 3168 | 3491 | 3513 | 4152 |
| Mid-West | 39.9 | 2945 | 3200 | 3717 | 4120 |
| West | 62.4 | 2588 | 3015 | 3435 | 4202 |
| Border | 54.8 | 2564 | 2823 | 3213 | 3968 |
| Midlands | 61.0 | 2591 | 3240 | 3124 | 4173 |
| State | 47.2 | 3050 | 3426 | 3622 | 4491 |

Source: Household Budget Survey, various years.

Figure 5.8.2b[22] examines the position of the regions relative to the state average for the start and end years of the sample period. There has been some narrowing of the distribution between 1973 and 1994, indicated by a movement of the regions towards the centre of the graph. However, convergence has not taken place because two regions remain in the bottom quartile and one in the top.

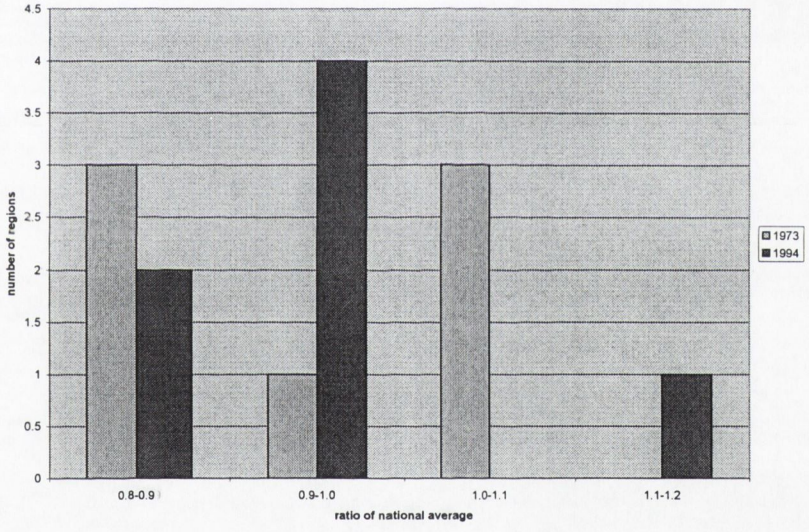


**Figure 5.8.2b Distribution of disposable income per person relative to national average, 1973-1994.**

Table 5.8.2d examines the mobility of the regions between these two dates. The East and Border regions have maintained their relative position at the top and bottom quartiles respectively while the Mid-West region remains in the second quartile.

**Table 5.8.2d Mobility table for disposable income, 1973-1994.**

| | **0.8-0.9** | **0.9-1.0** | **1.0-1.1** | **1.1-1.2** |
|---|---|---|---|---|
| **0.8-0.9** | BOR | West / ML | | |
| **0.9-1.0** | | MW | | |
| **1.0-1.1** | SE | SW | | East |
| **1.1-1.2** | | | | |

[22] The underlying data is given in Appendix D, section D.1, Table D.1i.

The West and Midlands region have, once more, seen a significant improvement in their relative positions and have moved from the bottom to second quartile. The South West and South East show decreases in their level of disposable income per person and have moved from the third to second and first quartile respectively.

Table 5.8.2e examines the percentage change in real expenditure per person between 1973 and 1994 and the level of expenditure per person during the period. Annual expenditure per person increased in real terms by 43 percent for the state as a whole, slightly less than the rates of increase recorded for the two income measures over the same period. The largest increase took place in the West region (51%) over the sample period, followed closely by the Border region (49%). As before, these increases were from a very low base, with the Border and West regions having the lowest levels of expenditure per person at the start of the sample in 1973. Also mirroring the income measures, the East region has enjoyed the highest level of expenditure per person for each of the years shown, increasing by 46.4 percent between 1973 and 1994.

**Table 5.8.2e Annual Expenditure per person, 1973-1994.**

| | Percentage Change 1973-1994 | 1973 £ | 1980 £ | 1987 £ | 1994 £ |
|---|---|---|---|---|---|
| East | 46.4 | 3988 | 4626 | 4383 | 5837 |
| South East | 39.4 | 3221 | 3846 | 3765 | 4491 |
| South West | 27.4 | 3505 | 4075 | 3871 | 4464 |
| Mid-West | 40.6 | 3273 | 3767 | 4226 | 4602 |
| West | 51.3 | 3063 | 3683 | 3824 | 4634 |
| Border | 49.3 | 2962 | 3419 | 3456 | 4421 |
| Midlands | 33.1 | 3081 | 3969 | 3601 | 4101 |
| State | 42.7 | 3481 | 4104 | 4021 | 4966 |

Source: Household Budget Survey, various years.

The position of the regions relative to the national average between 1973 and 1994 is examined in Figure 5.8.2c.[23] The regions were distributed across the four intervals in 1973 with three regions occupying the bottom quartile, two regions in the second quartile and one each in the third and top quartiles. By 1994, the regions are concentrated across three of the quartiles, and there has been a movement out of the third quartile.

[23] The underlying data is given in Appendix D, section D.1, Table D.1j.

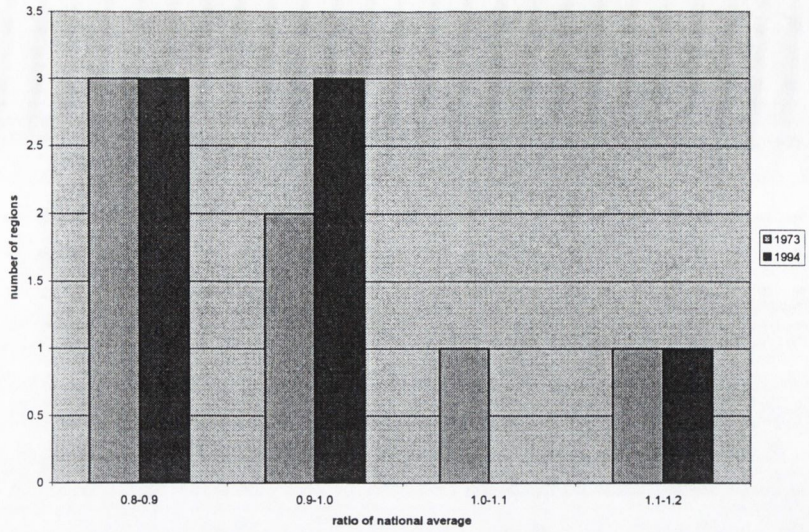


**Figure 5.8.2c Distribution of expenditure per person relative to national average, '73-'94.**

Table 5.8.2f examines the evolution of the regions relative to the national average for the start and end years of the sample period. The Border and Midlands region maintain their relative position in the bottom quartile of the table, while the East maintains its position in the top quartile. Similarly, the Mid-West and South East region maintain their relative position in the second quartile. The West region has significantly improved its relative position illustrated by its move from the bottom to second quartile while the South West has seen a worsening of its position having moved from the third to bottom quartile between 1973 and 1994.

**Table 5.8.2f Mobility table for expenditure, 1973-1994.**

| | **0.8-0.9** | **0.9-1.0** | **1.0-1.1** | **1.1-1.2** |
|---|---|---|---|---|
| **0.8-0.9** | BOR / ML | West | | |
| **0.9-1.0** | | MW / SE | | |
| **1.0-1.1** | | | | |
| **1.1-1.2** | | | | East |

Direct taxes per person (once again in real terms) are examined in Table 5.8.2g.

**Table 5.8.2g Annual Direct Taxation per person, 1973-1994.**

| | Percentage Change 1973-1994 | 1973 £ | 1980 £ | 1987 £ | 1994 £ |
|---|---|---|---|---|---|
| East | 167.7 | 522 | 871 | 1124 | 1396 |
| South East | 172.3 | 277 | 431 | 673 | 754 |
| South West | 150.9 | 310 | 568 | 757 | 779 |
| Mid-West | 178.9 | 259 | 469 | 826 | 722 |
| West | 219.6 | 233 | 408 | 575 | 746 |
| Border | 216.7 | 219 | 359 | 545 | 694 |
| Midlands | 126.2 | 301 | 415 | 646 | 681 |
| State | 173.6 | 356 | 608 | 847 | 975 |

Source: Household Budget Survey, various years.

The second column shows the percentage change in this variable between 1973 and 1994. It is interesting to note that direct taxes per person increased at a far higher rate than income itself over

the period, with the overall state experiencing a 174 percent increase in real tax payments per person over the sample period. As for the regional breakdown, the West and Border regions experienced the highest increases over the period (220 percent and 217 percent respectively), albeit once again from low bases. The East region shows by far the highest level of direct taxes per person in each period with the taxation levels for the remaining regions being closely bunched together.

This is illustrated clearly in Figure 5.8.2d.[24] The outlying East region can be seen in the fourth quartile, with all other regions being bunched closely together in the first two quartiles.

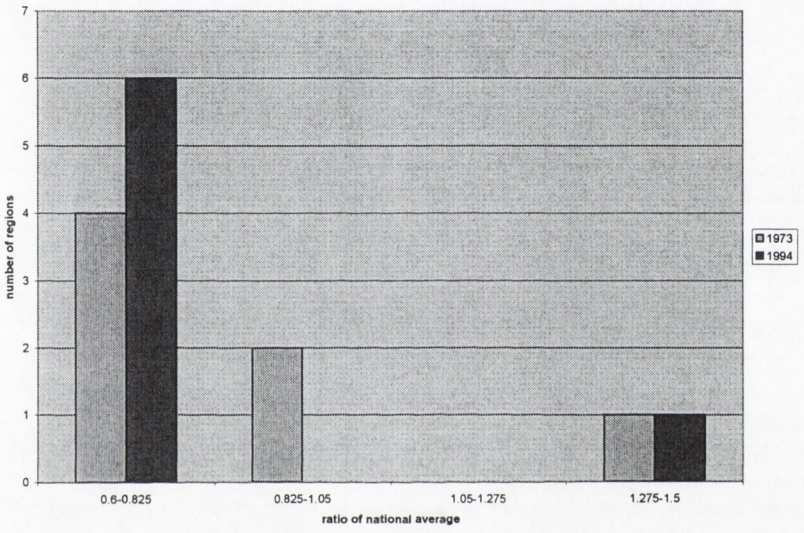


**Figure 5.8.2d Distribution of direct taxation per person relative to national average, '73-'94.**

This bunching is also clearly illustrated in the mobility matrix below, see Table 5.8.2h.

**Table 5.8.2h Mobility table for direct taxes, 1973-1994.**

| | **0.6-0.825** | **0.825-1.05** | **1.05-1.275** | **1.275-1.5** |
|---|---|---|---|---|
| **0.6-0.825** | SE/W/MW/BOR | | | |
| **0.825-1.05** | SW / ML | | | |
| **1.05-1.275** | | | | |
| **1.275-1.5** | | | | East |

Turning to the final measure examined in this section, Table 5.8.2i examines state transfers per person for the seven regions and the state as a whole. The second column shows the percentage change in this variable between 1973 and 1994. For the state as a whole, real state transfers per person increased by 158 percent over the sample period. The largest increase took place in the East region - 208 percent - while the lowest increase - 82 percent - took place in the West. However, these rates of change partly reflect the initial positions of both these regions, with the East having the lowest level of transfers per person in 1973 and the West having the highest.

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[24] The underlying data is given in Appendix D, section D.1, Table D.1k.

**Table 5.8.2i Annual State Transfers per person, 1973-1994.**

| | Percentage Change 1973-1994 | 1973 £ | 1980 £ | 1987 £ | 1994 £ |
|---|---|---|---|---|---|
| East | 208.2 | 279 | 362 | 752 | 859 |
| South East | 182.5 | 349 | 536 | 822 | 986 |
| South West | 164.6 | 351 | 453 | 737 | 928 |
| Mid-West | 129.7 | 407 | 502 | 752 | 935 |
| West | 82.0 | 478 | 588 | 784 | 870 |
| Border | 130.1 | 451 | 592 | 994 | 1038 |
| Midlands | 144.4 | 364 | 439 | 760 | 890 |
| State | 157.7 | 356 | 459 | 788 | 917 |

Source: Household Budget Survey, various years.

The position of the regions relative to the state average is illustrated in Figure 5.8.2e below.[25]

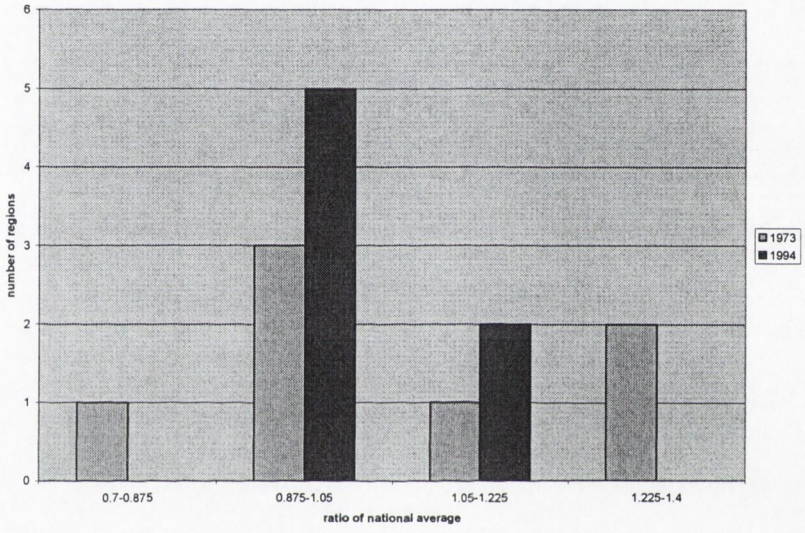


**Figure 5.8.2e Distribution of state transfers per person relative to the national average, 1973-1994.**

The relative position of the regions was distributed across the four intervals in 1973. Over the period to 1994, the histogram suggests a convergence of the regions relative position, illustrated by a centralising of the regions in the middle two intervals.

Table 5.8.2j - the mobility matrix - also illustrates this convergence clearly. Just two regions, the Midlands and South West have maintained their position relative to the state average over the sample period. All of the other regions have moved position. The East region has "improved" its relative position, moving from the first to second quartile and the South East has moved from the second to third quartile, indicating that both of these regions have increased their level of state transfers per person relative to the state average. The West and Border region have decreased their share of state transfers per person relative to the state average and have moved from the top quartile to the second and third quartile respectively. The Mid-West region has also experienced a decrease in its relative share and has moved from the third to second quartile.

**Table 5.8.2j Mobility table for state transfers, 1973-1994.**

| | 0.7-0.875 | 0.875-1.05 | 1.05-1.225 | 1.225-1.4 |
|---|---|---|---|---|
| **0.7-0.875** | | East | | |
| **0.875-1.05** | | ML / SW | SE | |
| **1.05-1.225** | | MW | | |
| **1.225-1.4** | | West | BOR | |

It would appear from the above discussion that, overall, the level of disparity between the regions for the various income measures has narrowed over the sample period. Moreover, for most measures there has been a noticeable improvement in the less developed regions, i.e. the West, Border and Midlands regions. Nevertheless, the underlying data must be interpreted with care. Although income per head measures may be exhibiting relative improvements in these regions, these data may be affected by migratory patterns. Accordingly, we complement the above analysis by commenting briefly on the overall share of state income accounted for by each of the regions over the sample period. These data are shown in Table 5.8.2k and Table 5.8.2l below.

Table 5.8.2k examines the percentage share of annual direct income, disposable income and expenditure for the eight regions over the 1973 to 1994 period. As would be expected, the East region accounts for the greatest share of these three income measures across all periods and indeed it has seen a large increase in its share of all three measures over the sample period. On the other hand, the Midlands occupies bottom place in terms of its proportionate share under all three measures and it has actually seen a worsening of its overall share over the sample period. Besides the East, the West and Border regions have increased their share of direct and disposable income and expenditure when comparing 1973 with 1994. The good performance of the West and Border regions for income measures per head discussed above is also evident from Table 5.8.2k. On the other hand, the good performance of the Midlands region for income measures per head is not evident from Table 5.8.2k.

**Table 5.8.2k Percentage share of annual income measures, 1973-1994.**

| | Direct Income | | | | Disposable Income | | | | Expenditure | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1973 | 1980 | 1987 | 1994 | 1973 | 1980 | 1987 | 1994 | 1973 | 1980 | 1987 | 1994 |
| East | 41.0 | 46.0 | 44.5 | 45.9 | 38.1 | 42.4 | 41.3 | 42.1 | 40.0 | 42.4 | 41.3 | 42.7 |
| South East | 12.8 | 7.8 | 9.2 | 10.3 | 13.1 | 8.4 | 9.7 | 11.0 | 11.2 | 8.5 | 9.7 | 11.3 |
| South West | 15.7 | 14.7 | 15.7 | 12.9 | 15.9 | 14.8 | 15.8 | 13.6 | 15.4 | 14.4 | 15.7 | 13.2 |
| Mid-West | 8.3 | 9.0 | 9.9 | 6.7 | 8.7 | 9.5 | 9.9 | 7.2 | 8.5 | 9.3 | 10.1 | 7.3 |
| West | 7.6 | 6.1 | 7.4 | 9.0 | 8.4 | 6.8 | 8.0 | 9.4 | 8.7 | 7.0 | 8.0 | 9.4 |
| Border | 9.0 | 9.7 | 8.7 | 10.4 | 9.8 | 11.0 | 10.3 | 11.5 | 10.0 | 11.1 | 10.0 | 11.6 |
| Midlands | 5.5 | 6.8 | 4.6 | 4.8 | 6.0 | 7.0 | 5.0 | 5.1 | 6.2 | 7.2 | 5.2 | 4.6 |
| State | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: Household Budget Survey, various years.

Table 5.8.2l examines the percentage share of direct taxes and state transfers for the seven planning regions over the 1973 to 1994 period. Given the increase in the share of disposable and direct

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[25] The underlying data is given in Appendix D, section D.1, Table D.1l.

income in the East, West, and Border regions discussed above, we would expect to see an increase in the share of direct taxes also. This proves to be the case and also for the South East region. The share of direct taxes in the remaining regions has fallen when comparing 1973 with 1994. The Midlands, Mid-West and West account for the lowest share of taxes while the East, South West and South East account for the highest shares. The proportion of state transfers has increased in the East and South East regions and remained the same in the Border region when comparing 1973 with 1994. The share of state transfers has decreased in all the other regions over this period. The Border accounts for the second highest share, after the East region of state transfers. The increase in state transfers in the East region in recent years reflects the increasing unemployment rate in that region, see section 5.4.

**Table 5.8.2l Percentage share of annual direct taxes and state transfers; 1973-1994.**

| | Direct Taxes | | | | State Transfers | | | |
|---|---|---|---|---|---|---|---|---|
| | 1973 | 1980 | 1987 | 1994 | 1973 | 1980 | 1987 | 1994 |
| East | 51.1 | 53.9 | 50.2 | 52.0 | 27.3 | 29.6 | 36.1 | 34.0 |
| South East | 9.4 | 6.5 | 8.2 | 9.7 | 11.9 | 10.6 | 10.8 | 13.4 |
| South West | 13.3 | 13.6 | 14.6 | 11.8 | 15.1 | 14.3 | 15.2 | 14.9 |
| Mid-West | 6.5 | 7.8 | 9.4 | 5.8 | 10.3 | 11.1 | 9.2 | 8.0 |
| West | 6.5 | 5.2 | 5.7 | 7.7 | 13.3 | 9.9 | 8.4 | 9.5 |
| Border | 7.2 | 7.9 | 7.5 | 9.3 | 14.8 | 17.2 | 14.7 | 14.8 |
| Midlands | 6.0 | 5.1 | 4.4 | 3.9 | 7.2 | 7.1 | 5.6 | 5.4 |
| State | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: Household Budget Survey, various years.

The good performance of the West and Border regions referred to earlier is borne out by the data just discussed and although these regions experienced out-migration, their actual level of income increased over the study period and there was a reduced dependency on state transfers. Although the West region in 1994 includes the county of Roscommon, it is unlikely that its good performance (for direct and disposable income, expenditure and taxes) is due entirely to the inclusion of this county, as the income measures had already begun to increase by 1987. Similarly, the poor performance of the Midlands region in 1994 cannot be attributed to its loss of Roscommon as the share of all income measures declined in 1987. On the other hand, the good performance of the Midlands region for income measures per head was not borne out by the income data in Table 5.8.2k. This may be due to out-migration and/or reduced income from agriculture due to decreases in employment in this sector.[26]

### 5.8.3 Income by Quartile

Drudy and Punch (1999) noted very small differences in disposable income by quartile across the eight regional authorities in 1994. Adopting the methodology used by Drudy and Punch, the

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[26] Migration in the Midlands in 1971 was 14 persons per 1000 compared to (-9) persons per 1000 in 1996. Agricultural employment fell by 53% between 1971 and 1996.

following tables examine indices of household weekly disposable income for the four quartiles, taking 100 as the national average for each of the years 1973, 1980, 1987 and 1994. The underlying data, which is adjusted for the consumer price index (1994=1), is given in Appendix D, section D.4.

**Table 5.8.3a Index of 1973 household weekly disposable income by quartile.**

| 1973 | Quartile 1 | Quartile 2 | Quartile 3 | Quartile 4 | Total |
|---|---|---|---|---|---|
| East | 99.6 | 98.6 | 97.7 | 96.8 | 111.6 |
| South East | 101.7 | 97.7 | 104.3 | 116.6 | 107.7 |
| South West | 98.6 | 100.1 | 101.1 | 99.2 | 102.1 |
| Mid West | 99.5 | 100.8 | 101.3 | 97.1 | 94.9 |
| West | 102.6 | 102.7 | 103.1 | 88.1 | 86.3 |
| Border | 101.3 | 101.4 | 97.7 | 97.3 | 82.5 |
| Midlands | 96.7 | 102.5 | 103.2 | 109.8 | 81.8 |
| State | 100 | 100 | 100 | 100 | 100 |

Source: Household Budget Survey, various years.

Table 5.8.3a shows an index of household weekly disposable income for 1973, broken down by quartile and a total column. The differences in income across the four quartiles are relatively minor, except for the fourth quartile where the West region is substantially below the other regions. The total column shows that the East region has a household weekly disposable income of 11 percent above average while the Midlands is 19 percent below average. The proportion of households in each quartile (see Appendix D, section D.4) provides some explanation for these discrepancies. The East has 17.4 percent of households in the 4$^{th}$ quartile compared to a national average of 13 percent. The Midlands has 6.9 percent of households in this quartile. On the other hand, the Midlands has 38 percent of households in the first quartile while the East has just 16 percent. The national average here is almost 26 percent.

**Table 5.8.3b: Index of 1980 household weekly disposable income by quartile.**

| | Quartile 1 | Quartile 2 | Quartile 3 | Quartile 4 | Total |
|---|---|---|---|---|---|
| East | 98.5 | 98.3 | 97.9 | 100.4 | 114.0 |
| South East | 99.4 | 100.0 | 102.0 | 95.7 | 89.6 |
| South West | 100.6 | 100.9 | 98.5 | 101.4 | 101.1 |
| Mid West | 94.7 | 100.3 | 100.7 | 98.5 | 94.6 |
| West | 103.9 | 101.3 | 102.1 | 103.7 | 85.2 |
| Border | 101.3 | 100.8 | 102.0 | 96.2 | 82.2 |
| Midlands | 103.2 | 101.7 | 103.1 | 102.5 | 95.4 |
| State | 100 | 100 | 100 | 100 | 100 |

Source: Household Budget Survey, various years.

Table 5.8.3b examines an index of household weekly disposable income by quartile and the total for 1980. Once again the differences across the quartiles for the various regions are minimal. The disparity between the East region and the rest in the final column can to a large extent be explained by the disparities in the proportion of households in the fourth quartile. The East region has 39 percent of its households in this quartile compared to the Border region's 17 percent. The national average for this quartile is almost 30 percent. The West and Border region have 36 and 34 percent of households respectively in the first quartile compared to a national average of 26 percent.

**Table 5.8.3c Index of 1987 household weekly disposable income by quartile.**

| | Quartile 1 | Quartile 2 | Quartile 3 | Quartile 4 | Total |
|---|---|---|---|---|---|
| East | 99.5 | 98.4 | 97.6 | 99.7 | 107.7 |
| South East | 102.0 | 100.7 | 99.5 | 98.9 | 94.9 |
| South West | 99.9 | 100.3 | 101.4 | 101.7 | 100.8 |
| Mid West | 99.1 | 100.7 | 102.6 | 95.7 | 100.5 |
| West | 98.1 | 102.4 | 102.7 | 105.7 | 96.6 |
| Border | 101.2 | 100.6 | 100.4 | 103.3 | 88.3 |
| Midlands | 99.9 | 100.6 | 103.7 | 93.6 | 84.7 |
| State | 100 | 100 | 100 | 100 | 100 |

Source: Household Budget Survey, various years.

The scenario is similar in both 1987 and 1994, tables 5.8.3c and 5.8.3d respectively. The difference in household weekly disposable income across the quartiles for the various regions is small. Differences exist in the final column of each table and these can be explained as before with reference to the proportion of households in the fourth quartile. The East region has a greater than average share of households in this quartile. The Mid West region in 1987 also had a greater than average share of households in this quartile, 25.3 percent compared to a national average of 25 percent. As would be expected, the index for total household weekly disposable income in the Mid West is greater than the state average for this year. As noted in an earlier section, there has been a narrowing of the disparity between the regions in household weekly disposable income - the difference between the East region and the rest is not as evident in 1994 as in previous years, see Table 5.8.3d.

**Table 5.8.3d Share of 1994 household weekly disposable income by quartile.**

| | Quartile 1 | Quartile 2 | Quartile 3 | Quartile 4 | Total |
|---|---|---|---|---|---|
| East | 100.1 | 99.9 | 99.1 | 103.1 | 113.3 |
| South East | 102.4 | 96.3 | 98.4 | 95.4 | 87.7 |
| South West | 97.6 | 100.2 | 99.2 | 98.8 | 93.9 |
| Mid West | 94.5 | 98.9 | 99.8 | 97.3 | 90.5 |
| West | 99.2 | 103.1 | 101.9 | 96.6 | 97.0 |
| Border | 100.3 | 101.1 | 102.6 | 94.8 | 89.7 |
| Midlands | 105.5 | 102.9 | 102.8 | 101.8 | 97.4 |
| State | 100 | 100 | 100 | 100 | 100 |

Source: Household Budget Survey, various years.

In summary, an index of household weekly disposable income by quartiles showed very little difference across the regions. The high (or low) proportion of households in the fourth quartile explained the differences in the total column. The East region had the highest proportion of households in this quartile and the lowest proportion in the first quartile. By 1994, the differences in the total column were less evident than for previous years. Furthermore, the proportion of households in each quartile for the various regions had become more similar, see Appendix D, section D.4. Nevertheless, as shown in Drudy and Punch (1999) the data continues to hide some important details. Drudy and Punch examined the case of Dublin, which is part of the East region above. Overall average income for Dublin was 15 per cent higher than the State and was explained by the presence of a higher proportion of households in quartile 4 (34 percent compared to a

national figure of 25 percent). Furthermore, a significant proportion of households in Dublin (40%) was found in the two lowest quartiles.

## 5.9 EDUCATION

The following tables examine an education profile of the regional economies. The data span the 1966[27] to 1996 period and refer to school and non-school population. The following paragraphs examine the number still at school in each region and the proportion of the non-school population for which education has ceased at the ages of 15 and under; between 16 and 18 and at 19 and over. These cut-off points refer broadly to those finishing school at lower secondary level (old intermediate certificate, group certificate and O levels), upper secondary level (technical or vocational certificates, leaving certificate) and third level (primary degree, professional qualification, post-graduate degree).

Table 5.9a examines the numbers still at school for each of the census years, 1966 to 1996 and the percentage change over that period. The numbers still at school have increased over the sample period for the state as a whole (from 143,000 in 1966 to 340,000 in 1996) and for each of the individual regions. This reflects increased participation. As would be expected, the East region has the largest number still at school. Indeed the ranking of levels of population across the regions is similar to the ranking of the numbers still at school except for the South East, Mid West and West. These regions are ranked third, fourth and fifth highest in terms of population respectively, yet the numbers still at school in these regions does not correspond to this ranking. The percentage change in the number still at school is examined in the final column of Table 5.9a. It reflects the large increases that have taken place in the numbers still at school. The largest increase took place in the East region (178%) while the smallest took place in the Midlands (94%).

**Table 5.9a Those still at school ('000s)**

| | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 | % Change 1966-1996 |
|---|---|---|---|---|---|---|---|
| East | 48.3 | 65.7 | 78.2 | 97.3 | 113.6 | 134.1 | 178 |
| South East | 14.7 | 18.8 | 20.0 | 24.1 | 27.4 | 33.5 | 128 |
| South West | 23.0 | 29.5 | 30.6 | 38.2 | 43.6 | 52.9 | 130 |
| Mid-West | 13.8 | 17.0 | 18.0 | 21.8 | 25.7 | 31.4 | 127 |
| West | 15.5 | 20.0 | 18.9 | 22.9 | 26.1 | 30.9 | 100 |
| Donegal/NW | 8.9 | 10.9 | 10.6 | 12.4 | 14.2 | 17.9 | 102 |
| Midlands | 11.7 | 14.9 | 14.5 | 17.3 | 19.0 | 22.8 | 94 |
| North East | 7.1 | 9.3 | 9.5 | 11.1 | 13.4 | 16.2 | 127 |
| State | 143.0 | 186.1 | 200.3 | 245.2 | 283.1 | 339.6 | 137 |

Source: Census of Population, various years.

[27] As noted in Chapter 4, the Census of Population did not report education data by age prior to this date.

Table 5.9b examines the proportion of the non-school population (i.e. those who have finished their full time education) in each region whose education ceased at the age of 15 years and under. 15 years has been the legal age at which an individual can leave the education system from 1971, with the leaving age having been set at 14 years in 1966.

**Table 5.9b Proportion of population whose education ceased at 15 and under**

| | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|
| East | 60.5 | 56.8 | 45.2 | 39.0 | 36.7 | 32.1 |
| South East | 65.4 | 62.2 | 50.2 | 41.9 | 40.4 | 35.6 |
| South West | 64.5 | 61.2 | 48.5 | 40.1 | 38.9 | 33.7 |
| Mid-West | 62.7 | 59.3 | 46.7 | 38.0 | 37.5 | 32.6 |
| West | 74.7 | 70.6 | 55.6 | 45.5 | 43.5 | 37.4 |
| Donegal/NW | 78.3 | 75.2 | 61.6 | 53.2 | 51.2 | 44.9 |
| Midlands | 70.9 | 67.3 | 53.6 | 44.0 | 43.1 | 37.1 |
| North East | 75.5 | 71.9 | 59.4 | 50.7 | 48.7 | 42.7 |
| State | 66.1 | 62.4 | 49.7 | 41.8 | 40.0 | 34.9 |

Source: Census of Population, various years.

As expected, there has been a steady decline in the proportion of early school leavers over the study period. In 1966, 66 percent of the total population ceased formal education at 15 and under compared with just 35 percent in 1996. Donegal North West had the highest proportion of early school leavers over the sample period, while the East region showed the lowest proportion of those finishing education at 15 and under, followed closely by the Mid-West region.

Table 5.9c examines the share of the population for whom education ceased between the ages of 16 and 18. This variable would capture all those finishing their formal education at secondary level. As would be expected, the proportion of the population staying on in education and leaving at second level has increased over time. For the state as a whole, 28 per cent of the population finished education between the ages of 16 and 18 in 1966 compared to 46 percent in 1996, representing an increase of almost two thirds. The proportion finishing school at upper secondary level has more than doubled in the West, Donegal/North West and North East regions, albeit from low bases in each case. The Mid West region has accounted for the highest share of upper secondary school leavers for most of the sample, with Donegal North West having the lowest share despite its catch up over the period. It is, however, obvious from the data, that the dispersion among the regions is far lower in 1996 than in the beginning of the sample period. For instance, while the East region had almost twice the proportion of upper secondary school leavers as Donegal North West in 1966, the ratio between the highest and lowest regions had fallen to just 1.2 in 1996.

**Table 5.9c Proportion of population whose education has ceased between 16 and 18**

| | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|
| East | 32.5 | 35.1 | 42.6 | 47.5 | 47.7 | 45.7 |
| South East | 30.0 | 32.5 | 41.9 | 48.1 | 48.7 | 48.8 |
| South West | 29.9 | 32.3 | 41.2 | 47.6 | 47.5 | 46.8 |
| Mid-West | 32.0 | 34.4 | 43.7 | 50.2 | 49.6 | 49.2 |
| West | 20.5 | 23.3 | 34.5 | 42.1 | 42.5 | 42.6 |
| Donegal/NW | 17.6 | 19.8 | 30.6 | 37.2 | 38.6 | 39.9 |
| Midlands | 25.0 | 27.7 | 38.9 | 46.3 | 46.6 | 47.6 |
| North East | 20.5 | 23.4 | 33.5 | 40.3 | 41.5 | 42.9 |
| State | 28.3 | 31.0 | 40.2 | 46.2 | 46.6 | 45.9 |

Source: Census of Population, various years.

Table.5.9d examines the proportion of the population whose education has ceased from the age of 19 and over. This variable captures all those who participated in third level education. As expected, the proportion of those finishing education in this category has also increased over time, from 5.6 percent for the state as a whole in 1966 to 19.2 per cent in 1996, or almost a quadrupling over the period. The increase has been quite remarkable for all regions, Table 5.9d. The East region continues to show the highest share participating in third level education followed by the West and South West regions. Each of these regions has a major university and urban centre and therefore their high third level participation rates may reflect the preponderance of skilled occupations in these regions. The North East has consistently displayed the lowest share participating in third level education. Overall, however, the dispersion of third level participation rates between the regions has, as in the case of upper secondary school leavers, narrowed sharply over the sample period.

**Table 5.9d Proportion of population whose education has ceased at 19 and over**

| | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|
| East | 7.0 | 8.1 | 12.2 | 13.5 | 15.6 | 22.1 |
| South East | 4.6 | 5.3 | 8.0 | 10.0 | 10.9 | 15.6 |
| South West | 5.5 | 6.6 | 10.2 | 12.3 | 13.6 | 19.6 |
| Mid-West | 5.3 | 6.3 | 9.6 | 11.8 | 12.9 | 18.2 |
| West | 4.8 | 6.1 | 9.9 | 12.4 | 14.0 | 20.0 |
| Donegal/NW | 4.1 | 5.0 | 7.9 | 9.6 | 10.3 | 15.2 |
| Midlands | 4.1 | 5.0 | 7.5 | 9.8 | 10.4 | 15.3 |
| North East | 3.9 | 4.6 | 7.0 | 9.0 | 9.7 | 14.3 |
| State | 5.6 | 6.6 | 10.1 | 12.0 | 13.4 | 19.2 |

Source: Census of Population, various years.

In summary, the majority of the non-school population finished formal education at 15 and under in 1966 while by 1996, this share had fallen considerably in all regions. As a mirror image of these developments, the proportion in the two higher education categories - those finishing formal education between the ages of 16 and 18 and those aged 19 and over - has increased markedly. The rate of increase has been particularly strong in the latter, tertiary education sector.

## 5.10 CONCLUSION

This chapter examined a socio-economic profile of the eight Irish planning regions for a total of 32 variables. These variables summarised developments in demographics, employment, unemployment, education, output and income at the regional level. The analysis of these variables focused on the identification of the absolute and relative position of the region over time. Suggested by the literature review in Chapter Two and compiled for the Irish regional economy subject to the constraints identified in Chapter Four, these variables commented on the economic welfare of the Irish planning regions for an extended period.

Demographic data including total population, population change and its components, natural increase and migration and also the age breakdown of the population were examined for the 1926 to 1996 inter-censal period. Employment data including those employed in agricultural, industrial, manufacturing and service employment were examined over the same time frame. Unemployment data were examined for the inter-censal periods from 1946 to 1996. A second source of unemployment data, the Labour Force Survey, examined bi-annual rates of unemployment from 1975 to 1996. Education data were examined over the inter-censal periods from 1966 to 1996, a similar time frame to the proportion of urban and rural population in each region. Output data that included gross and net output are examined at three-year intervals from 1979 to 1996 as were wages and salaries data and investment data. Income data were examined for 1973, 1980, 1987 and 1994 while gross value added, a more recent regional output construct was examined annually from 1991 to 1996.

The share of population has been highest for the East region and lowest for the North East region. The ranking of the regions has not changed except prior to 1966 when the West region had a higher population share than the Mid-West. Population change has been positive for the East for the entire sample period and for all the regions from either 1961 or 1971. Out-migration, the severity of which has lessened in recent years, has been a dominant feature of Irish population history and has been broadly the norm across all regions except the East. The East region has had consistently the highest level of natural increase per 1000 population while the North East has had the lowest. The ranking of the regions has changed little over the study period; an exception is the West region, moving from the second highest level at the start to the second lowest at the end of the period. The East has ranked lowest in the share of rural population throughout the period (1966-1996) while Donegal/North West has ranked highest and the South East has remained seventh. The West, South East and Mid-West regions have decreased their share of rural population between 1991 and 1996 while the Midlands and North East have increased theirs. The opposite has been the case for the share of urban population.

There was no consistent ranking of the regions for the 0-14 age group. The East region had the highest share of 15-64 year olds for each of the sample years with Donegal/North West overtaking the Mid-West region in 1966 with the lowest share. The East region has the lowest share of its population in the 65 plus age group while Donegal/NW has the highest share.

The East region accounts for the largest share of total employment in each period, although its lead in recent years has moderated. The share of agricultural employment across all the regions has declined over the study period. The decrease for some regions has been quite dramatic. Nevertheless over 20 percent of total employment in the West and Midlands regions in 1996 was in agriculture. The share of manufacturing and industrial employment has increased for most of the regions over the study period. The East has experienced a decline in its share since 1971 while some regions, notably the West and Donegal/NW have increased considerably their share since then. A wide disparity continues to characterise the share of service employment in each region.

The Live Register data showed an increasing rate of unemployment over the 1946 to 1996 period for all regions with the South West having the highest rate of unemployment in each year.[28] The Labour Force data covered the 1975 to 1996 period and showed that rate of unemployment had increased for each year of the sample to 1994. Donegal/NW had the highest rate of unemployment except for 1992 and 1994 when the South East had the highest rate.

The composition of industry in each region in terms of three categories of industrial establishments, modern, traditional and natural resource was examined for the 1979 to 1996 period. The East region had the largest share of all three types of industrial establishment. The groupings were characterised by a wide disparity across the regions that had not narrowed over the study period.

Despite an increasing level of gross output per employee across the regions, differences remained. The pattern per employee for net output was similar to that of gross output. The South West had the largest level of net output per head for the sample period while Donegal/NW had the lowest level. The East region had the highest level of wages and salaries per employee while Donegal/NW had the lowest level. However, the level of disparity between the regions was minor and did not change over the study period, 1979 to 1996.

There was no consistent pattern of increase or decrease in investment per employee over the 1979 to 1996 sample period. Thus the level of disparity, with the East having the highest rate of investment continued.

GVA, or gross value added was examined for seven regional authorities (the Mid-East and Dublin region were combined). The level of disparity across the regions, as measured by the percentage difference between the highest and lowest level of regional GVA per person had increased over the period. Five income measures were considered, direct and disposable income, expenditure, direct taxes and state transfers. All but the latter have been highest in the East region for the entire study period and lowest in the Border region. The text noted a change in the ranking of the regions for these measures however with an accompanied narrowing in the level of disparity. Finally, the proportionate share of weekly disposable income by quartile was examined over the 1973 to 1994 period. The disparity among the regions for this measure was attributed to the wide disparity in the proportion of households in each quartile group.

The proportion of the population still at school had increased for all the regions over the sample period, with the West and North East showing the highest and lowest rate respectively. The East region had the lowest share of its population finishing school at 15 and under for each of the sample years while Donegal/NW had the highest share. There has been an increase in the proportion of the population finishing school between the ages of 16 and 18 and this has been especially evident for the South East, North East, Donegal/North West, West and Midlands regions. Finally, the share of each region's population finishing their formal education at 19 and over has also increased over the study period. The East has consistently had the highest share of population finishing education at this age level.

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[28] Except in 1961 when the West region had the highest rate.

# Chapter Six

# TESTING FOR REGIONAL CONVERGENCE AND EXAMINING THE REASONS WHY

## 6.1 INTRODUCTION

This chapter builds upon the work of previous chapters by presenting a formal empirical examination of the inter-regional differences in the Republic of Ireland. The principal aims of the analysis are, first, to determine whether convergence has taken place across the eight planning regions in key economic variables and, second, to uncover the causal factors underlying these findings. The empirical analysis is informed by the literature review on regional convergence presented in chapter two, and data availability considerations discussed in chapters four and five. Notwithstanding the data constraints, it remains possible to undertake the analysis using two important economic welfare measures, namely, employment[1] and disposable income. In the first instance, employment and income are examined for sigma convergence. The procedure used - discussed in chapter four - provides for a more in-depth study of sigma convergence than usually reported in the literature. In addition, the discussion of the results will also focus on the reasons underlying the presence, or otherwise, of sigma convergence. Second, employment and income variables are examined for both absolute and conditional beta convergence. Although theory suggests that conditional beta convergence may be redundant for regional data sets, the discussion of empirical regional studies contained in chapter two showed that, for the most part, ancillary variables are included in studies of regional convergence. It is these control variables that help to explain the reasons why convergence in economic growth has taken place across the Irish planning regions.

The rest of the chapter is organised as follows. Section 6.2 tests for sigma convergence. Section 6.3 examines absolute beta convergence, while a study of conditional beta convergence is undertaken in section 6.4 by including several explanatory variables. These variables, which have been suggested by the literature review, capture a dynamic nature of Irish regional disparity and are modelled here using regression analysis. Section 6.5 concludes.

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[1] While employment developments are not, in themselves, representative of overall economic growth patterns, in that they fail to take into account changes in productivity, productivity enhanced measure of employment, developed in chapter four is used here. This variable is discussed further in section 6.3.

## 6.2 SIGMA CONVERGENCE

This section examines whether patterns of convergence or divergence have taken place in employment and disposable income across Ireland's eight planning regions over time. The data used in this study are taken from the Census of Population and the Household Budget Survey, respectively, as discussed in chapter four. County level data have been aggregated to produce regional totals for the employment variable, which is examined over the period 1926 to 1996. The employment rate, i.e. those at work as a proportion of the total population is also considered for the eight planning regions over the 1926 to 1996 period. The productivity-enhanced employment rate, which was described in chapter four and again below, is considered over the 1926 to 1996 period also. Disposable income across the regions is considered for the years 1973, 1980, 1987 and 1994. To ensure consistent spatial coverage, seven regions[2] are defined for the disposable income measure. This step was deemed necessary as the 1994 data were based on the region according to the regional authority classification, while earlier years employed the planning region concept. Thus, two of the planning regions, the North East and Donegal/NW region have been combined to correspond with the 1994 Border region and the Dublin and Mid-East regional authorities have been combined to correspond with the East planning region.

The methodology for examining sigma convergence at the inter-regional level in the Republic of Ireland has already been outlined in chapter four. It was agreed that the variance was the most suitable measure of disparity, encompassing the cross-section and time-series nature of the data and following logically from the application of the Bartlett test of homogeneity of variance. Once independence of variance is tested, using the Bartlett test, it is then important to chart the variance over time to determine whether the pattern of variance reflects convergence (decreasing values of variance) or divergence (increasing values of variance).

Total, agricultural, industrial and service sector employment data are examined for sigma convergence in section 6.2.1 while the pattern of variance uncovered in each case is further elaborated upon in section 6.2.2. The employment rate is examined for convergence properties in section 6.2.3. Section 6.2.4 examines the factors that contribute to the variance pattern in the employment rate. Section 6.2.5 examines the pattern of variance disposable income and section 6.2.6 examines the pattern of variance for the productivity-enhanced employment rate.

### 6.2.1 Testing Employment for Sigma Convergence

Table 6.2.1a shows the results from applying the Bartlett test to total employment and sectoral employment over the 1926 to 1996 period. Rejecting the null hypothesis of homogeneity of

[2] Income data were discussed for these seven regions in the previous chapter.

variance means that that the variance for the given variable is statistically independent over time. Finding independence of variance provides for greater confidence when commenting on the graph of the data and the sigma convergence result.

**Table 6.2.1a Outcome from Bartlett Test for Total and Sectoral Employment**

| Variable | Bartlett Test Result | Critical Values | Accept/Reject Homogeneity |
|---|---|---|---|
| Total Employment | 29.3 | 18.5 | Reject at 1% |
| Agricultural Employment | 86.9 | 18.5 | Reject at 1% |
| Industrial Employment | 20.5 | 18.5 | Reject at 1% |
| Service Employment | 34.4 | 18.5 | Reject at 1% |

The null hypothesis under the Bartlett test is rejected at the 1 percent level for all of the employment variables. In other words, homogeneity of variance of employment is not accepted for any of the sectors over time. Therefore, the variance for these four variables in each period from 1926 to 1996 is independent.

The analysis of the employment data continues with graphing the variance of the logs of total, agricultural, industrial and service employment. Given that the Bartlett test has been rejected for all of these variables at a high confidence level, the conclusions from the graph of the employment variables will be statistically robust. Moreover, because the graph refers to the variance of the log of the data, Galton's Fallacy is also ruled out and any change in the variance over time is thus attributable solely to the underlying data and not to a change in the mean over time.

Figure 6.2.1a examines a plot of the variance of total employment over the study period 1926 to 1996. The pattern is one of increasing variance suggesting a divergence in total employment between the eight planning regions. At the start of the period, in 1926, the variance was 0.11. By the end of the period, the variance had increased over three times to a value of 0.46 (1996). The divergence has, however been relatively constant over the period 1981 to 1996 when the variance increased by just 10 percent compared to more than a doubling between 1926 and 1996. However, the level of disparity between the regions in total employment is higher in 1996 compared to any other year of the sample period. The underlying data show that the region with the highest share of employment in 1926 (the East) was three times that of the lowest region (the North East) while the region with the highest share of employment in 1996 was eight times that of the lowest share. Moreover, the region with the lowest share of employment in 1926, the North East remains in that category in 1996 and similarly for the East region, which occupied the highest share of employment for all years of the study period.

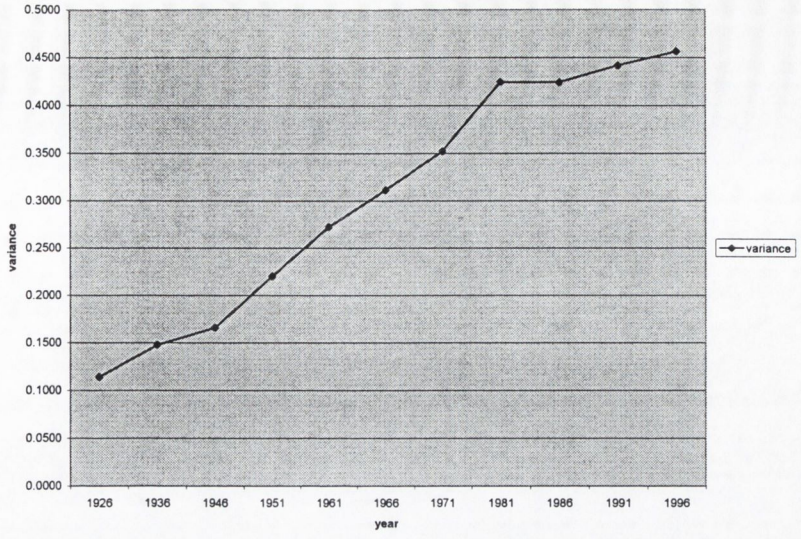


**Figure 6.2.1a Plot of variance of total employment, eight regions**

Figure 6.2.1b examines a plot of the variance of agricultural employment for the eight regions over the period 1926 to 1996. While no persistent pattern of convergence or divergence is suggested from the graph, three distinct patterns are evident.

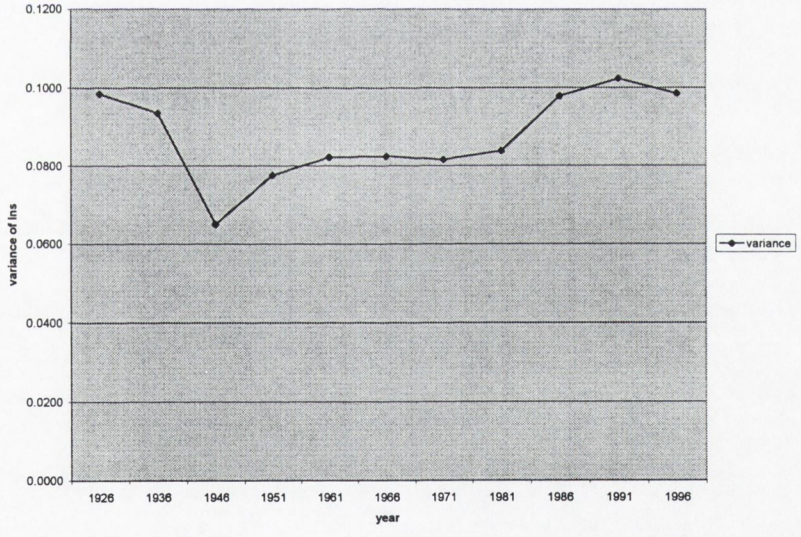


**Figure 6.2.1b Plot of variance of agricultural employment, eight regions**

The first covers the period 1926 to 1946 when a pattern of convergence emerges; from 1946 to 1991 a pattern of divergence takes place; and, finally, between 1991 and 1996, the variance decreases once more. Overall, the disparity between the regions has changed only marginally between the start and end periods of the sample. The level of disparity among the regions was highest in 1991 when the share of agricultural employment in the West region was 6½ times that of the East and at its lowest level in 1946, when the share of agricultural employment in the West was 4½ times greater than that in the East.

Figure 6.2.1c examines a plot of the variance of industrial employment; no persistent pattern emerges here either. Increasing variance over the 1926 to 1961 period (with the exception of 1946 when the variance decreased) was followed by convergence over the 1961 to 1996 period (with the exception of 1991 when the variance increased). Overall, however, the level of industrial employment among the eight planning regions is becoming more similar over time and the level of disparity between the start and end years of the sample has decreased by almost a third. The share of industrial employment in the highest share (North East) region is now only 1½ times that in the lowest share (East) region. The level of disparity among the regions was highest in 1961; the share of industrial employment in the East region (which had the highest share at the time) was more than 3 times higher than the share of industrial employment in the West. There has also been a complete turn-around in the ranking of the regions in terms of the share of industrial employment over the sample period, with the East region now accounting for the smallest share compared to accounting for the dominant share up to 1971.

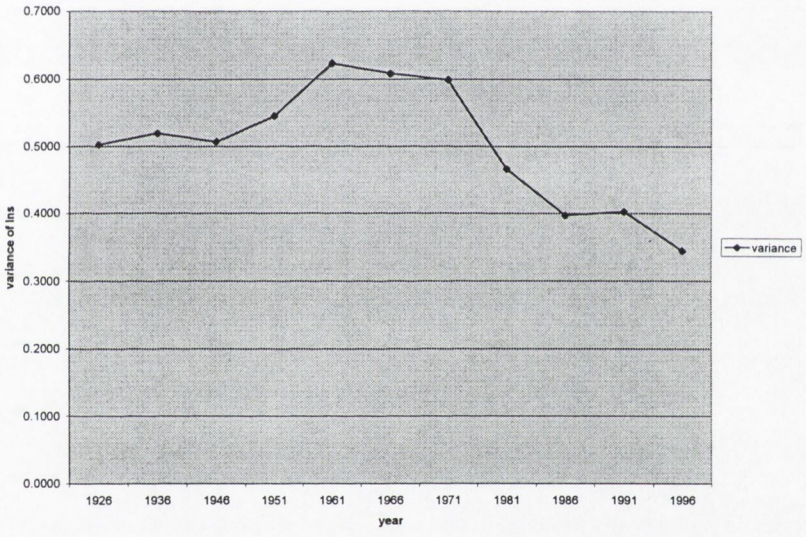


**Figure 6.2.1c Plot of variance of industrial employment, eight regions.**

Figure 6.2.1d shows the plot of variance for service sector employment. This variance increases for the majority of the study period, except for a brief period of convergence over the 1981 to 1991 period. Overall, the level of disparity among the regions in service sector employment has increased by slightly more than a third between 1926 and 1996.

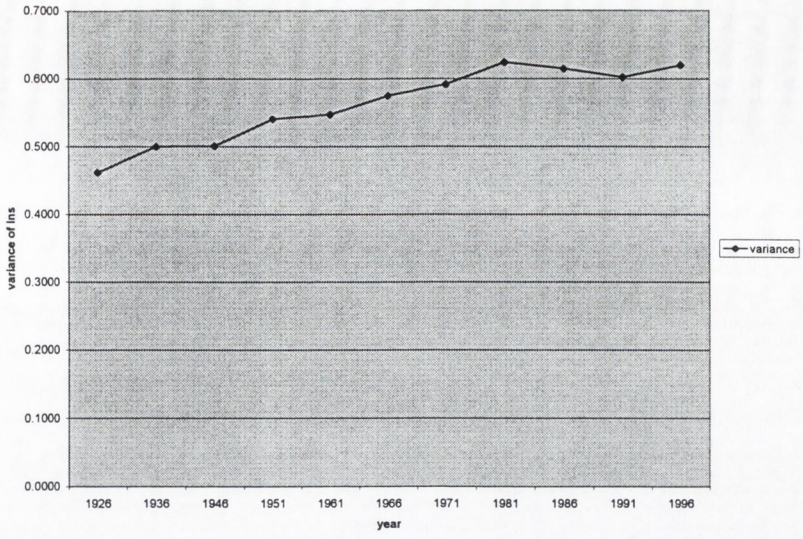


**Figure 6.2.1d Plot of variance of service employment, eight regions.**

### 6.2.2 Factors Contributing to Sigma Convergence in Employment

The results from the sigma convergence study may be summarised according to the pattern of variance found and the changes in the level of disparity between the start and end years of the period, as shown by the actual value of the variance in these periods. First, the variance for both total and service sector employment showed a pattern of predominantly increasing divergence among the eight planning regions over the sample period. The pattern for agricultural and industrial employment was less consistent, with alternating periods of divergence and convergence. However, overall divergence decreased for industrial employment and remained roughly constant in the case of agricultural employment. This section sets out to elaborate upon these differing patterns of divergence and convergence found in total employment and its sectoral components.

To this end, reference is made to underlying demographic and employment factors. For example, one would expect that a decreasing variance in employment across the eight planning regions would be accompanied by a decreasing variance in population for these same regions. The variance of population is, therefore, examined below. Moreover, changes in population brought about by movements in the rate of natural increase and migration are important explanatory factors of a region's economic wellbeing. These factors have already been discussed in the previous chapter.

Furthermore, although total employment may be diverging, one or more of the various sectors of total employment - agriculture, industry and/or services - may be converging. This factor is examined below. The methodology seeks to establish whether the regional employment mix is becoming more similar to that of the state over the 1926 to 1996 period. A favourable employment

mix that has a high concentration of service and industrial employment will have a positive impact on a region's economic health and future growth.

*Variance of Population*

Figure 6.2.2a examines the pattern of variance of the log of population for the eight planning regions. As would be expected from the discussion on population in the previous chapter, the variance of population is increasing over the entire study period. However the rate of increase has slowed down from 1981. For example, while the variance almost doubled between 1926 and 1996 only about 10 percent of the actual increase was registered between 1981 and 1996. To further illustrate the extent of population divergence that has occurred over the sample period, the underlying data show that while the East's population was three times higher than that of the North East in 1926 this multiple had risen to seven by the end of the sample period.

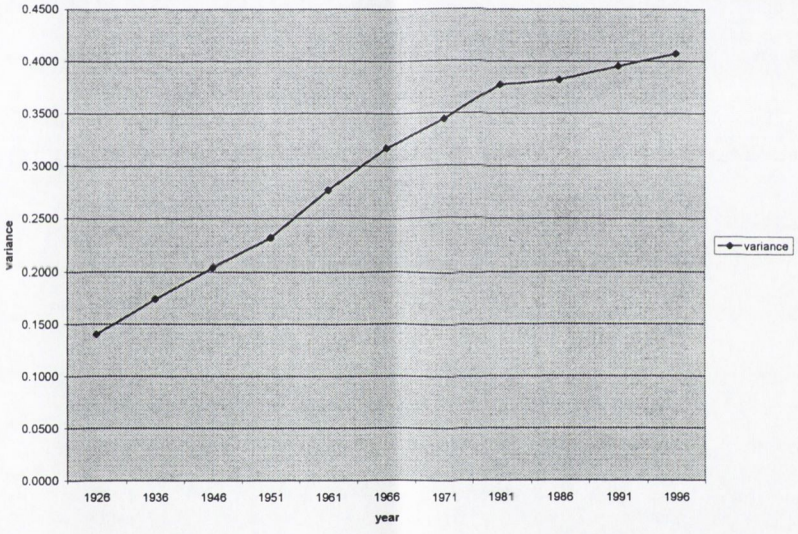


**Figure 6.2.2a Variance of population**

The pattern of variance for population is similar to that found for employment. The increasing variance for both population and employment began to slow down from 1981 and the level of disparity in both variables is higher in 1996 than it was at the beginning of the period.

*Structural Composition of Employment*

In any given year, employment data may be categorised on a sectoral and regional basis. Using such data, it is possible to derive the expected value for employment at the regional level in each sector based on overall national employment patterns. These expected sectoral employment values are computed across regions for the entire sample period and, from these expected values, a chi-squared statistic is derived which examines whether regional employment patterns have been converging over time. More formally, the chi-squared statistic is computed from the row by

column (R by C) table below, Table 6.2.2a, which comprises actual and "expected" sectoral employment for each of the regions and where:

f is the observed (actual value)
and F is the expected value, which is calculated by:
F = (row total) (column total) / n
and n equals total employment.

**Table 6.2.2a The Row by Column Table**

| | *East* | *SW* | *SE* | *NE* | *DNW* | *West* | *MW* | *ML* | *Total* |
|---|---|---|---|---|---|---|---|---|---|
| AGR | F | f | f | f | f | F | f | f | |
| | F | F | F | F | F | F | F | F | |
| IND | F | f | f | f | f | F | f | f | |
| | F | F | F | F | F | F | F | F | |
| SERV | F | f | f | f | f | F | f | f | |
| | F | F | F | F | F | F | F | F | |
| TOTAL | | | | | | | | | n |

Source: Snedecor and Cochran, 1967.

This table is computed for each of the census years from 1926 to 1991 and the test statistic is given by:

$\chi^2 = \Sigma(f - F)^2 / F$ with (R-1)(C-1) degrees of freedom.

where: f = observed value and F= expected value

Thus, the chi-squared statistic is computed by comparing expected values of sectoral employment (which are computed with reference to the state sectoral total) to the actual observed value in each region, and summing the square of such differences across each region. A falling value of the chi-squared statistic indicates that sectoral regional employment patterns are converging over time.

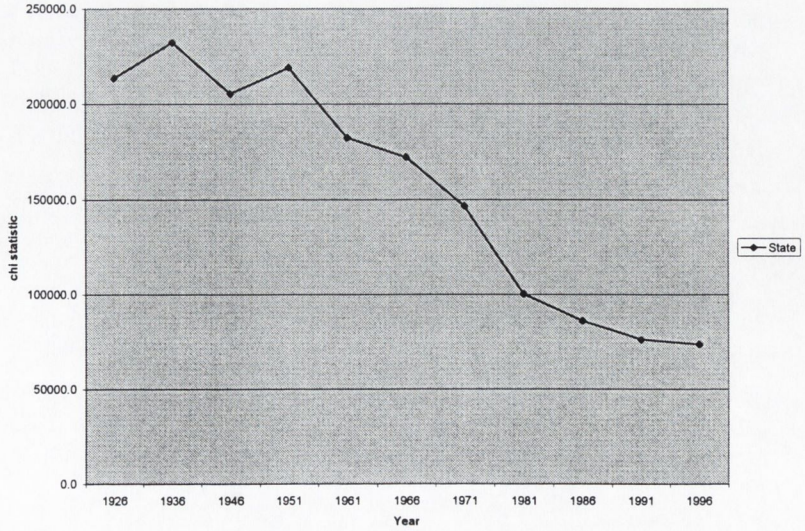


**Figure 6.2.2b Chi squared statistic for total employment**

The chi squared statistic ($\chi^2$) for total employment is falling over time as Figure 6.2.2b shows; this indicates that the sectoral employment patterns at the state level are increasingly being mirrored at the regional level over time. In other words, the sectoral mix of employment in terms of the share of agricultural, industrial and service employment in each region is becoming similar to the share of agricultural, industrial and service employment at the national level. The chi-squared statistic, which was at its highest value in 1926 had decreased significantly by 1996, indicating that the disparity between the regions had narrowed over the sample period.

The chi-squared statistic in Figure 6.2.2b summarises overall sectoral employment patterns over time. A plot of each of the individual chi-squared statistics in Figure 6.2.2c illustrates a declining pattern for each of the individual sectors also. Specifically, although such convergence has occurred for the service and agricultural sectors, the industrial sector has seen most convergence over time.

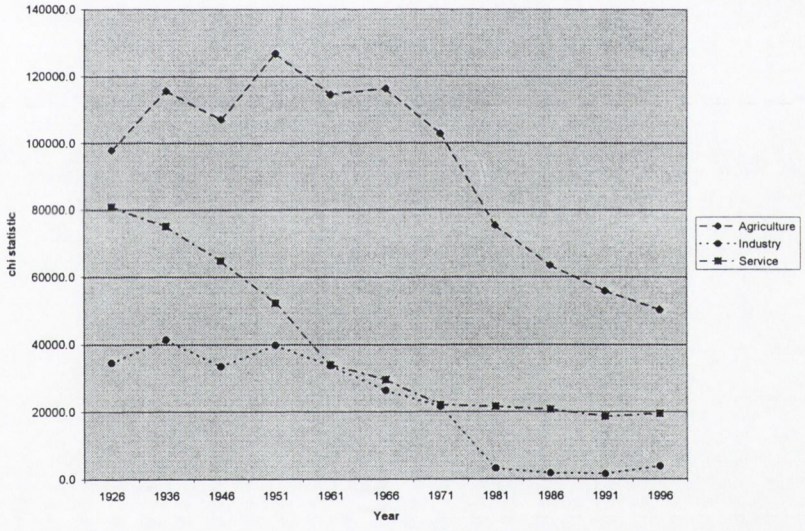


**Figure 6.2.2c Chi-squared statistic for sectoral employment**

In sum, although total employment levels have not been converging across the eight planning regions, as discussed above in section 6.2.1, significant convergence in the mix of employment across the regions has taken place. The result of these changes is summarised by Figure 6.2.2b, which shows a convergence of the regional breakdown of employment on the state mix. The dominant share of employment across the three employment sectors has shifted to services over the study period as shown in the previous chapter. In 1996, service employment in the state accounted for 63 percent of overall employment, while industry accounted for just over 27 percent and the state share of agricultural employment was just 10 percent. The pattern of convergence shown in Figure 6.2.2b will have a positive impact on the overall economic health of the region. As noted earlier in chapter two, a region that makes the transition from an agricultural to industrial and to a service base has a greater potential for increased income generation.

### 6.2.3 Testing for Sigma Convergence in the Employment Rate

This section will test for convergence of the employment rate (i.e. the ratio of the number employed to the total population) across the regions. The Bartlett test for homogeneity of variance[3] is rejected at the 1 percent level. The variance of the log of the employment rate is plotted in Figure 6.2.3a below.

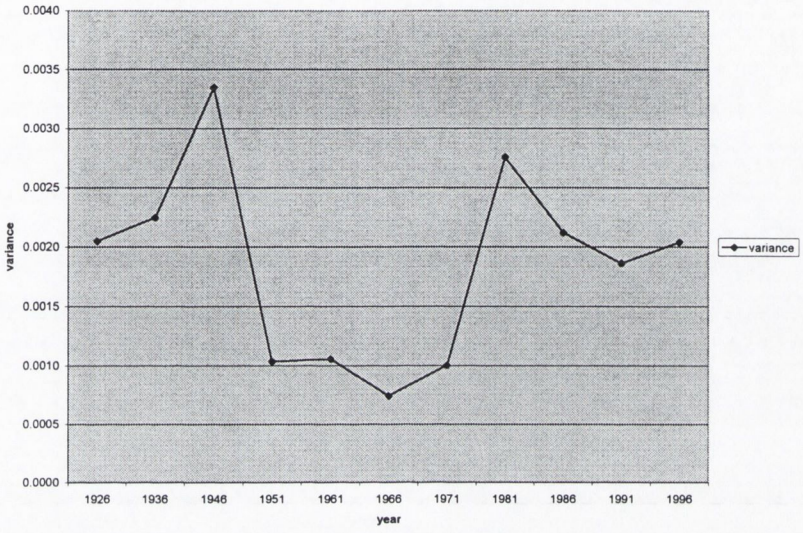


**Figure 6.2.3a Variance of the employment rate**

The variance of the log of the regional employment rates shows no consistent pattern over the study period. Specifically, a period of divergence (1926 to 1946) is followed by a period of convergence (1946 to 1966) repeated (divergence 1966 to 1981; convergence from 1981 to 1991) and the period finishes with a brief period of divergence, 1991 to 1996. Despite the fluctuating pattern, the overall level of disparity between the regions has changed little during the study period and indeed the start and end years show the exact same value of variance (0.002). The value of variance was lowest in 1966 and a comparison of the employment rates for that year indicates that the employment rate in the East region was just 8 percent higher than that in the South East. On the other hand, the value of variance was highest in 1946 and the employment rate in the Midlands region was 16 percent higher than that in the East.[4]

### 6.2.4 Refining the Pattern of Variance in the Employment Rate

The pattern of the variance in the employment rate is associated with the variance of the working age rate, the unemployment rate and the participation rate. The number of people working at any one time will depend on the available pool of workers, i.e. those in the active age group of 15 to 64 years old, and also on unemployment and labour force participation rates. The participation rate,

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[3] The test result for the Bartlett test is 21.7, which is rejected at the 1% level.
[4] See Appendix E, Section E.1 for the regional employment rates.

i.e. the ratio of those employed and unemployed to those aged 15 to 64 and the unemployment rate - the ratio of those unemployed to the sum of those employed and unemployed are necessarily dependent or endogenous. On the other hand, the working age rate, the ratio of those aged 15 to 64 to the population is exogenous. Table 6.2.4a examines the pattern of variance in the employment rate and the variance of the factors contributing to this; the participation rate, the unemployment rate and the working age rate.[5]

**Table 6.2.4a The pattern of variance in the employment rate and contributing factors.**

| Dependent Variable | | Contributing Factors | | | | | |
|---|---|---|---|---|---|---|---|
| Employment Rate | | Participation Rate | | Unemployment Rate | | Working Age Rate | |
| Period | Variance | Period | Variance | Period | Variance | Period | Variance |
| | | | | | | | |
| 1926-1946 | ↑ | | N/A | | N/A | 1926-1936 | ↓ |
| | | | | | | 1936-1946 | ↑ |
| 1946-1966 | ↓ | 1946-1981 | ↓ | 1946-1951 | ↑ | 1946-1971 | ↓ |
| | | | | 1951-1966 | ↓ | | |
| 1966-1981 | ↑ | | ↓ | 1966-1971 | ↑ | 1971-1991 | ↑ |
| 1981-1991 | ↓ | 1981-1986 | ↑ | 1971-1986 | ↓ | | |
| | | 1986-1991 | ↓ | | | | |
| 1991-1996 | ↑ | 1991-1996 | ↑ | 1986-1996 | ↑ | 1991-1996 | ↓ |

Reading across from left to right in Table 6.2.4a, the increasing variance in the employment rate in the 1926 to 1946 period is contributed to in part by an increasing variance in the working age rate between 1936 and 1946. (Participation and unemployment rate variance data could not be calculated for this period.) Thus there was a widening gap between the employment rates across the regions explained by a widening gap in the working age rate. This gap or disparity in employment rates narrowed between 1946 and 1996 and was associated with a narrowing gap in the participation rate that continued to 1981; in the unemployment rate that lasted to 1951 only and in the age rate that continued to 1971 between the eight planning regions. The increasing disparity in the variance of the employment rates between 1966 and 1981 was also associated with an increasing disparity in the unemployment rate across the regions. The period of convergence in the employment rate between 1981 and 1991 derived from a convergence in the unemployment rate from 1971 to 1986 and a convergence in the participation rate from 1986 to 1991. Finally, the increasing disparity between the employment rates across the regions in the short period from 1991 to 1996 coexisted with an increase in disparity in the participation rates and the unemployment rates.

In summary, while all three contributing factors endorse the pattern of variance in the employment rate by themselves following a similar pattern, the variance in the unemployment rate appears to be most aligned with that of the employment rate.

[5] See Appendix E, Section E.2 for the underlying graphs.

### 6.2.5 Testing for Sigma Convergence in Disposable Income

The variance of the logs of disposable income is examined in Figure 6.2.5a.[6] As noted previously, the data refer to annual disposable income per person for seven regions. The data are adjusted for the consumer price index, which was set to 100 in 1994 and are compiled from the Household Budget Survey with the sample period running from 1973 to 1994.

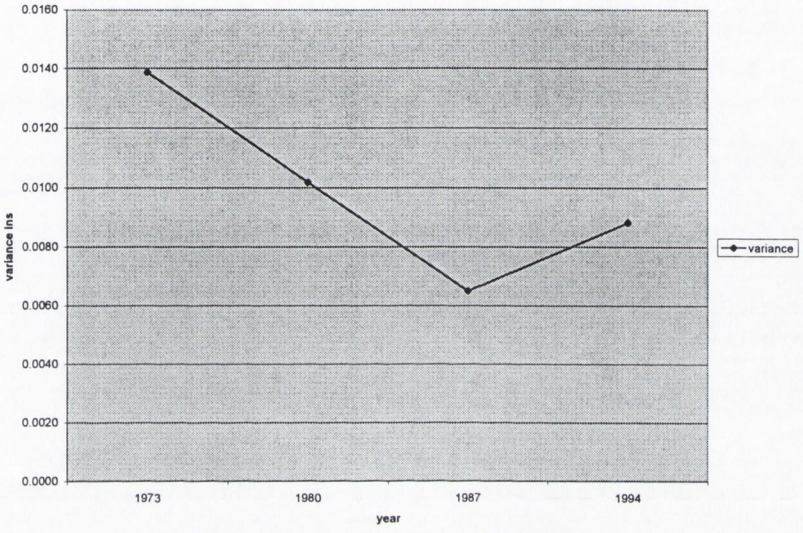


**Figure 6.2.5a Variance of disposable income per person, 1973-1994.**

Figure 6.2.5a examines a plot of the variance for disposable income per person across the seven regions over the period 1973 to 1994. The variance decreased dramatically (by over half) over the 1973 to 1987 period, indicating a marked convergence between the regions. The underlying data show that the difference between the region with the highest level of disposable income per person in 1973 (East) was 30 percent greater than the region with the lowest income level (Border). By 1987, the difference between the highest and lowest region had fallen to 26 percent (the East and Midlands regions respectively). However, between 1987 and 1994, there was a reversal of the convergence patterns and variance actually increased by 35 percent between 1987 and 1994. Overall, however, some convergence took place over the sample period, with the variance in 1994 being lower than it was in 1973.

As already mentioned, a formal explanation of convergence in disposable income that will incorporate the lessons from the convergence literature discussed in chapter two and a range of socio-economic variables analysed in the previous chapter will be examined in section 6.4 below.

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[6] The Bartlett test statistic for disposable income is 2.5, which rejects homogeneity of variance at the 90 percent level.

### 6.2.6 Testing for Sigma Convergence in Productivity-Enhanced Employment Rate

While the regions have become more unequal in terms of their employment and population make-up, as discussed in sections 6.2.1 and 6.2.2 above, the absence of any information on productivity movements over the period prevents us from drawing any strong conclusions on the overall economic health of the regions. To try and capture this issue of productivity, the variance of the productivity-enhanced measure of employment that was introduced in chapter four is examined below. Moreover, because it lends itself more readily to welfare-based analysis, this productivity-enhanced employment measure is suitable for both sigma and beta analysis. The variable was described in chapter four and is shown below.

$$A = \left[ \frac{Empl * \left[ \frac{Ind + Serv}{Empl} \right]}{Population} \right]$$

where: Empl = total employment
Ind = industrial employment
Serv = service employment

The variable A is tested using the Bartlett test and the test result (33.0) indicates rejection of homogeneity of variance at the 1% level. The variable A is subsequently logged and its variance is computed. The graph of the variance of A is shown in Figure 6.2.6a, which shows convergence over the entire study period, 1926-1996, apart from a slight increase in variance in 1951. Although the productivity-based measure is crude, it adds to our understanding of employment at the regional level. The graph indicates that the disparity between the regions in terms of productivity-adjusted employment rates has narrowed considerably over the study period. Therefore, although the variance in overall employment levels is increasing, suggesting a divergence among the eight planning regions, the variance of productivity adjusted employment rates, as measured by variable A, is declining, suggesting a convergence.

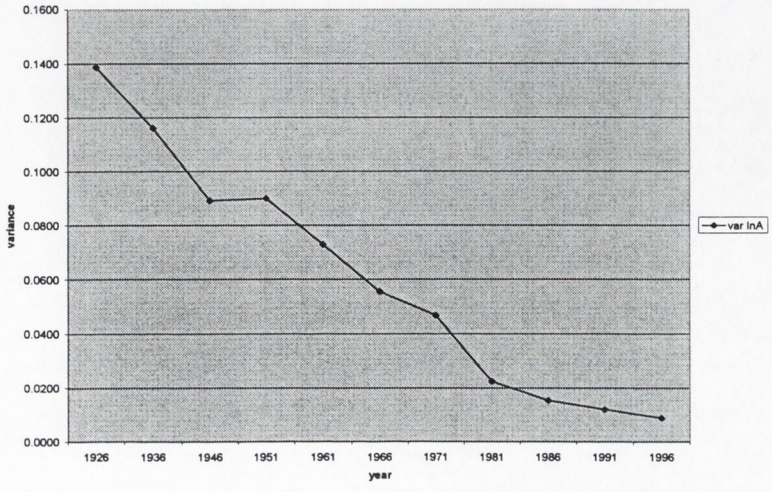


**Figure 6.2.6a Variance of A**

The reasons for the converging pattern of the productivity-enhanced employment rate will be considered first in section 6.3 by examining the relationship between the growth rate of this variable and its initial level. This analysis will be extended in section 6.4 to include ancillary variables identified in chapter four.

## 6.3 ABSOLUTE CONVERGENCE

This section examines the productivity adjusted employment measure and disposable income for absolute convergence. In doing so, the growth rate per capita of these variables is regressed on the initial value plus an intercept. The econometric package used is EViews and all variables are expressed in terms of logs. Pooled cross section regressions are performed for 80 observations in the case of the employment measure and 21 observations for the income measure. Absolute convergence is tested for eight planning regions over the period 1926 to 1996 for productivity enhanced employment and for seven regions in the case of disposable income over the 1973 to 1994 period.

For absolute convergence to have taken place, the coefficient on the initial value of the variable in question should be negative. The magnitude of the coefficient represents the speed of convergence and this may be interpreted to give the annual speed of convergence and the time it would take for complete convergence to occur.[7] The results from the regressions are presented in the following two sub-sections.

### 6.3.1 Absolute Convergence and Productivity Enhanced Employment

We test for absolute convergence by regressing the growth rate of variable A - our productivity enhanced employment rate in this case - on its initial (1926) value and an intercept. The results from the regression, which used pooled least squares, are shown in Table 6.3.1a.

**Table 6.3.1a Results of productivity adjusted employment**

| Variable | Coefficient | Standard Error | t-Statistic | $R^2$/Adjusted $R^2$ |
|---|---|---|---|---|
| Intercept | -0.08 | 0.04 | -1.93 | 0.13/0.12 |
| LnA | -0.08 | 0.02 | -3.5 | |

A negative coefficient of 0.08 on the initial level of A is statistically significant. This result indicates that absolute convergence has taken place across the eight planning regions for productivity enhanced employment. It suggests that convergence is taking place at 8 percent per period. Given that the average period is 6.36 years, this implies that the gap between the regions is

narrowing at 1.2 percent per annum. This rate is lower than that usually found in the economic growth literature. However, the variable used is not as robust as one would normally find in such regressions. Nevertheless, the high statistical significance of the variable and the expected negative sign on the coefficient is reassuring. At a convergence rate of 1.2% per annum, we would expect complete convergence after 58 years, leaving aside developments in other "ancillary" variables.

### 6.3.2 Absolute Convergence for Disposable Income

The growth rate in annual disposable income per person was regressed on its initial level for the seven defined regions over the 1973 to 1994 period after logging the variables and adjusting them for developments in the CPI. If convergence had taken place, we would expect a negative coefficient on the independent variable, the initial level of disposable income per person. The results from the regression, again using pooled least squares, are shown in Table 6.3.2a below.

**Table 6.3.2a Results from regression**

| Variable | Coefficient | Standard Error | t-Statistic | $R^2$/Adjusted $R^2$ |
|---|---|---|---|---|
| Intercept | 1.45 | 1.08 | 1.34 | 0.07/0.02 |
| Lny | -0.22 | 0.18 | -1.22 | |

Although the regression results return the expected negative sign on the initial level of income the coefficient is not statistically significant; the low value for $R^2$ is also disappointing. However, we may still use the results to illustrate the concept of absolute convergence, even though the fairly low significance levels preclude any clear conclusions from the regression. The coefficient of -0.22 implies that the gap between the regions is narrowing at 2.2 percent per annum, again leaving aside the control variables. Complete convergence would take place after 24 years.[8] Thus, with everything else held constant, disposable income per person is converging at 3% per year across the seven regions. Interestingly, this result conforms to those found in the international studies on regional convergence discussed in chapter two.

In summary, although the regression result showed that the growth rate of disposable income per person was negatively related to its initial level for the seven regions, a more robust *t* statistic would be needed to be confident that convergence had taken place. This result is consistent with the sigma convergence analysis in section 6.2.5. The pattern of variance showed a convergence in disposable income per person over the 1973 to 1987 period and a divergence to 1994. The increasing disparity between the regions, which was evident at the end of the period, may account

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[7] For example, a coefficient of –0.25 indicates total convergence of 25%. Assuming the period over which this convergence occurred was 10 years, then the annual rate of convergence is 2.3%, i.e. $1.023=(1.25)^{(1/10)}$. Moreover, complete convergence would occur in 31 years. (Complete convergence would require n years such that (1+0.023)^n = 2. This in turn implies that n = 31=ln(2)/ln(1.023)).

[8] Using the same formula as described in footnote 7 gives us these results.

for the poor performance of the *t* statistic. However, the presence of the negative coefficient on the initial level of income is noteworthy.

## 6.4 EXPLAINING CONVERGENCE

As noted in chapter two, conditional convergence studies analyse whether convergence would occur while holding certain control or ancillary variables constant. The analysis of convergence in both the productivity-enhanced measure of employment and disposable income is now extended to include such ancillary factors that are drawn from the analysis in preceding chapters. These variables include the education rate, share of agricultural employment, proportion of urban population, investment rate, share of service employment, unemployment rate and a policy variable. The presence of regional disparity has provided one of the most compelling reasons for regional policy. In particular, its long-term association with regional disparity in the Irish economy (see chapter eight for a discussion on the approach of Irish regional policy) suggests its inclusion as a factor promoting regional convergence. However, not all of these control variables are available for the same timeframe, as discussed in chapter four. Thus, the study of productivity enhanced employment and disposable income will cover two different, but overlapping time periods that will be dictated by data availability for the ancillary variables. The following paragraphs discuss these data, beginning with the two dependent variables of the convergence studies - productivity enhanced employment and disposable income.

### 6.4.1 Variable and Data Issues

Although data on productivity-adjusted employment rates are available from 1926, it will not be possible to carry out a regression from that date due to the unavailability of ancillary variable data for the same timeframe. Instead, the regression of the growth rate of this variable on its initial level plus the ancillary variables of education, agricultural employment, urban population, investment and unemployment is undertaken for the 1966 to 1996 period for the eight planning regions.[9]

While the ancillary variables dictated the sample period for the dependent variable in the productivity-enhanced employment case, the dependent variable dictates the choice of sample period and spatial unit in the disposable income analysis. As previously noted, seven spatial units that correspond to the regional authority structure are used to discuss and analyse disposable income. The growth rate of this variable is regressed on its initial level and the ancillary variables of education, investment, urban population, agricultural employment, unemployment, service employment and policy.

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[9] While agricultural employment is available from 1926, education and urban population data are not available before 1966 and unemployment data are not available before 1946 - see chapter four.

The investment data are from 1966[10] to 1996 and were discussed in the previous chapter; they are converted into real terms by adjusting for the wholesale price index with 1973=1 and are expressed per industrial employee. The investment data used in explaining the growth and convergence pattern of the productivity measure are deflated by industrial employment from the various Censuses of Population, dating from 1966 to 1996. Data are collected for the eight planning regions and, as is the case for the other variables discussed below, are compiled and expressed in natural log form. On the other hand, investment data for the disposable income study have been aggregated[11] to produce regional totals for the following defined regions,[12] East, Border (=addition of Donegal/North West and North East), Midlands, Mid-West, West, South West and South East. The data are also expressed in log form and are deflated by the industrial employment from the Census of Population and the years are chosen that lie closest to the sample years for disposable income.[13]

The education data, which are taken from the Census of Population, are based on the numbers reported to be "still at school". As before, data for the productivity analysis are aggregated to produce regional totals for the eight planning regions for the Census years and for the disposable income study are aggregated to produce totals for the seven regions. 1971, 1981, 1986 and 1996 data are used, as these years lie closest to the available sample years for disposable income. The education data, or those still at school are expressed as a share of the relevant population in each region for the selected years.

The proportion of the population living in urban areas, i.e. those areas with 1500 or more inhabitants, is used as the urban variable. The data are derived from various Censuses of Population, as discussed in the previous chapter, and cover the years 1971, 1981, 1986 and 1996 for the disposable income study, while the productivity enhanced employment study also includes data from 1966 and 1991.

Agricultural employment as a proportion of total employment is used as the agricultural variable. The data are from the Census of Population, as discussed in the previous chapter, and cover the years 1971, 1981, 1986 and 1996 for the disposable income study, while data for 1966 and 1991 are used in the productivity enhanced employment study.

The service employment variable is from the Census of Population and comprises service employment as a proportion of total employment in each of the seven regions for 1971, 1981, 1986

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[10] The 1966, 1971 and 1972 data are from An Foras Forbartha while the remaining data are from the Census of Industrial Production. Appendix E, section E.3 shows the investment data from An Foras Forbartha.
[11] All variables used have been aggregated to produce regional totals for the defined regions.
[12] This ensures complementarity with the income data as discussed in chapter 4 and used in the analysis in this and the previous chapter.

and 1996. The service employment variable, which aims to capture 'modern' type employment is used in the disposable income study only as the make-up of the productivity enhanced measures of employment includes service employment.

Two sources of unemployment data are used. The unemployment rate (for 1975, 1983, 1987 and 1994) are drawn from the Labour Force Survey for the disposable income study, while the unemployment rate (for 1966, 1971, 1981, 1986, 1991 and 1996) from the Live Register are used for the productivity-enhanced employment. The differences between the two sources of data and the superiority of the Labour Force estimates have already been discussed in chapter four. However, it was not possible to use this source for the two studies, as data on the unemployment rate was not available for 1966 or 1971 from the Labour Force Survey.

Finally, the policy variable was made available by Forfás - the planning and policy body for industrial development within the Republic of Ireland. The data represents grant payments by Forbairt (the agency for indigenous industrial development) and IDA Ireland (the agency responsible for foreign industrial development within the Republic) re-based using 1973 prices and expressed as a proportion of population in each region. The policy variable is used in the disposable income study and thus is calculated for the seven regions for the sample years 1973, 1980, 1987 and 1994.[14]

### 6.4.2 Explaining Convergence in Productivity Enhanced Employment

In the regression analysis the growth rate of productivity-enhanced employment (i.e. the growth rate of A) is regressed on its initial level (ln$A$) and the natural log of those still at school as a proportion of population (ln*edu*), the natural log of the urban population (ln*urb*), the natural log of the unemployment rate (ln*une*), the natural log of investment per industrial employee (ln*inv*) and the natural log of agricultural employment (ln*agr*) as a proportion of total employment. The study is carried out for the eight planning regions for the Census years 1966, 1971, 1981, 1986, 1991 and 1996.

First, each variable is regressed with the initial value of A (ln$A$) on the growth rate of $A$ and the coefficient values, $t$-statistics and $R^2$ values are given in Table 6.4.2a. The results for the individual regressions are shown in Appendix E, section E.4. The coefficient on the initial level of $A$ ($lnA$) is negative for all of the regressions, indicating that the growth rate of $A$ ($ln\Delta A$) is negatively related

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[13] Industrial employment data from the 1971, 1981, 1986 and 1996 Census of Population are used.

[14] Policy-related data are not available from 1966, which would have facilitated their inclusion in the productivity analysis.

to its initial level (*lnA*). This is the usual finding in the economic growth literature. Moreover, the coefficient of *A* is statistically significant for all the regressions.[15]

The ancillary variables themselves display the expected *a priori* signs, except for unemployment (*lnune*), which has a positive, albeit statistically insignificant, coefficient.[16] Thus the education (*lnedu*) and investment (*lninv*) variables are found to be positively related to regional growth rates (*lnΔA*), and also statistically significant. The agricultural variable (*lnagr*), again a statistically significant explanatory variable, is negatively related to the growth rate of *A*. Urban population (*lnurb*) is statistically insignificant explanatory factor of the growth rate in *A*, but it displays the expected *a priori* positive sign.

**Table 6.4.2a Individual regressions**

| Regression | Intercept | Ln*A* | Ln*edu* | Ln*agr* | Ln*urb* | Ln*une* | Ln*inv* | $R^2$/Adj. $R^2$ |
|---|---|---|---|---|---|---|---|---|
| (1) | -0.47<br>(-3.82) | -0.13<br>(-2.72) | 0.17<br>(3.37) | | | | | 0.34<br>0.30 |
| (2) | -0.19<br>(-2.5) | -0.32<br>(-3.90) | | -0.08<br>(-2.87) | | | | 0.29<br>0.26 |
| (3) | -0.62<br>(-1.29) | -0.26<br>(-1.88) | | | 0.08<br>(1.04) | | | 0.16<br>0.12 |
| (4) | -0.19<br>(-2.02) | -0.12<br>(-2.26) | | | | 0.03<br>(1.15) | | 0.17<br>0.12 |
| (5) | -0.43<br>(-3.48) | -0.17<br>(-3.45) | | | | | 0.06<br>(2.99) | 0.31<br>0.27 |

The next step of the analysis involves a multivariate regression, in which the growth rate of A (*lnΔA*) is regressed on its initial level and all of the ancillary variables discussed above, see equation 6.4.2a.

$$\ln \Delta A = \alpha + \beta \ln A + a \ln edu + b \ln agr + c \ln une + d \ln inv + e \ln urb \qquad \textbf{6.4.2a}$$

A summary of the results from this regression is given in Table 6.4.2b below.

**Table 6.4.2b Results from growth equation**

| Variable | Coefficient | Standard Error | t-Statistic |
|---|---|---|---|
| Intercept | 0.02 | 0.41 | 0.05 |
| LnA | -0.33 | 0.17 | -2.00 |
| Lninv | 0.07 | 0.03 | 2.64 |
| Lnedu | 0.04 | 0.45 | 0.45 |
| Lnagr | -0.11 | 0.04 | -2.76 |
| Lnurb | -0.08 | 0.07 | -1.14 |
| Lnune | -0.06 | 0.03 | -2.25 |
| $R^2$ | 0.50 | | |
| Adj. $R^2$ | 0.41 | | |

[15] It is only marginally significant in regression 3, which includes the urban population variable as an explanatory factor

[16] The unemployment variable is used as a proxy for overall structural rigidities within each region; accordingly, we would have expected a negative sign to have been associated with this variable.

All of the variables in Table 6.4.2b display the expected *a priori* signs, except for urban population (*lnurb*), which in any event is not statistically significant. Moreover, the initial level of A (*lnA*), the agricultural variable (*lnagr*), the unemployment rate (*lnune*) and the investment variable (*lninv*) are all statistically significant and thus feature strongly as explanatory factors for the growth rate in A ($ln\Delta A$). The $R^2$ and *Adjusted* $R^2$ statistics are also quite high for cross-country regressions and indicate that the explanatory variables employed are capable of explaining a good deal of the cross-regional growth patterns that have occurred over the period. It is surprising that the education variable is insignificant, but further tests show that this variable is highly correlated with the investment variable.[17] A final regression, which does not include the urban variable or the education variable, is run and a summary of the results is given in Table 6.4.2c below, see equation 6.4.2b.

$$\ln \Delta A = \alpha + \beta \ln A + a \ln agr + b \ln une + c \ln inv \qquad \textbf{6.4.2b}$$

**Table 6.4.2c Results for final regression**

| Variable | Coefficient | Standard Error | t-Statistic |
|---|---|---|---|
| Intercept | -0.42 | 0.11 | -3.80 |
| lnA | -0.47 | 0.09 | -4.79 |
| lnagr | -0.11 | 0.03 | -3.48 |
| lnune | -0.06 | 0.03 | -2.18 |
| lninv | 0.07 | 0.02 | 3.42 |
| $R^2$/Adjusted $R^2$ | 0.48/0.43 | | |

Deleting the education variable (*lnedu*) and the urban variable (*lnurb*) from the growth equation results in even higher levels of statistical significance for the remaining variables (and the $R^2$ statistic remains largely unchanged). The growth rate of *A* ($ln\Delta A$) is negatively related to its initial level (*lnA*) as the growth theory suggests, but it is also related to the proportion of total employment in agriculture (*lnagr*), the unemployment rate (*lnune*) and the proportion of investment per industrial employee (*lninv*). The coefficient value of (-0.47) on the initial level of *A* (*lnA*) suggests an annual rate of convergence of 6 percent with complete convergence taking place after 12 years.[18] This contrasts sharply with the annual convergence rate found by simply regressing the growth rate of A on the natural log of *A* above which yielded an annual convergence rate of just 1.2 percent with complete convergence taking place after 58 years. Accordingly, the inclusion of the agriculture, investment and unemployment control variables indicate that a far faster rate of convergence would have taken place over the period if these variables were equal across all regions.

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[17] The correlation coefficient between investment and education is 0.64, suggesting the presence of multicollinearity in the equation.

### 6.4.3 Explaining Convergence in Disposable Income

The growth rate of disposable income per person is regressed on the initial value of disposable income per person and the natural log of the ancillary or control variables. These variables represent the proportion still at school (ln*edu*); agricultural employment (ln*agp*), the share of urban population (ln*urb*), the unemployment rate (ln*une*), policy per capita (ln*pol*), the share of service employment (ln*serv*) and investment per industrial employee (ln*inv*). We would expect, *a priori*, that the education, investment, modern industrial establishments and share of urban population variables would be positively related to the growth rate of income while agricultural employment and the unemployment rate would be negatively related. These variables are regressed individually in turn, alongside the initial value of disposable income per person, on the growth rate of disposable income and the results are shown in Table 6.4.3a.

In total, seven regressions are run and the detailed results are shown in Appendix E, section E.5. Table 6.4.3a shows the coefficients, *t* statistics and $R^2$ values. All seven regressions yield a negative coefficient on the initial level of disposable income per person (*lny*), as would have been expected from theory and the coefficient is statistically significant in regressions 2, 3 and 6, which include agricultural employment (*lnagr*), urban population (*lnurb*) and service employment (*lnserv*) respectively. The *R-squared* values are robust in the first, second and sixth equation respectively.

The ancillary variables themselves display the expected *a priori* sign on their coefficient for all variables except unemployment (*lnune*) and policy (*lnpol*),[19] which show a positive and negative sign respectively. The education, agricultural employment and service employment variables are statistically significant in their respective regressions. The explanatory power of the regressions varies widely, ranging from zero in equations 4, 5, and 7, to relatively high explanatory power in equations 1, 2 and 6.

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[18] The annual rate of convergence is calculated as x=(1.07)(1/6.36) and x = 1.062. The interval between each Census year is approximately 6.36 years. Thus the annual rate of convergence is equal to the coefficient value to the power of the inverse of 6.36. Complete convergence is calculated as y=ln(2)/ln(1.062) and y= 11.5 years.

[19] It is surprising that policy does not feature as a significant explanatory variable. It could be that its positive role is not captured fully in the make-up of the policy variable. The approach of regional policy, which will be discussed in chapter eight, relied on a structural transformation of employment. The convergence in productivity-enhanced employment (section 6.2.6 and section 6.4.2) and the *chi-squared* results for employment (section 6.2.2) indicate that a structural transformation did take place. Arguably regional policy played a significant part in this.

**Table 6.4.3a Individual regressions**

| Regression | Intercept | lny | Lnedu | lnagr | lnurb | lnune | lnpol | Lnserv | lninv | $R^2$/A $R^2$ |
|---|---|---|---|---|---|---|---|---|---|---|
| (1) | 1.16 (1.21) | -0.23 (-1.49 | 0.20 (2.52) | | | | | | | 0.32/ 0.24 |
| (2) | 3.33 (2.64) | -0.49 (-2.48) | | -0.08 (-2.33) | | | | | | 0.29/ 0.21 |
| (3) | 3.26 (1.99) | -0.60 (-1.90) | | | 0.14 (1.44) | | | | | 0.17/ 0.08 |
| (4) | 1.45 (1.11) | -0.22 (-0.18) | | | | 0.00 (0.00) | | | | 0.07/ -0.02 |
| (5) | 1.45 (1.09) | -0.21 (-0.18) | | | | | -0.04 (-0.74) | | | 0.10/ 0.00 |
| (6) | 1.71 (1.80) | -0.46 (-2.57) | | | | | | 0.32 (2.64) | | 0.33/ 0.26 |
| (7) | 1.45 (1.29) | -0.22 (-1.13) | | | | | | | 0.00 (0.02) | 0.07/ 0.02 |

As before, we now turn to the multivariate analysis. The results from an initial regression that includes all of these variables, see equation 6.4.3a, are presented in Table 6.4.3b below.

$$\ln \Delta y = \alpha + \beta \ln y + a \ln agr + b \ln edu + c \ln inv + d \ln serv + e \ln urb + f \ln une + g \ln pol$$

**6.4.3a**

Although the explanatory power of the regression is not as high as in the case of the productivity analysis, it is, nevertheless, satisfactory for a cross-section regression of this type (the *R squared* is 0.56, while the *adjusted R squared* is 0.27). It can also be seen that most of the ancillary variables show the expected sign, including agriculture, education, policy, service employment and unemployment, while the remaining variables, investment and urban population display unexpected negative signs. Also unexpected is the positive coefficient on the initial level of disposable income per person (*lny*), which appears to indicate that divergence would have occurred among the regions even after taking the various control variables into account. Furthermore, none of the variables are statistically significant - only the unemployment variable, with a *t*-statistic of -1.7 is approaching significance.

**Table 6.4.3b Results from growth equation**

| Variable | Coefficient | Standard Error | t-Statistic |
|---|---|---|---|
| Intercept | -1.49 | 4.32 | -0.35 |
| Lny | 0.12 | 0.46 | 0.27 |
| Lninv | -0.00 | 0.05 | -0.17 |
| Lnedu | 0.03 | 0.27 | 0.13 |
| Lnagr | -0.06 | 0.14 | -0.41 |
| Lnurb | -0.36 | 0.31 | -1.17 |
| Lnune | -0.10 | 0.06 | -1.70 |
| Lnpol | 0.00 | 0.05 | 0.05 |
| Lnserv | 0.66 | 0.94 | 0.70 |
| $R^2$ | 0.56 | | |
| Adj. $R^2$ | 0.27 | | |

Adopting a general to specific approach, whereby the worst performing variables, in terms of coefficient sign and lack of statistical significance are dropped from the regression in turn, yields equation 6.4.3b.

$$\ln \Delta y = \alpha + \beta \ln y + a \ln edu + b \ln agr + c \ln une \qquad \textbf{6.4.3b}$$

A summary of the results is shown in Table 6.4.3c.

**Table 6.4.3c Results for final regression**

| Variable | Coefficient | Standard Error | t-Statistic |
|---|---|---|---|
| Intercept | 2.34 | 1.21 | 1.93 |
| Lny | -0.38 | 0.18 | -2.12 |
| Lnedu | 0.23 | 0.09 | 2.50 |
| Lnagr | -0.05 | 0.03 | -1.62 |
| Lnune | -0.07 | 0.04 | 1.74 |
| $R^2$/Adjusted $R^2$ | 0.50/0.37 | | |

Once the other ancillary variables are dropped the resulting equation shows a marked improvement. The adjusted R squared statistic increases to 0.37. Moreover, the coefficients on the independent variables display the expected *a priori* signs with the initial level of disposable income (*lny*), agricultural employment (*lnagr*) and unemployment (*lnune*) showing expected negative coefficients while the education variable shows a positive coefficient. Moreover, all variables are either statistically significant at the 10 percent level or, as in the case of the agricultural and unemployment variables, almost significant.

The coefficient value for the initial level of disposable income per person of (-0.39) suggests that the disparity between the seven regions would have narrowed at a rate of 4.8 percent per year, and that complete convergence would have taken place after 15 years had the control variables been equal among the regions. As in the case of the productivity analysis, this rate of convergence is far higher than that shown by the simple bivariate analysis employed earlier.[20] The annual rate of convergence for the growth rate of disposable income across the regions was 2.9 percent. This implied that complete convergence would take place after 24 years. The addition of the control or ancillary variables increased the rate of convergence and decreased the time required for complete convergence to take place.

## 6.5 CONCLUSION

The chapter examined the pattern of disparity across the eight planning regions for two principal economic welfare variables, employment and income. The format of the study and the discussion of the results relied on the detection and explanation of convergence patterns in the data sets.

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[20] Given a coefficient value of (-0.39), the convergence rate per annum (x) is equal to $(1.39)^{(1/7)}$ which is 1.048. Thus the annual rate or speed of convergence is 5 percent. At this rate, complete convergence would take 15 years. Complete convergence, y, is calculated as: y=ln(2)/ln(1.048).

Convergence was determined by reference to three mutually inclusive tests. These included a test of sigma convergence, a test of absolute beta convergence and a test of conditional beta convergence. The final test highlighted the variables responsible for convergence.

Sigma convergence was tested using first the Bartlett test for independence of variance and then plotting the variance of the natural log of the economic welfare variable to detect patterns of convergence and/or divergence. At first, employment levels and employment rates were considered for sigma convergence. Both employment levels, which included total, agricultural, industrial and service employment and employment rates showed independence of variance in each period according to the Bartlett test.

Total employment showed an increasing variance over time, which indicated a divergence between the regions, with the rate of increase being much slower from 1971. Convergence patterns characterised industrial employment, in particular from 1966. The variance of agricultural employment showed no definite pattern of convergence or divergence while divergence characterised the entire period for service employment, except in 1986 and 1991 when the variance was constant.

Interpreting the results from the employment studies relied on the variance of population and a study of the employment mix at the regional level. As expected, the variance of population was similar to that of total employment. The regional breakdown of total employment into agriculture, industry and services was similar to that at the national level. Thus the main conclusion from the employment study was that even though overall employment was diverging across the regions, the structural make-up of this total employment was becoming more similar or converging over time. The employment rate showed no one pattern of convergence or divergence over the study period. Moreover, the level of disparity between the regions was similar at both the start and end of the study period. The variance pattern was interpreted with reference to the variance of the age structure of the population, the participation rate and the variance of the unemployment rate. It was found that the variance of the employment rate was most closely linked to or explained by the variance of the unemployment rate.

The two principal economic welfare indicators, that of the productivity-enhanced employment rate and disposable income were then examined for sigma convergence. The variance of the former showed a decreasing variance over time, indicating a convergence of productivity across the eight planning regions. The plot of the variance of disposable income showed a convergence over the 1973 to 1987 period and a divergence to 1994.

Following the sigma convergence study, the chapter considered absolute convergence for the productivity enhanced employment variable and disposable income. The growth rate of both these economic welfare variables was regressed on their initial levels. The results indicated that the growth rate of disposable income was negatively related to its initial level and the growth rate of the productivity-enhanced employment rate was negatively related to its initial level. The coefficients were significant. Thus, the gap between the regions in terms of the productivity-enhanced employment rate was narrowing at a rate of 1.2 percent per annum. At this rate, complete convergence would take place after 58 years. Regional disparity in terms of disposable income per head was narrowing at a rate of 2.9 percent per annum with complete convergence expected after 24 years.

In order to explain these results and thus account for why convergence had taken place, the study built on these convergence findings by including explanatory factors - investment, education, agricultural employment, urban population, service employment, unemployment and policy - into the regression analysis.

First, the growth rate in productivity-enhanced employment was regressed on its initial level and the education rate, the unemployment rate, the investment rate, the share of agricultural employment and the proportion of urban population. The final regression included the initial level of productivity-enhanced employment, agricultural employment, unemployment and the share of industrial investment. The rate of convergence with these explanatory variables was 6 percent per annum, compared to 1.2 percent without, as in the absolute convergence study. A high correlation marked the investment and education variables, with the regression analysis suggesting the inclusion of the investment variable. It was positively related to the growth rate of the productivity-enhanced employment rate while unemployment and agriculture were negatively related. The higher annual rate of convergence suggested that complete convergence should occur after 12 years.

A similar approach was followed for the growth rate of disposable income, which was also regressed on its initial level and each of the following ancillary variables in turn: education, agricultural employment, urban population, service employment, unemployment and policy. There followed a regression that included all of the variables and the analysis concluded with a final regression that included the initial level of disposable income, education, agricultural employment and unemployment. Thus these four variables explained the convergence pattern found in disposable income per head over the 1973 to 1994 period. Moreover, the rate of convergence had increased to 4.8 percent per annum when these variables were included. This rate suggested that complete convergence or the disappearance of regional disparity could take place after 15 years. The education variable, used as a proxy for human capital, was positively related to the growth rate

of disposable income while agricultural employment was negatively related. Similarly unemployment, used a proxy for structural rigidities at the regional level, was negatively related to the growth rate of disposable income.

# Chapter Seven

# EMPLOYMENT CHANGE AND INTRA-REGIONAL DISPARITY

## 7.1 INTRODUCTION

The previous chapter undertook a detailed bivariate and multivariate analysis of the interregional situation in Ireland. This chapter builds on that analysis by examining employment change at the intra-regional level over the 1926 to 1996 period. (The reasons for focusing on employment are basically data-driven, as explained below.) Specifically, the chapter analyses intra-regional economic disparity by looking at both the level and pattern of disparity and identifying those counties that have fared best over the study period. First in section 7.2, there is an examination of county-level changes in employment since 1926; this is followed by a study of the variance of employment and the productivity-enhanced employment rate within six regions[1] over the entire sample period in section 7.3. Section 7.4 elaborates on the results of the disparity study for employment and the productivity-enhanced employment rate by considering the evolving population and employment mix at the county level. Section 7.5 examines the results from applying the absolute beta test of convergence to employment and the productivity-enhanced employment rate for six of the eight planning regions, although the lack of sufficient data precludes the study of explanatory variables and their role in the convergence process. Section 7.6 concludes.

## 7.2 ECONOMIC GROWTH AT THE INTRA-REGIONAL LEVEL

Although income data would be the preferred measure of regional economic welfare[2] such data do not generally exist at the county level.[3] In the absence of such income data, the analysis below is based on employment-based measures. The following section examines employment change in each of the eight planning regions from 1926.[4] Employment is set equal to 100 in this year for each county (the analysis thus precludes any analysis of the variation within regions in this year).

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[1] The low number of counties in two of the regions (i.e. the South West and West with just two counties each) restricts the analysis to just six of the eight planning regions.
[2] See section 2.2 and section 2.4.
[3] This is untrue for the Dublin regional authority and Drudy and Punch (1999) examine income data for this region.
[4] Later in the chapter, we supplement this analysis by looking at intra-regional sectoral employment patterns by using productivity-enhanced employment and *chi*-squared analysis.

Beginning with the East region, Table 7.2a shows that overall employment levels have more than doubled over the 1926 to 1996 period. At the intra-regional level it can also be seen that all four counties in the East have experienced healthy employment growth over the period; such increases range from 57 percent in Meath to 118 percent in Kildare. The other interesting feature that emerges from the table is that there are two distinct stages in the employment developments. Specifically, from 1926 to 1971, while employment had already increased by 63 percent in Dublin, the other counties had all seen sluggish employment growth.[5] From 1971, however, it appears that the counties surrounding Dublin have benefited from its expansion;[6] this would seem to be especially true of Kildare, which has experienced a remarkable 87 percent increase in population between 1971 and 1996 and a doubling of its employment levels.

**Table 7.2a Index of employment change - East region; 1926-1996.**

| | 1926 | 1946 | 1951 | 1961 | 1971 | 1986 | 1996 |
|---|---|---|---|---|---|---|---|
| Dublin | 100 | 120.2 | 149.6 | 143.8 | 162.9 | 175.5 | 211.9 |
| Kildare | 100 | 116.2 | 113.9 | 103.3 | 108.2 | 153.8 | 217.5 |
| Meath | 100 | 110.0 | 107.1 | 94.2 | 99.5 | 119.8 | 156.6 |
| Wicklow | 100 | 103.7 | 108.4 | 97.0 | 102.8 | 124.2 | 162.8 |
| Total | 100 | 117.5 | 138.8 | 131.4 | 146.7 | 163.8 | 202.9 |

Source: Census of Population.

The employment patterns for the South East region are examined in Table 7.2b. Overall, employment in the region has declined by more than 10 percent over the period. At the county level, Tipperary South has seen the largest employment decline (by almost a quarter), while only Waterford has seen an increase (of just 5 percent). Once again, the performance between 1926 and 1971 was particularly poor, with overall employment falling by a quarter, while there has been an increase of more than 20 percent in the 1971 to 1996 period. Similarly, population change has been positive for each county in this period compared to negative changes in the 1926 to 1971 period, see Appendix F, section F.1 and Table 7.2i below.

**Table 7.2b Index of employment change, South East region, 1926-1996.**

| | 1926 | 1946 | 1951 | 1961 | 1971 | 1986 | 1996 |
|---|---|---|---|---|---|---|---|
| Carlow | 100 | 93.5 | 93.5 | 82.6 | 78.1 | 83.7 | 95.5 |
| Kilkenny | 100 | 92.4 | 89.7 | 76.8 | 71.0 | 75.7 | 89.0 |
| Wexford | 100 | 88.1 | 86.3 | 73.3 | 70.1 | 71.4 | 87.4 |
| Waterford | 100 | 88.8 | 94.1 | 83.9 | 87.0 | 87.8 | 105.0 |
| Tipperary South | 100 | 92.0 | 89.4 | 74.7 | 69.6 | 66.9 | 76.8 |
| Total | 100 | 90.5 | 90.0 | 77.4 | 74.5 | 75.9 | 89.8 |

Source: Census of Population.

Employment developments in the North East are examined in Table 7.2c. While overall employment has declined by almost 25 percent over the period, the contrast between the performance of Louth on the one hand, and Cavan and Monaghan on the other, is striking. Louth

[5] In the case of Meath, employment actually declined slightly over the period.

[6] This expansion has produced negative externalities in terms of traffic congestion, housing and labour shortages. Fitzpatrick (1999) refers to "a paradox of unsustainable development of the most sustainable locations" (p. 72).

has experienced fairly steady employment growth throughout the sample period, with employment in 1996 being 30 percent higher than seventy years earlier. By contrast, the employment performance of Monaghan and (especially) Cavan has been very poor, with these counties registering employment losses of about one-third and a half respectively. Underlying these differences, has been significant differences in the sectoral breakdown of employment and population developments in each county. While agricultural employment continues to account for a significant proportion of overall employment in Cavan (26 percent) and Monaghan (22 percent), in Louth the corresponding ratio is only 6 percent (see Appendix F, Section F.3). Some of the contrast in performances between the counties could relate to the fact that Louth contains two major urban centres, Dundalk and Drogheda, and is also situated on the Dublin commuting corridor.

**Table 7.2c Index of employment change - North East region; 1926-1996.**

| | 1926 | 1946 | 1951 | 1961 | 1971 | 1986 | 1996 |
|---|---|---|---|---|---|---|---|
| Cavan | 100 | 86.5 | 80.9 | 61.5 | 53.8 | 46.0 | 50.6 |
| Louth | 100 | 104.8 | 117.6 | 106.4 | 112.5 | 109.7 | 130.2 |
| Monaghan | 100 | 90.5 | 87.4 | 66.8 | 63.0 | 56.6 | 64.7 |
| Total | 100 | 92.7 | 92.9 | 75.4 | 72.6 | 66.7 | 76.6 |

Source: Census of Population.

Table 7.2d examines county level employment data for the Midlands region over the sample period. Overall employment performance in the Midlands has been even poorer than in the South East with total employment declining by almost 30 percent over the period. Employment in Roscommon has fallen by almost 50 percent relative to its 1926 level, while Westmeath, the best performing county only suffered a 5 percent decline in employment. Once again, two distinct pre- and post-1971 performance phases emerge for each of the counties, except for Roscommon, which has seen an almost continuous employment decline throughout the sample period. Moreover, population change pre and post 1971 shows that population change was negative prior to 1971 and positive for all counties, except Roscommon, post 1971 (Table 7.2i). The relative success of Westmeath may be due to the existence of Athlone, a major town[7] whose dominant employment makeup is in the increasingly important services sector, see appendix F, section F.3.

**Table 7.2d Index of employment change - Midlands region; 1926-1996.**

| | 1926 | 1946 | 1951 | 1961 | 1971 | 1986 | 1996 |
|---|---|---|---|---|---|---|---|
| Laois | 100 | 100.9 | 96.2 | 83.0 | 73.1 | 74.1 | 85.9 |
| Longford | 100 | 92.8 | 83.5 | 67.7 | 57.9 | 54.9 | 59.1 |
| Offaly | 100 | 98.6 | 91.1 | 86.7 | 72.2 | 69.5 | 80.8 |
| Westmeath | 100 | 97.1 | 93.6 | 82.6 | 76.1 | 82.3 | 95.1 |
| Roscommon | 100 | 90.5 | 81.9 | 65.3 | 53.1 | 47.9 | 50.2 |
| Total | 100 | 95.5 | 88.6 | 76.3 | 65.4 | 64.2 | 72.2 |

Source: Census of Population.

[7] It is interesting to note that urban population in Westmeath and Roscommon increased by 43.5 and 44.3 percent respectively over the 1966 to 1996 period - Athlone lies on the border of these two counties.

Employment change in the Donegal/North West region is examined in Table 7.2e. Overall employment declined by 44 percent during the 1926 to 1996 period, making it the worst performing region overall. Moreover, Leitrim recorded an employment decline of two thirds over the period, making it by far the worst performer in the country. While Sligo has fared best in the region, its employment level in 1996 was still a third lower than in 1926. However, Donegal and Sligo registered healthy employment gains in the last decade of the sample. Once again, the relatively better performance overall of Sligo county is reflected in the higher proportion of its employment employed in the services sector (59%) compared to Donegal (52%) and Leitrim (49%), see appendix F, section F.3.

**Table 7.2e Index of employment change - Donegal/NW region; 1926-1996**

| | 1926 | 1946 | 1951 | 1961 | 1971 | 1986 | 1996 |
|---|---|---|---|---|---|---|---|
| Donegal | 100 | 84.9 | 80.0 | 61.0 | 53.1 | 48.6 | 59.2 |
| Leitrim | 100 | 82.8 | 76.2 | 56.3 | 43.4 | 33.4 | 34.2 |
| Sligo | 100 | 86.3 | 82.6 | 66.6 | 58.4 | 57.0 | 65.6 |
| Total | 100 | 84.8 | 79.9 | 61.4 | 52.5 | 47.6 | 55.7 |

Source: Census of Population.

Employment change in the Mid-West region is reviewed in Table 7.2f. Overall employment has declined by 7 percent during the sample period, with Limerick recording employment gains of 6 percent and both Tipperary North and Clare registering declines of about a fifth. In the cases of Clare and Limerick, the pre-1971 and post-1971 distinction also emerges clearly from the table. By way of explanation for its better performance, Limerick has a well-developed urban centre[8] and its employment make-up is weighed heavily towards services (57%) and less towards agriculture (11%) than the other counties, see Appendix F, section F.3.

**Table 7.2f Index of employment change - Mid-West region; 1926-1996**

| | 1926 | 1946 | 1951 | 1961 | 1971 | 1986 | 1996 |
|---|---|---|---|---|---|---|---|
| Limerick | 100 | 93.3 | 97.2 | 83.8 | 85.0 | 89.6 | 105.6 |
| Tipperary North | 100 | 96.0 | 91.9 | 77.9 | 73.4 | 69.8 | 79.9 |
| Clare | 100 | 97.7 | 81.8 | 67.6 | 64.6 | 71.3 | 83.4 |
| Total | 100 | 92.0 | 90.8 | 77.1 | 75.7 | 79.3 | 92.7 |

Source: Census of Population.

Table 7.2g examines employment change in the West region where overall employment has declined by 30 percent over the sample period. However, the contrast between the performances of Galway and Mayo is striking. While employment fell by less than 10 percent in Galway over the period, in Mayo employment in 1996 was only half its level in 1926. And, while Mayo has registered small employment gains in the last decade of the sample, in Galway the employment gains over this period have been impressive.[9] This improved performance is probably due to its

[8] Clare also has the well-developed urban centres of Ennis and Shannon, which may account in part for its markedly improved performance since 1971.

[9] Employment increased by 22 percent in Galway over the 1986 to 1996 period or at a rate of 2 percent per annum.

large (and rapidly growing) urban centre and an employment make-up that favours services (59 percent of total employment in 1996) (Appendix F, section F.3).

**Table 7.2g Index of employment change - West region; 1926-1996.**

| | 1926 | 1946 | 1951 | 1961 | 1971 | 1986 | 1996 |
|---|---|---|---|---|---|---|---|
| Galway | 100 | 95.1 | 90.1 | 77.7 | 70.7 | 74.9 | 91.3 |
| Mayo | 100 | 85.4 | 81.3 | 64.0 | 52.0 | 45.1 | 49.6 |
| Total | 100 | 90.3 | 85.7 | 70.9 | 61.4 | 60.0 | 70.5 |

Source: Census of Population.

Employment change in the South West region is examined in Table 7.2h. Overall, employment in the region has declined by 6 percent over the period, with the pre- and post-1971 distinction once more in evidence. And, once again, Cork, the county with a major urban centre, has seen a much better overall performance than Kerry, with employment increasing slightly over the sample period, as opposed to almost a 30 percent decline in Kerry. As regards the sectoral breakdown of employment, in 1996, service employment accounted for almost 60 percent of total employment in Cork, while agricultural employment accounted for just 12 percent. In Kerry, although the service sector share was only slightly lower than in Cork, the agriculture sector accounted for almost 20 percent of total employment in 1996 (Appendix F, section F.3).

**Table 7.2h Index of employment change - South West region; 1926-1996**

| | 1926 | 1946 | 1951 | 1961 | 1971 | 1986 | 1996 |
|---|---|---|---|---|---|---|---|
| Cork | 100 | 92.4 | 96.2 | 85.5 | 85.5 | 86.4 | 102.8 |
| Kerry | 100 | 90.1 | 84.2 | 69.0 | 63.6 | 60.1 | 72.7 |
| Total | 100 | 91.8 | 92.7 | 80.7 | 79.1 | 78.8 | 94.1 |

Source: Census of Population.

Apart from the strong performances in the East region, which is no doubt related to the expansion of Dublin, only four counties, Cork, Limerick, Waterford and Louth experienced positive overall employment change relative to the 1926 level of employment. Of these, only Louth, which experienced a 30 percent employment increase over the sample period, registered any significant gains. It is also likely that Louth registered some of these gains as a result of its position within the Dublin commuter belt. The remaining three counties (Waterford, Limerick and Cork) all registered gains of 6 percent or less. The common characteristics of these counties included the existence of an urban centre in each case and a sectoral makeup of employment that relied more on services and less on agriculture than most of the other counties.

The analysis also showed a distinct divide between the pre and post 1971 period. The following two tables examine the percentage change in population, employment including agriculture, industry and service employment for the counties for the 1926 to 1971 period and from 1971 to 1996 respectively.

**Table 7.2i Percentage change in population and employment - counties; 1926-1971**

| | | Population Change | Employment Change | Agriculture Change | Industry Change | Service Change |
|---|---|---|---|---|---|---|
| | | 1926-1971 | 1926-1971 | 1926-1971 | 1926-1971 | 1926-1971 |
| East | Dublin | 68.5 | 62.9 | -44.1 | 121.8 | 44.7 |
| | Kildare | 24.0 | 8.2 | -47.3 | 324.4 | -2.9 |
| | Meath | 13.7 | -0.5 | -43.3 | 207.7 | 14.0 |
| | Wicklow | 15.1 | 2.8 | -52.7 | 202.4 | 10.4 |
| South East | Carlow | -0.7 | -21.9 | -51.2 | 56.7 | -7.1 |
| | Kilkenny | -13.4 | -29.0 | -55.0 | 67.5 | -13.5 |
| | Wexford | -9.9 | -29.9 | -55.8 | 44.7 | -7.3 |
| | Waterford | -1.6 | -13.0 | -55.9 | 114.5 | -13.5 |
| | Tipperary S. | -14.9 | -30.4 | -51.7 | 32.7 | -19.3 |
| North East | Cavan | -36.2 | -46.2 | -63.4 | 96.4 | -17.3 |
| | Louth | 19.7 | 12.5 | -63.5 | 180.9 | 5.4 |
| | Monaghan | -29.0 | -37.0 | -62.3 | 126.7 | -7.8 |
| Midlands | Laois | -12.2 | -26.9 | -52.7 | 78.0 | -2.8 |
| | Longford | -29.1 | -42.1 | -61.9 | 82.4 | -7.2 |
| | Offaly | -1.5 | -27.8 | -56.1 | 20.1 | -2.3 |
| | Westmeath | -5.7 | -23.9 | -57.5 | 70.2 | 8.4 |
| | Roscommon | -35.9 | -46.9 | -60.9 | 69.8 | -6.6 |
| Donegal/ NW | Donegal | -29.0 | -46.9 | -68.9 | 56.0 | -7.9 |
| | Leitrim | -49.3 | 56.6 | -68.4 | 45.0 | -19.0 |
| | Sligo | -29.6 | -41.6 | -63.9 | 73.9 | -2.3 |
| Mid-West | Limerick | 0.1 | -15.0 | -53.1 | 55.0 | 4.2 |
| | Clare | -21.1 | -35.4 | -58.0 | 38.2 | 1.4 |
| | Tipperary N. | -8.9 | -26.6 | -53.3 | 95.3 | -10.8 |
| West | Galway | -11.9 | -29.3 | -55.0 | 107.3 | 32.4 |
| | Mayo | -36.6 | -48.0 | -63.8 | 90.1 | -0.6 |
| South West | Cork | -3.5 | -14.5 | -55.1 | 88.0 | -5.4 |
| | Kerry | -24.4 | -36.4 | -58.4 | 64.7 | -7.7 |
| Total | | 0.2 | -13.8 | -58.3 | 99.4 | 12.4 |

Source: Census of Population.

All counties except Dublin, Kildare, Louth, Meath, Wicklow and Limerick experienced a fall in population over the 1926 to 1971 period, Table 7.2i. This is unsurprising given the above discussion on total employment. However, it is also apparent from Table 7.2i that employment losses were due to the significant decreases that occurred in agricultural employment and which were not subsequently generated in industry and services. This was evident especially in Donegal, Leitrim, Clare, Mayo, Offaly, Wexford and Longford. The remaining counties showed significant increases in industrial employment in particular and also in service employment.

Agricultural employment continued to show large decreases over the 1971 to 1996[10] period, Table 7.2j, but unlike the previous period, total employment change was positive in all counties except for Leitrim, Mayo, Roscommon and Cavan. Thus, industrial and in particular service employment continued to experience increases, which contributed to the overall increase in total employment. Moreover, population change was positive in all counties except Leitrim and Roscommon.

[10] Matthews (1995) examines the structural changes that have taken place in agriculture and identifies the challenges for the sector and for rural development in the Republic of Ireland.

The increase in industrial employment that took place in most counties over the 1926 to 1971 period was especially evident in Dublin, Kildare, Meath, Wicklow, Louth, Waterford, Galway and Monaghan, Table 7.2i. On the other hand, service employment showed the highest increases over the 1971 to 1996 period and this was especially evident again in the counties of Dublin, Wicklow, Meath, Galway and Clare, see Table 7.2j.

**Table 7.2j Percentage change in population and employment - counties; 1971 - 1996**

| | | Population Change | Employment Change | Agriculture Change | Industry Change | Service Change |
|---|---|---|---|---|---|---|
| | | 1971-1996 | 1971-1996 | 1971-1996 | 1971-1996 | 1971-1996 |
| East | Dublin | 21.6 | 22.4 | -45.7 | 41.2 | 68.7 |
| | Kildare | 87.4 | 101.1 | -34.5 | 59.4 | 209.8 |
| | Meath | 52.8 | 57.4 | -42.2 | 53.1 | 166.4 |
| | Wicklow | 54.5 | 58.4 | -39.7 | 19.5 | 142.4 |
| South East | Carlow | 21.6 | 22.4 | -45.7 | 41.2 | 68.7 |
| | Kilkenny | 22.3 | 25.3 | -42.4 | 24.9 | 99.6 |
| | Wexford | 20.8 | 24.7 | -40.6 | 49.2 | 71.5 |
| | Waterford | 22.4 | 20.7 | -39.1 | 17.5 | 55.3 |
| | Tipperary S. | 8.9 | 10.3 | -43.4 | 39.2 | 45.8 |
| North East | Cavan | 0.5 | -6.0 | -53.5 | 34.7 | 52.4 |
| | Louth | 22.7 | 15.8 | -44.3 | -10.7 | 67.1 |
| | Monaghan | 10.9 | 2.7 | -46.3 | 22.3 | 52.8 |
| Midlands | Laois | 16.7 | 17.5 | -45.3 | 25.3 | 90.6 |
| | Longford | 6.7 | 2.1 | -55.0 | 48.9 | 61.3 |
| | Offaly | 14.0 | 12.0 | -46.8 | 17.1 | 73.3 |
| | Westmeath | 18.0 | 25.0 | -50.9 | 67.6 | 58.7 |
| | Roscommon | -3.1 | -5.5 | -61.2 | 71.0 | 78.7 |
| Donegal/NW | Donegal | 19.5 | 11.4 | -64.2 | 59.5 | 72.2 |
| | Leitrim | -11.7 | -21.2 | -69.0 | 47.5 | 49.4 |
| | Sligo | 10.7 | 12.3 | -63.4 | 49.8 | 86.0 |
| Mid-West | Limerick | 17.5 | 24.2 | -47.1 | 35.5 | 59.1 |
| | Clare | 25.2 | 29.2 | -53.8 | 62.3 | 125.3 |
| | Tipperary N. | 6.6 | 8.8 | -45.9 | 15.1 | 68.6 |
| West | Galway | 26.4 | 29.0 | -58.8 | 84.2 | 124.5 |
| | Mayo | 1.7 | -4.6 | -63.1 | 71.0 | 70.6 |
| South West | Cork | 19.1 | 20.3 | -42.1 | 4.6 | 68.7 |
| | Kerry | 11.6 | 14.3 | -51.9 | 29.9 | 89.8 |
| Total | | 21.6 | 23.9 | -50.9 | 9.7 | 78.5 |

Source: Census of Population.

## 7.3 EMPLOYMENT DISPARITIES

The following subsections build on the above analysis by extending the formal analysis of convergence - using charts of variance and the Bartlett test as before - to analyse the pattern of disparity over time in each of the regions.[11] The methodology is similar to that used for the study of inter-regional convergence in the previous chapter. First, the Bartlett test for homogeneity of variance is computed for the employment variable and then a plot of the variance is shown to ascertain whether sigma convergence or divergence has taken place. Total employment and its

components are first examined and then the variance of the productivity-enhanced employment rate is considered.

### 7.3.1 Total and Sectoral Employment Disparities

Data on total and sectoral employment are available at the county level. This section examines the intra-regional variance of total employment and each of its components - agriculture, industry and services - and also that of the employment rate, which is defined as the ratio of those employed to the population. As before, the West and South West regions are examined separately, due to the small number of counties in these regions. Results from the Bartlett test for total employment are given in Table 7.3.1a below.

**Table 7.3.1a Results of Bartlett Test for Total Employment- 6 regions**

| Region | Bartlett Test Result | Critical Values | Accept/Reject Homogeneity |
|---|---|---|---|
| East | 6.9 | 6.3 | Reject at 10% |
| South East | 3.4 | 3.4 | Accept[12] |
| North East | 8.1 | 7.4 | Reject at 2.5% |
| Midlands | 13.4 | 11.1 | Reject at 2.5% |
| Donegal/NW | 5.2 | 4.6 | Reject at 10% |
| Mid-West | 1.1 | 1.1 | Accept |

The East region has 3 degrees of freedom. The South East and Midlands have 4 degrees of freedom. The North East, Donegal/North West and the Mid-West have 2 degrees of freedom.

The Bartlett test results indicate that homogeneity of variance is rejected for all the regions, except for the South East and Mid-West. This indicates that the variance of total employment within each region (except for the South East and Mid-West) varies in a statistically significant way over time,[13] albeit at varying degrees of statistical significance. Table 7.3.1b examines the results from the Bartlett test for agricultural employment within the given regions. Unlike the case for total employment, the Bartlett test indicates that homogeneity of variance is rejected at the 1 percent level in all of the regions.

**Table 7.3.1b Results of Bartlett Test for Agricultural Employment - 6 regions**

| Region | Bartlett Test Result | Critical Values | Accept/Reject Homogeneity |
|---|---|---|---|
| East | 25.3 | 11.3 | Reject at1% |
| South East | 39.9 | 13.3 | Reject at 1% |
| North East | 33.9 | 9.2 | Reject at 1% |
| Midlands | 80.0 | 13.3 | Reject at 1% |
| Donegal/NW | 50.2 | 9.2 | Reject at 1% |
| Mid-West | 28.3 | 9.2 | Reject at 1% |

Degrees of freedom are the same as those given at the end of Table 7.3.1a.

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[11] It is not possible to extend this formal analysis to the South West and West regions, each of which has only two counties. However, we test informally for the presence or otherwise of convergence in each of these two regions.

[12] "Accept" is used where the null hypothesis is not rejected at the 10 percent level.

The Bartlett test results for industrial employment within each of the six planning regions are given in Table 7.3.1c below. Once more, the test is rejected for all the regions at varying degrees of statistical significance.

**Table 7.3.1c Results of Bartlett Test for Industrial Employment - 6 regions**

| Region | Bartlett Test Result | Critical Values | Accept/Reject Homogeneity |
|---|---|---|---|
| East | 7.3 | 6.3 | Reject at 10% |
| South East | 15.9 | 13.3 | Reject at 1% |
| North East | 8.5 | 7.8 | Reject at 5% |
| Midlands | 18.7 | 13.3 | Reject at 1% |
| Donegal/NW | 6.8 | 6.0 | Reject at 5% |
| Mid-West | 6.1 | 6.0 | Reject at 5% |

Degrees of freedom are the same as those given at the end of Table 7.3.1a.

Table 7.3.1d examines the results from the Bartlett test for service employment within the six planning regions. This time, homogeneity of variance is accepted in the cases of Donegal North West and the Mid West, although it is rejected in the case of all the other regions covered, albeit at varying degrees of statistical significance.

**Table 7.3.1d Results of Bartlett Test for Service Employment- 6 regions**

| Region | Bartlett Test Result | Critical Values | Accept/Reject Homogeneity |
|---|---|---|---|
| East | 11.2 | 9.3 | Reject at 2.5% |
| South East | 4.8 | 4.6 | Reject at 10% |
| North East | 14.0 | 9.2 | Reject at 1% |
| Midlands | 14.0 | 13.3 | Reject at 1% |
| Donegal/NW | 4.4 | 2.8 | Accept |
| Mid-West | 3.1 | 2.8 | Accept |

Degrees of freedom are the same as those given at the end of Table 7.3.1a.

The following paragraphs examine the pattern of the variance of each of the employment variables for the six planning regions over the 1926 to 1996 period. We will be able to comment on whether the level of disparity among the counties has increased or decreased over the period by comparing the start and end value of variance. Furthermore, the pattern of variance will indicate whether there has been a convergence (declining variance) or divergence (increasing variance) among the counties. The results of the Bartlett tests should, however, be considered when interpreting the results. For example, in the case of the total employment and service sector employment analysis, the fact that homogeneity of variance is accepted for some of the regions should be borne in mind.[14] Rather than discuss each plot of variance for each variable and region, Table 7.3.1e below reports on the pattern of variance for total, agricultural, industrial and service sector employment levels over the 1926 to 1996 period. It also shows, in the final column, how overall disparity had changed from the start to the end of the sample period. The underlying graphs are given in Appendix F, section F.2.

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[13] In other words, the variance across the counties in each region is independent from one period to the next; i.e. the variance of total employment in 1936 does not depend on the variance of total employment in 1926 etc.

[14] When homogeneity of variance has been accepted, the variance in one period depends or is influenced by the variance in another period.

Beginning with total employment, the Donegal/North West region has seen a pattern of persistent divergence over the sample period, although this is not the case for the other regions. While the East region shows convergence at the latter end of the sample period, between 1971 and 1996, in the Mid-West convergence took place at the beginning of the sample period, with divergence having occurred since 1936. The North East displayed convergence up until 1951 and again throughout the 1980s, with divergence at all other times, while the Midlands only saw convergence at the beginning of the period, 1936-1946, and over the five year 1966 to 1971 period. The South East also experienced convergence at the beginning of the period to 1961 and divergence from 1981.

The overall pattern of variance for agricultural employment throughout the regions was also shows mixed results. The Mid-West region shows a pattern of persistent convergence from the beginning of the period and, while the North East only saw a decade of divergence in its agricultural employment, in the remaining regions there were alternating periods of convergence and divergence.

As for industrial employment, only the East region saw convergence for the vast majority of the period. And, while only the North East and Midlands saw sustained convergence from the 1960s, there were long periods of divergence in the other regions.

As for services sector employment, only two regions, the East and Mid-West, have seen convergence of employment levels in this sector over the majority of the study period, and even for both of these regions there were long periods in which divergence took place. However, it is noteworthy that there has been a convergence of service sector employment for most of the regions for at least the past decade of the sample period.

Comparing the value of variance at the beginning and end of the study period indicates whether the level of disparity between the counties has increased or decreased, without identifying the counties in question, see the final column in Table7.3.1e above. However, reference to the underlying data identifies the county with the highest and lowest share of the variable in question (here employment and its components), see appendix F, section F.3 and also illustrates whether there has been a change in the top and bottom ranking county over the study period. Moreover, the magnitude of the percentage differences between the highest and lowest ranking county illustrates on the degree of disparity between these two counties.

**Table 7.3.1e Variance of employment - six regions; 1926-1996.**

| Graph | Counties in: | Variable | Convergence | Divergence | Disparity |
|---|---|---|---|---|---|
| F.2a | East | Total | 1936-1946<br>1971-1996 | 1926-1936<br>1946-1971 | ↑ |
| | | Agriculture | 1926-1936<br>1961-1966<br>1981-1991 | 1936-1961<br>1966-1981<br>1991-1996 | Same |
| | | Industry | 1936-1996 | 1926-1936 | ↓ |
| | | Services | 1971-1996 | 1926-1971 | ↓ |
| F.2b | South East | Total | 1926-1961<br>1971-1981 | 1961-1971<br>1981-1996 | ↓ |
| | | Agriculture | 1926-1946<br>1951-1971<br>1981-1986<br>1991-1996 | 1946-1951<br>1971-1981<br>1986-1991 | ↓ |
| | | Industry | 1946-1961<br>1971-1981 | 1926-1946<br>1961-1971<br>1981-1996 | ↑ |
| | | Services | 1936-1966<br>1971-1981<br>1986-1991 | 1926-1936<br>1966-1971<br>1981-1986<br>1991-1996 | ↓ |
| F.2d | North East | Total | 1926-1951<br>1981-1991 | 1951-1981<br>1991-1996 | ↑ |
| | | Agriculture | 1926-1946<br>1951-1966<br>1971-1996 | 1946-1951<br>1966-1971 | ↓ |
| | | Industry | 1936-1946<br>1961-1991 | 1926-1936<br>1946-1961<br>1991-1996 | ↓ |
| | | Services | 1926-1946<br>1986-1996 | 1946-1986 | ↑ |
| F.2c | Midlands | Total | 1936-1946<br>1966-1971 | 1926-1936<br>1946-1966<br>1971-1996 | ↑ |
| | | Agriculture | 1936-1946<br>1966-1996 | 1926-1936<br>1946-1966 | ↓ |
| | | Industry | 1926-1946<br>1961-1991 | 1946-1961<br>1991-1996 | ↓ |
| | | Services | 1926-1946<br>1986-1996 | 1946-1986 | ↑ |
| F.2e | NW/Donegal | Total | | 1926-1996 | ↑ |
| | | Agriculture | 1926-1961<br>1966-1981 | 1961-1966<br>1981-1996 | ↑ |
| | | Industry | 1926-1946<br>1951-1961<br>1966-1981 | 1946-1951<br>1961-1966<br>1966-1981 | ↑ |
| | | Services | 1926-1936<br>1966-1971<br>1991-1996 | 1936-1966<br>1971-1991 | ↑ |
| F.2f | Mid-West | Total | 1926-1936 | 1936-1996 | ↑ |
| | | Agriculture | 1926-1996 | | ↓ |
| | | Industry | 1926-1946<br>1951-1961<br>1966-1971<br>1991-1996 | 1946-1951<br>1961-1966<br>1971-1991 | ↓ |
| | | Services | 1926-1946<br>1961-1966<br>1971-1996 | 1946-1961<br>1966-1971 | Same |

For example, the degree of disparity between the highest and lowest ranking county within the Midlands, North East and South East regions remained fairly constant when comparing the 1926 disparity level with that of 1996.[15] This was less true of the East, North West/Donegal and Mid-West regions. The level of disparity between Dublin and Wicklow increased from 8.6 percent in 1926 to 11.2 percent in 1996 - Dublin continuing to have the highest share of total employment. Donegal in the North West/Donegal region has the highest share of employment but the difference between it and Leitrim has increased from 2.7 percent in 1926 to 4.7 percent in 1996. In the Mid-West, Limerick continues to have the highest share of total employment and the difference between it and Tipperary North has increased from a 2.1 percentage difference in 1926 to 2.8 percent in 1996.

Turning to agricultural employment, Table 7.3.1e indicates that the disparity between the end and start years of the period increased for the Donegal/North West region and decreased for all other regions. An exception was the East, where the level of disparity remained the same from the beginning to the end of the sample period. Despite this, the percentage difference between the highest and lowest ranked county in 1926 is less than that in 1996 suggesting an increasing gap between these two counties, see appendix F, section F.3. There was some change in the top and bottom ranking of the counties within the regions - Tipperary North replaced Clare in 1996 as having the highest share of agricultural employment in the Mid-West region compared to1926. In the South East region, Tipperary South replaced Kilkenny as the county with the highest share of agricultural employment in 1996 compared to 1926. On the other hand, Westmeath in the Midlands region replaced Offaly as the county with the lowest share of agricultural employment in 1996 and Donegal replaced Sligo in the North West/Donegal region when comparing the position of counties in 1926 and 1996. Limerick, Louth and Waterford in the Mid-West, North East and South East regions respectively maintained their relative position as the counties with the lowest share of agricultural employment when comparing 1926 with 1996.

Although the level of disparity in industrial employment decreased in all regions except the South East and North West/Donegal region, (Table7.3.1e) once again, the percentage difference between the highest and lowest ranking county decreased dramatically within all of the regions except the South East region. In this region, the share of industrial employment in Waterford was 29 percent greater than in Wexford in 1926 increasing to 30 percent in 1996 with Kilkenny replacing Wexford as the county with the lowest share of industrial employment. There was no change in the top and bottom ranking counties in the share of industrial employment in the North East (Louth and Cavan

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[15] Total employment in 1926 in Roscommon was 2.1% higher than that in Longford while in1996, this level had increased to 2.2 percent with Westmeath replacing Roscommon as the county with the highest share of total employment. The share of total employment in Cavan in 1926 was 1.5 percent higher than in Louth and by 1996 Louth's share of employment was 1.7 percent greater than that in Monaghan. Total employment in

respectively), in the Midlands region (Offaly and Roscommon) and Mid-West region (Limerick and Tipperary North respectively). On the other hand, Meath replaced Dublin in having the highest share of industrial employment in 1996 in the East region while Dublin replaced Kildare in having the lowest share of industrial employment when comparing 1996 with 1926. Similarly, in the North West/Donegal region, Sligo replaced Leitrim in having the lowest share of industrial employment in 1996 while Donegal continued to have the highest share of industrial employment.

The final column in the tables suggests that the level of disparity in service employment has actually increased in the Midlands, North East and Donegal/NW regions, while remaining the same in the Mid-West region. Turning to the share of service employment in the highest and lowest ranked counties, service employment in Dublin in 1926 was 133 percent higher than Meath in the East region, falling to a 39 percent difference in 1996. Louth, Westmeath, Sligo and Limerick continue to have the highest share of industrial employment in their respective regions (North East, Midlands, North West/Donegal and Mid-West) when comparing 1996 with 1926, see appendix F, section F.3. On the other hand, there has been a change in the lowest ranking counties in all regions except the East (Meath), North East (Cavan) and North West/Donegal (Leitrim). Tipperary South replaces Kilkenny in having the lowest share of service employment in 1996 in the South East region while Longford replaces Roscommon (Midlands region) and Tipperary North replaces Clare (Mid-West).

To complement the above analysis, the shares of total, agricultural, industrial and service employment for the remaining two regions, the West and South West, are examined next in Tables 7.3.1f and 7.3.1g. In Table 7.3.1f below it can be seen that, although the share of total employment in the West was equal in both Galway and Mayo in 1926, the share occupied by Galway had increased to almost two thirds by 1996.

Turning to the sectors, Table 7.3.1f shows that, although the share of agricultural employment in both counties has fallen dramatically over the sample period, Galway has reduced its share of agricultural employment somewhat more rapidly than Mayo. On the other hand, the share of industrial employment in each county has increased dramatically over the study period, from just over 5 percent on average in 1926 to 26 percent in 1996. At the end of the sample period, Mayo had a slightly higher share of industrial sector employment than Galway, a reversal of the position in 1926. The share of services employment has also increased dramatically in each county over the study period, with the regional share increasing from 16.6 percent in 1926 to 56.4 percent in 1996, with the services sector employment share in Galway being 8 percent higher than in Mayo at the end of the period.

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Wexford was 2.8 percent higher than that of Carlow in 1926. By 1996, the difference had decreased to 2.6percent.

**Table 7.3.1f Share of employment - West region; 1926-1996.**

| | | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | Galway | 50.1 | 51.0 | 52.8 | 52.6 | 54.9 | 56.3 | 57.7 | 60.9 | 62.5 | 63.6 | 64.9 |
| | Mayo | 49.9 | 49.0 | 47.2 | 47.4 | 45.1 | 43.7 | 42.3 | 39.1 | 37.5 | 36.4 | 35.1 |
| | Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Agricultural | Galway | 75.8 | 71.3 | 69.3 | 64.3 | 60.2 | 54.9 | 48.2 | 29.6 | 26.4 | 21.5 | 15.4 |
| | Mayo | 80.9 | 77.4 | 76.6 | 72.7 | 67.2 | 62.1 | 56.3 | 37.3 | 33.0 | 30.8 | 21.8 |
| | Total | 78.3 | 74.3 | 72.8 | 68.3 | 63.3 | 58.0 | 51.6 | 32.6 | 28.9 | 24.9 | 17.6 |
| Industrial | Galway | 6.1 | 8.6 | 8.6 | 12.6 | 12.4 | 15.0 | 17.8 | 25.4 | 24.8 | 24.7 | 25.4 |
| | Mayo | 4.1 | 6.2 | 6.7 | 8.8 | 10.2 | 13.0 | 15.1 | 25.6 | 24.6 | 24.0 | 27.0 |
| | Total | 5.1 | 7.4 | 7.7 | 10.8 | 11.4 | 14.1 | 16.7 | 25.5 | 24.7 | 24.4 | 26.0 |
| Service | Galway | 18.2 | 20.2 | 22.0 | 23.2 | 27.4 | 30.2 | 34.0 | 44.9 | 48.8 | 53.8 | 59.2 |
| | Mayo | 15.0 | 16.4 | 16.6 | 18.5 | 22.6 | 24.9 | 28.6 | 37.1 | 42.4 | 45.2 | 51.2 |
| | Total | 16.6 | 18.3 | 19.5 | 21.0 | 25.2 | 27.8 | 31.7 | 41.9 | 46.4 | 503.7 | 56.4 |

Source: Census of Population.

Employment data for the South West region are examined in Table 7.3.1g below. Beginning with total employment, Cork accounts for the greater proportion of employment in the region and this share increased by seven percentage points between 1926 and 1981. Since then the proportionate share of employment in both regions has remained very steady at 78 percent for Cork and 22 percent for Kerry. Both counties have experienced sharp declines in their share of agricultural employment over time. The decline has, however, been larger in the case of Kerry, which started the period with almost 70 percent employed in agriculture; the ratio of the shares employed in both counties has, however, remained fairly constant over the period. The share of industrial employment has increased significantly in both counties over the study period. This trend is more noticeable in Kerry, where the share of industrial employment was just 8 percent in 1926 compared to 15 percent in Cork. The level of disparity between the two counties narrowed sharply during the 1970s, a period in which the share of industrial employment in Cork increased by only 1 percent and that in Kerry increased by more than 8 percent. The share of service employment has increased markedly in each county also and accounted for more than 59 percent of total employment in Cork in 1996 and 58 percent in Kerry and the disparity between the counties was also at its lowest at the end of the sample period.

**Table 7.3.1g Share of employment - South West region; 1926-1996.**

| | | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total | Cork | 71.0 | 71.8 | 71.5 | 73.6 | 75.2 | 76.2 | 76.7 | 77.8 | 77.8 | 77.8 | 77.6 |
| | Kerry | 29.0 | 28.2 | 28.5 | 26.4 | 24.8 | 23.8 | 23.3 | 22.2 | 22.2 | 22.2 | 22.4 |
| | Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Agricultural | Cork | 46.7 | 44.3 | 44.2 | 37.8 | 33.1 | 29.0 | 24.5 | 17.1 | 16.8 | 15.4 | 11.8 |
| | Kerry | 68.1 | 66.2 | 64.5 | 60.9 | 56.0 | 51.5 | 44.6 | 30.5 | 28.2 | 24.8 | 18.8 |
| | Total | 52.9 | 50.5 | 50.0 | 43.9 | 38.8 | 34.4 | 29.2 | 20.1 | 19.3 | 17.5 | 13.4 |
| Industrial | Cork | 15.1 | 18.3 | 19.7 | 25.2 | 27.9 | 31.1 | 33.1 | 34.0 | 29.8 | 29.4 | 28.8 |
| | Kerry | 8.0 | 9.6 | 11.0 | 14.1 | 14.3 | 16.5 | 20.7 | 29.0 | 26.1 | 25.6 | 23.5 |
| | Total | 13.0 | 15.9 | 17.2 | 22.3 | 24.5 | 27.6 | 30.2 | 32.9 | 29.0 | 28.6 | 27.6 |
| Service | Cork | 38.2 | 37.4 | 36.1 | 37.0 | 39.0 | 39.9 | 42.3 | 48.9 | 53.5 | 55.2 | 59.4 |
| | Kerry | 24.0 | 24.2 | 24.5 | 25.0 | 29.7 | 32.1 | 34.8 | 40.4 | 45.7 | 49.6 | 57.8 |
| | Total | 34.1 | 33.6 | 32.8 | 33.8 | 36.7 | 38.0 | 40.6 | 47.0 | 51.7 | 54.0 | 59.0 |

Source: Census of Population.

### 7.3.2 Productivity-Enhanced Employment

Productivity-enhanced employment has already been studied at the inter-regional level in the previous chapter. This variable combines the employment rate (those employed divided by population) with the ratio of industrial and service employment to total employment. As noted in the previous chapter, the industrial and service sectors are more productive than the agricultural sector, so that higher proportions of employment accounted for by these sectors would tend to be associated with higher overall output. The variance of the natural log of productivity-enhanced employment is examined for six of the eight planning regions and the productivity-enhanced employment rate is examined for the West and South West regions.[16] Figure 7.3.2a begins the analysis by plotting the variance for the East region.

It can be seen that, apart from the 1936 to 1951 period, when the variance did not change much, there has been a persistent convergence of the productivity enhanced employment variable within the East region.

[16] Given that the Bartlett test has already been carried out for total employment and its components for each of the regions, it is not computed again for the productivity-enhanced employment measure.

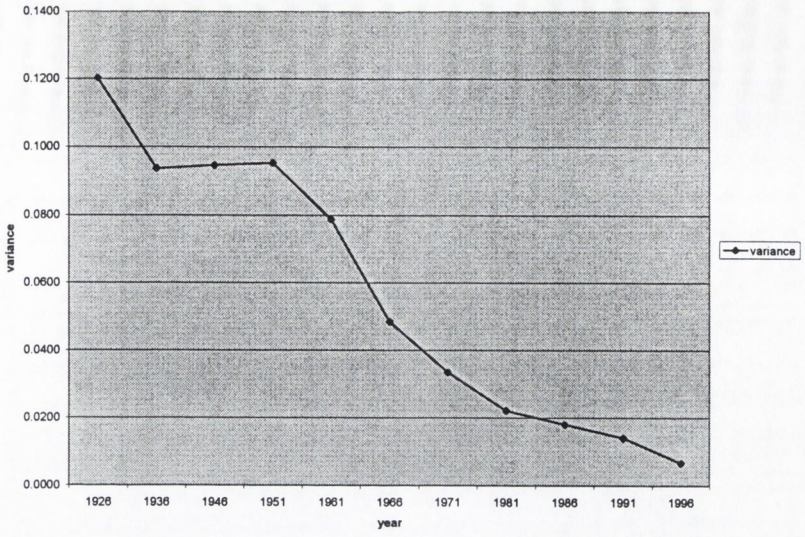


**Figure 7.3.2a Variance of productivity-enhanced employment; East region**

In the South East (Figure 7.3.2b), while the variance has also declined over the sample period, the pattern has been much less systematic. After declining for the first 20 years of the sample, variance increased over the 1946 to 1961 period. While the variance has continuously declined from this point, it was not until 1981 that variance fell below its level at the start of the sample period.

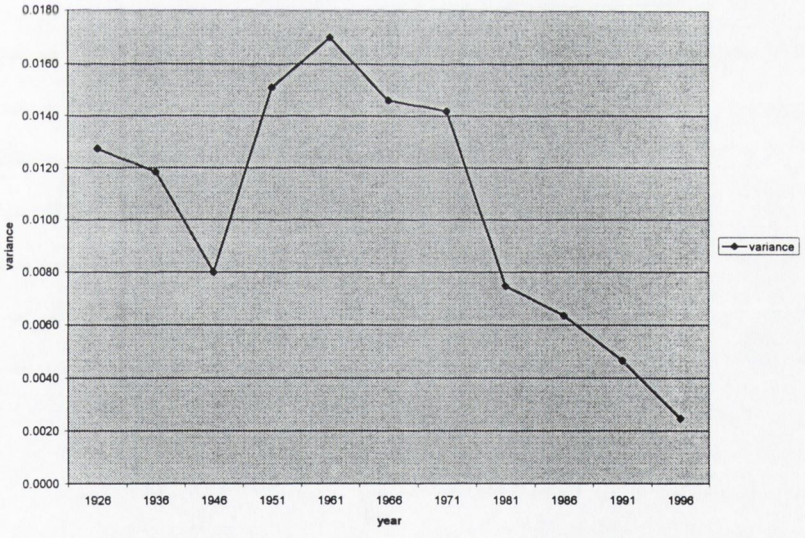


**Figure 7.3.2b Variance of productivity-enhanced employment; South East region**

Figure 7.3.2c examines the variance of the productivity-enhanced employment measure for the North East region. It has also seen an almost uninterrupted decline in its variance, although there was a small upturn in the 1946 to 1991 period and the rate of decline has tapered off since 1981.

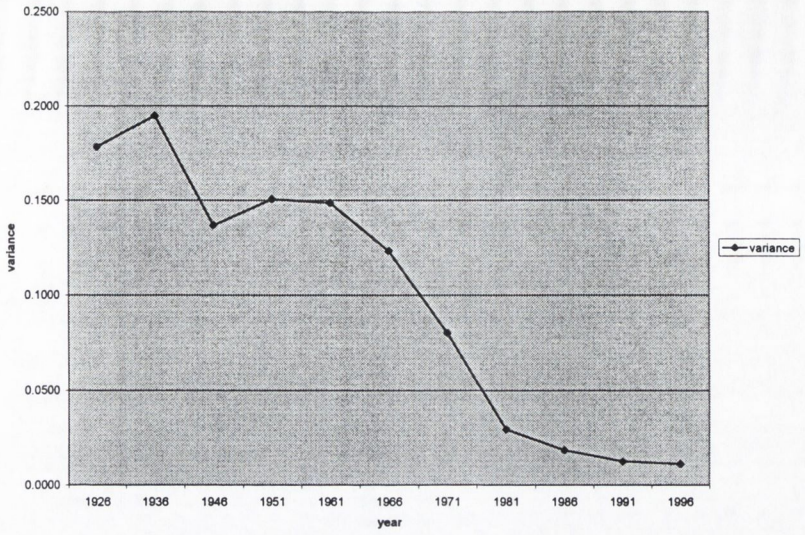


**Figure 7.3.2c Variance of productivity enhanced employment rate - North East region**

The variance of the productivity-enhanced employment rate for the Midlands region is examined in Figure 7.3.2d. The pattern of variance is very similar to that of the North East, i.e. an overall decline in variance, albeit with a period of 15 years (1946 to 1961) in which the variance increased and with a tapering off from the 1980s onwards.

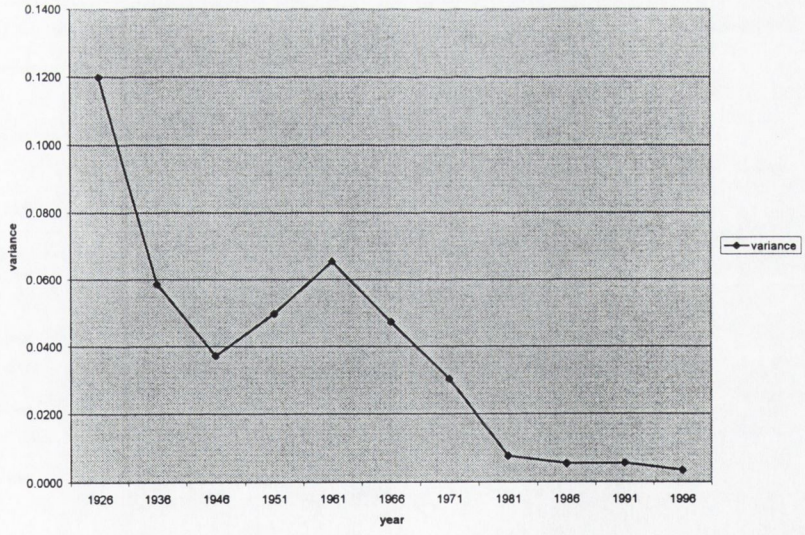


**Figure 7.3.2d Variance of productivity enhanced employment rate - Midlands region**

In the North West/Donegal region (Figure 7.3.2e), variance also declines, with some upturn in the 1946 to 1966 period. The rate of decline has also tapered off in this region, this time since 1986.

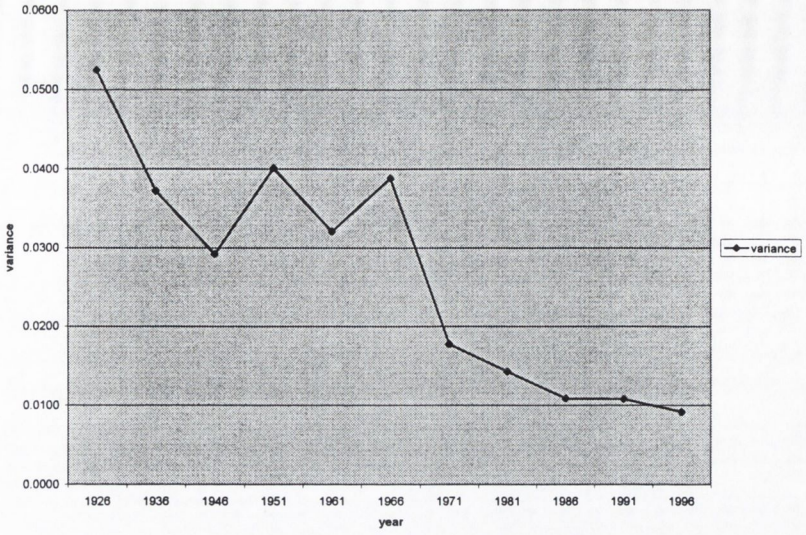


**Figure 7.3.2e Variance of productivity enhanced employment rate - DNW region**

Finally, the variance of the productivity-enhanced employment measure for the Mid-West region is examined in Figure 7.3.2f. Its variance did not change from 1926 and 1951, following alternating periods of variance increase and decline. However, the variance has been declining since then, with some tapering off from the 1980s.

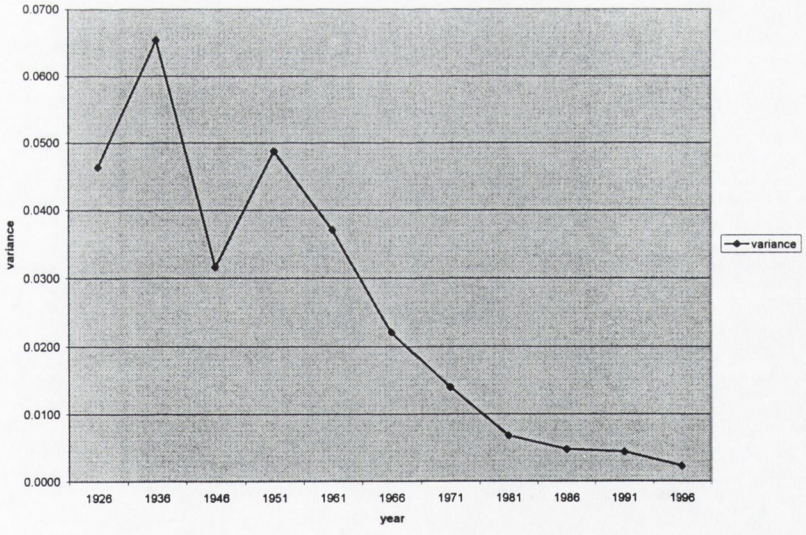


**Figure 7.3.2f Variance of productivity enhanced employment rate - Mid-West region**

The productivity-enhanced employment rate for the West and South West regions[17] is examined in tables 7.3.2a and 7.3.2b respectively.

[17] The productivity-enhanced employment rate in the other six regions is shown in Appendix F, section F.4.

**Table 7.3.2a Productivity-enhanced employment rate; West region**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Galway | 10.6 | 12.7 | 13.1 | 14.9 | 15.3 | 17.2 | 18.2 | 22.5 | 22.8 | 25.6 | 30.3 |
| Mayo | 8.2 | 10.0 | 9.9 | 11.5 | 12.6 | 14.5 | 15.3 | 19.4 | 19.4 | 21.0 | 25.7 |
| Total | 9.4 | 11.4 | 11.6 | 13.3 | 14.1 | 16.0 | 17.0 | 21.3 | 21.5 | 23.9 | 28.6 |

Although the productivity-enhanced employment rate has been higher in Galway over the entire study period, the level of disparity between the two counties has narrowed somewhat over the period. The productivity-enhanced employment rate in Galway was almost 30 percent higher than in Mayo in 1926, but by 1996, this had narrowed to just 18 percent.

Table 7.3.2b examines the productivity-enhanced employment rate in the South West region over the 1926 to 1996 period. The table shows an increase in this employment measure over the entire period, and that the level of disparity between the two counties has declined over the period. In 1996 the productivity-enhanced employment rate in Cork was 12 percent higher than in Kerry, while in 1926, the productivity-enhanced employment rate in Cork was 67 percent higher.

**Table 7.3.2b Productivity enhanced employment rate - South West region**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cork | 21.0 | 22.5 | 21.7 | 25.3 | 25.0 | 26.2 | 26.4 | 27.1 | 25.1 | 27.4 | 31.1 |
| Kerry | 12.6 | 13.7 | 14.1 | 15.3 | 15.4 | 16.8 | 18.5 | 21.3 | 20.5 | 23.4 | 27.7 |
| Total | 18.6 | 20.0 | 19.5 | 22.6 | 22.5 | 23.8 | 24.5 | 25.8 | 24.1 | 26.5 | 30.3 |

In summary, the above analysis for the six planning regions shows that, apart from short periods of interruption, the variance of the productivity enhanced employment measure showed a marked decline in each region over the sample period. These declines ranged from a 95 percent reduction in the Mid-West region to an 80 percent reduction in the South East region. The West and South West regions also experienced a decline in the level of disparity in productivity-enhanced employment when comparing the start and end year of the study period and the measure had increased strongly for both sets of counties over the study period.

## 7.4 Refining The Results

Unfortunately due to the lack of an adequate county socio-economic database, it is not possible to link the findings from the previous sections to their underlying causes, as we did at the inter-regional level. However, it will be possible to complement the above results with recourse to trends in demographic[18] and further employment data. In a sense, these variables help to explain patterns found in the total employment and productivity enhanced employment rate variables, but on the other hand, these factors could themselves also be considered indicators of welfare. Thus, it becomes difficult to separate cause from effect. Accordingly, the most that can be achieved is an

[18] For a graph of the variance of population for each region, please see Appendix F, section F.6.

elaboration of the disparity indicators above for each region with reference to trends in demographic and employment data.[19]

### 7.4.1 Demographic Factors

Disparity in employment is examined with reference to the underlying population data. It would be expected that the patterns of variance of population data would correspond closely to the variance of employment, which was already discussed. Therefore, a plot of the variance of the natural log of population for each of the six planning regions is undertaken below. Table 7.4.1a examines the variance of population for the six planning regions over the 1926 to 1996 period and includes as a reference the variance of employment as discussed in section 7.3.1 above. Table 7.4.1a illustrates the pattern of variance for total employment as already discussed in section 7.3.1 and links this to the pattern of variance in population. Before commenting on this link, the pattern of variance of population within each region is briefly noted. The "overall" entry in each row compares the value of the variance at the beginning of the period with that at the end.

The overall level of disparity has increased in all of the regions except the South East. Although some convergence marked earlier periods in the population history of the South East (1926-1961), Midlands (1926-1951) and North East (1926-1946), the pattern over the past three decades or more has been one of increasing variance or divergence. Donegal/NW and the Mid-West have experienced divergence in population over the entire study period, 1926 to 1996. By contrast, the East region experienced a pattern of convergence from 1971.

In terms of the correspondence between the variance patterns for employment and population, although a close correlation is evident from the table as shown by the "overall row", for the most part, the variance of population is more stable than that of employment. For example, in the Midlands region, although employment oscillates between periods of divergence and convergence over five distinct parts of the study period, that of population changes just once from a pattern of convergence over the 1926 to 1951 period to a pattern of divergence from 1951 to 1996. The exception to this is the South East region, where the pattern of the variance of population is less stable than for the other regions. However, as in the other regions, the pattern of variance in population in the South East provides for a strong indication of the pattern of variance in employment.

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[19] While the above analysis identified successful counties, this line of research will not be pursed here. It is outside the scope of this chapter and the thesis. However, this type of approach represents a first step towards understanding why some counties are more successful than others and it is the type of analysis called for in the most recent National Development Plan (NDP), see following chapter. The NDP calls for the development of "zones of influence" as part of an overall regional development strategy. This concept, although not new, stresses the importance of the agglomeration economies emanating from the successful region (here county) to areas within its environs or influence.

**Table 7.4.1a Variance of employment and population rate - six regions; 1926-1996.**

| Region | Employment | | Population | |
|---|---|---|---|---|
| | Period | Variance | Period | Variance |
| | | | | |
| East | 1926-1936 | ↑ | 1926-1966 | ↑ |
| | 1936-1946 | ↓ | | |
| | 1946-1971 | ↑ | | |
| | 1971-1996 | ↓ | 1966-1996 | ↓ |
| | Overall | ↑ | | ↑ |
| | | | | |
| South East | 1926-1961 | ↓ | 1926-1966 | ↓ |
| | 1961-1971 | ↑ | 1966-1971 | ↑ |
| | 1971-1981 | ↓ | 1971-1981 | ↓ |
| | 1981-1996 | ↑ | 1981-1996 | ↑ |
| | Overall | ↓ | | ↓ |
| | | | | |
| North East | 1926-1951 | ↓ | 1926-1946 | ↓ |
| | 1951-1981 | ↑ | 1946-1996 | ↑ |
| | 1981-1991 | ↓ | | |
| | 1991-1996 | ↑ | | |
| | Overall | ↑ | | ↑ |
| | | | | |
| Midlands | 1926-1936 | ↑ | | |
| | 1936-1946 | ↓ | 1926-1951 | ↓ |
| | 1946-1966 | ↑ | 1951-1996 | ↑ |
| | 1966-1971 | ↓ | | |
| | 1971-1996 | ↑ | | |
| | Overall | ↑ | | ↑ |
| Donegal/NW | 1926-1996 | ↑ | 1926-1996 | ↑ |
| | Overall | ↑ | | ↑ |
| | | | | |
| Mid-West | 1926-1936 | ↓ | 1926-1996 | ↑ |
| | 1936-1996 | ↑ | | |
| | Overall | ↑ | | ↑ |

Key: ↑ = increasing variance or divergence
↓ = decreasing variance or convergence
'Overall' refers to a comparison of the value at the beginning and end of the sample period.

Turning to the remaining two regions, the share of population in the West is examined in Table 7.4.1b. The regional population was almost even in both counties at the beginning of the study period. Over time, population share in Galway has increased while that in Mayo has fallen. This is very similar to the employment patterns for the region, already examined above.

**Table 7.4.1b Share of population - West region; 1926-1996.**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Galway | 49.5 | 51.0 | 52.7 | 53.0 | 54.9 | 56.2 | 57.7 | 60.0 | 60.8 | 62.0 | 62.9 |
| Mayo | 50.5 | 49.0 | 47.3 | 47.0 | 45.1 | 43.8 | 42.3 | 40.0 | 39.2 | 38.0 | 37.1 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: Census of Population.

Table 7.4.1c examines population shares in the South West region over the 1926 to 1996 period, which also broadly mirror the region's employment patterns. Population share in Kerry has declined over the period, but, as in the case of employment, its population share has remained quite steady over the 1980s and 1990s.

**Table 7.4.1c Share of population - South West region; 1926-1996.**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cork | 71.0 | 71.8 | 72.0 | 72.9 | 73.9 | 758.1 | 75.8 | 76.6 | 76.9 | 77.1 | 77.0 |
| Kerry | 29.0 | 28.2 | 28.0 | 27.1 | 26.1 | 24.9 | 24.2 | 23.4 | 23.1 | 22.9 | 23.0 |
| Total | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |

Source: Census of Population.

## 7.4.2 Sectoral Employment Mix

Disparity in the pattern of variation in total employment may be further elaborated upon by considering the changes taking place in underlying sectoral employment. Adopting a quasi shift-share approach, the computation of a chi-squared statistic illustrates how closely the expected value of employment at the county level, based on the county shares of agricultural, industrial and service employment approximates the sectoral shares at the regional level. A falling chi squared statistic indicates that the sectoral mix of employment is becoming more similar across counties within the region over time. Further insight into the variance of the productivity-enhanced employment rate will also be gained from a consideration of industrial and service employment over time.

As noted in the previous chapter, employment may be classified according to region (county) and according to sector. This approach facilitates a comparison of the county mix of employment relative to the regional mix over time by using the chi-squared statistic computed from the row by column table. This method, explained in chapter six, is used below for each of the six planning regions for which the variance of employment was discussed above, and also for the West and South West regions.

Beginning with the East region, Figure 7.4.2a shows a plot of the chi-squared statistic for total employment, and for the individual sectors, over the 1926 to 1996 period. The "total" value represents the addition of the chi-squared statistic for agricultural, industrial and service employment. Two definite patterns are evident from Figure 7.4.2a.

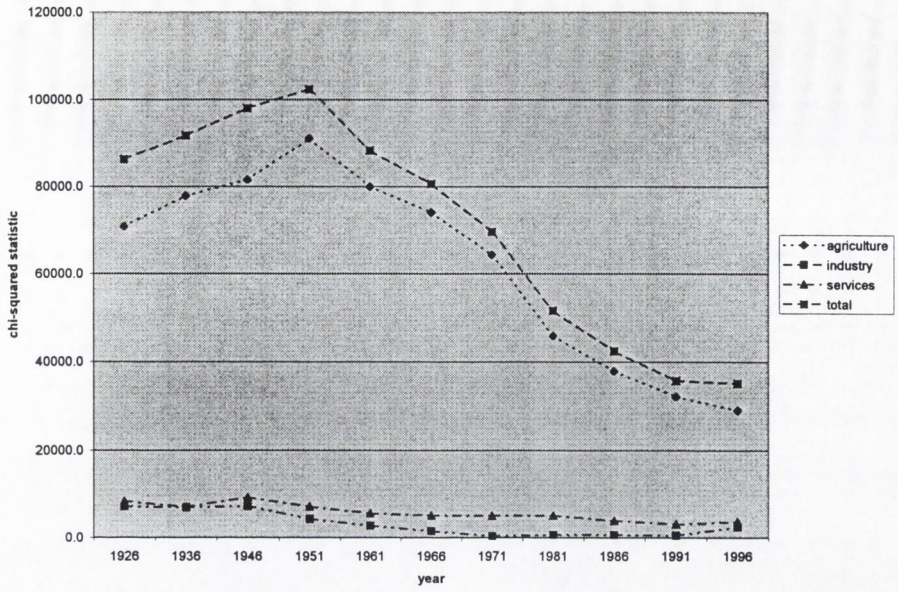


**Figure 7.4.2a Plot of chi-squared statistic for employment; East region**

First, there is a divergence, or increasing value of the chi-statistic for total employment over the 1926 to 1951 period. The underlying chi-statistics show that while convergence characterised industrial and service employment from 1946, agricultural employment continued to diverge to 1951. However, the pattern changed to one of convergence from 1951 to 1996, reflecting primarily closer agricultural employment shares in the counties over time, see Appendix F, section F.3. As might be expected, this coincides with the findings for the variance of the productivity-enhanced employment rate, when it too followed a pattern of convergence from 1951.

Figure 7.4.2b examines the pattern of the chi-squared statistic for employment in the South East region. While the chart indicates an overall decline in the chi statistic, the pattern has been quite erratic with alternating periods of convergence and divergence. (And, once again, the pattern of the chi-statistic is similar to the variance of the productivity-enhanced employment variable, as discussed earlier. [20]) As for the individual sectors, it can be seen that the chi-squared statistics for industry and agriculture are highly correlated, and that the patterns for both these sectors broadly match the overall chi-squared pattern. On the other hand, the chi-squared for the services sector shows an almost persistent pattern of convergence over the sample period, albeit with a minor reversal over the 1991 to 1996 period.

[20] This is also the case for most of the other regions below.

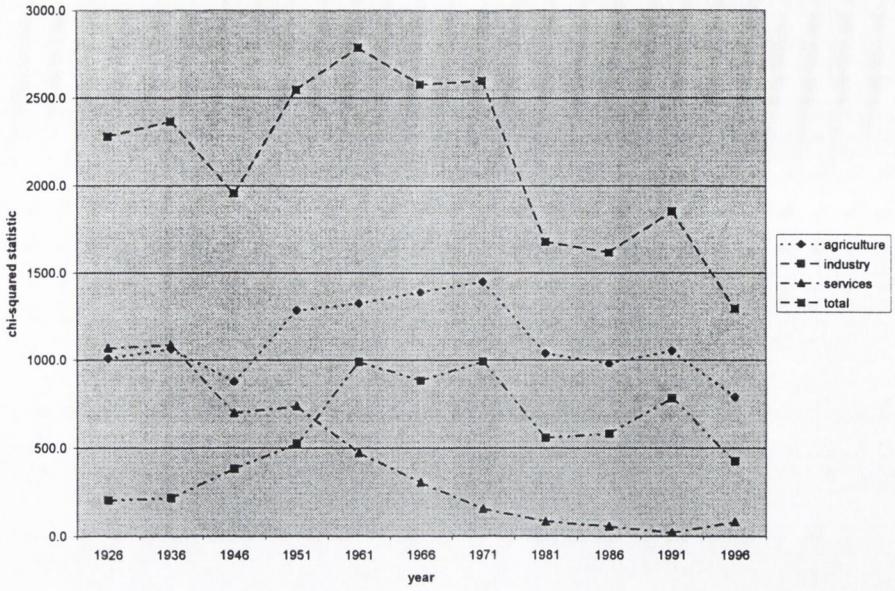


**Figure 7.4.2b Plot of chi-squared statistic for total employment; South East region**

The pattern of the chi-squared statistic for employment for the North East region in Figure 7.4.2c shows alternating periods of convergence and divergence, with the result that the level of sectoral employment disparity within the region remained broadly unchanged over the 1926 to 1971 period. However, from that date there has been a marked decline in the chi-squared statistic, indicating that sectoral employment patterns within the region have become much more similar over this period. Turning to the individual sectors, we can see that once again there is a clear distinction between the services sector on the one hand, and the agricultural and industrial sectors on the other. While the latter two sectors display chi-statistic patterns broadly similar to that of the overall pattern, for services there has been an almost continuous convergence over the sample period.

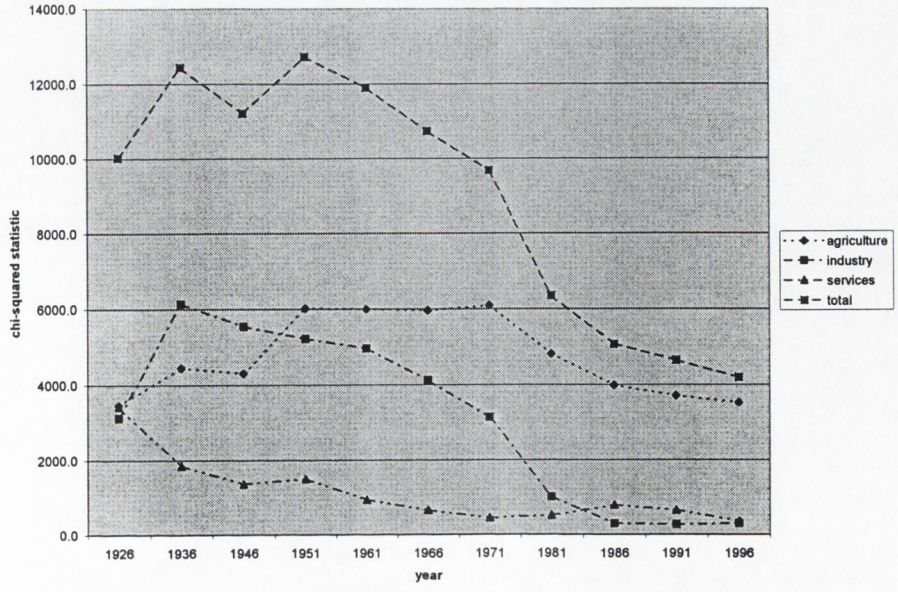


**Figure 7.4.2c Plot of chi-squared statistic for total employment; North East region**

The chi-squared statistic for employment in the Midlands region, shown in Figure 7.4.2d, also follows a similar pattern to the productivity enhanced employment variance. After an initial period of convergence over the first 20 years of the sample, divergence takes place from 1946 to 1961, before convergence resumes. This pattern is broadly reflected at the individual sectoral level, although, once again, the pattern of convergence in the services sector is smoother than that of the agricultural and industrial sectors.

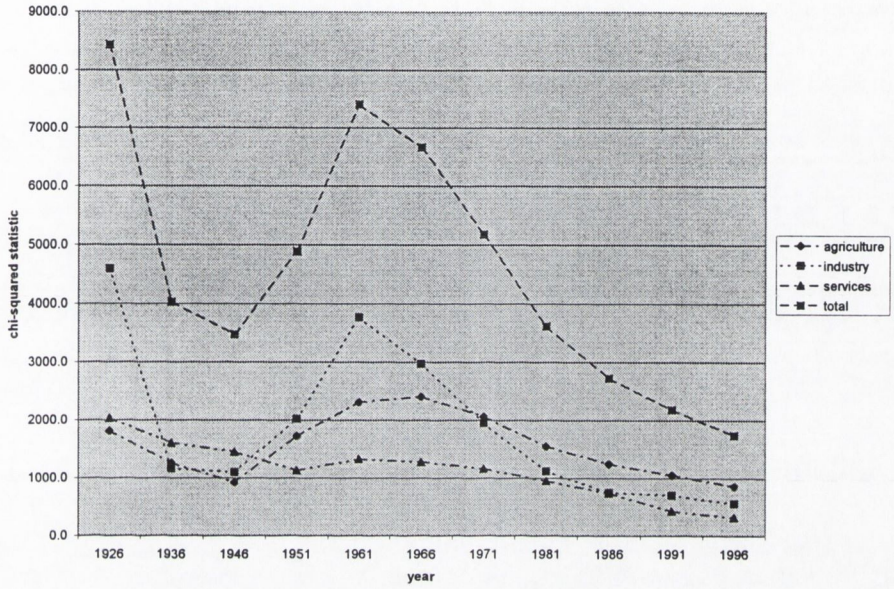


**Figure 7.4.2d Plot of chi-squared statistic for total employment; Midlands region**

Figure 7.4.2e examines the chi-squared statistic for the Donegal/North West region over the 1926 to 1996 period. Unlike in the case of the other regions that we have looked at, there is no discernible difference between the level of disparity at the beginning and end of the sample period.[21] Although there has been a marked convergence since 1951, this followed a period of marked divergence from 1926. As for the individual sectors, it can be seen that the level of intra-regional disparity has increased considerably in the agricultural sector. Although industry has seen a convergence over the entire sample period, the pattern has been quite volatile overall. Once again, the services sector has seen a significant and continuous convergence throughout the sample period.

[21] Also unlike the other regions, this pattern does not broadly mirror the pattern shown in the earlier variance analysis, which showed a convergence in the productivity enhanced employment rate over the sample period.

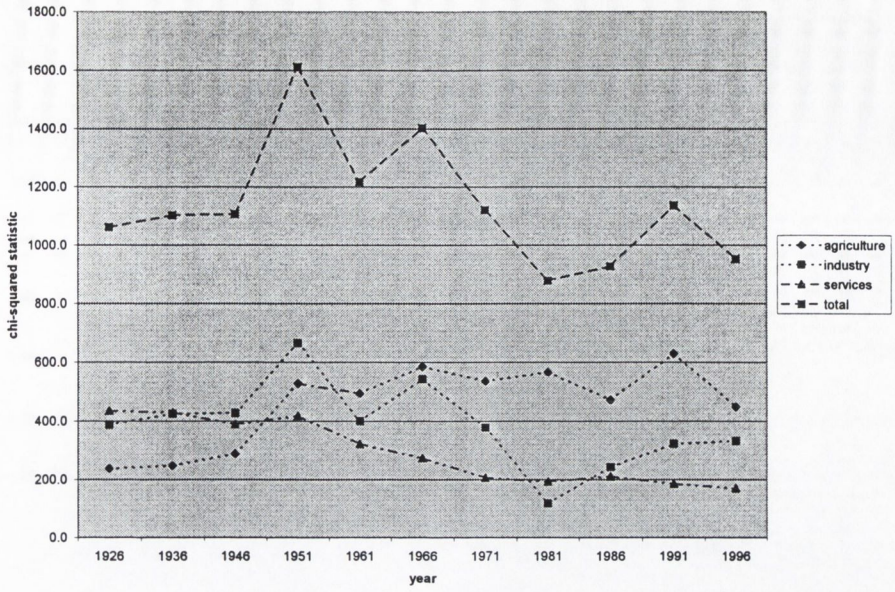


**Figure 7.4.2e Plot of chi-squared statistic for total employment; Donegal/NW region**

In the Mid-West region (Figure 7.4.2f) there is almost a continuous convergence of the sectoral employment makeup, apart from some divergence at the start of the sample. This pattern is broadly repeated at the sectoral level, although the convergence in the services sector is once again far smoother than for the other sectors.

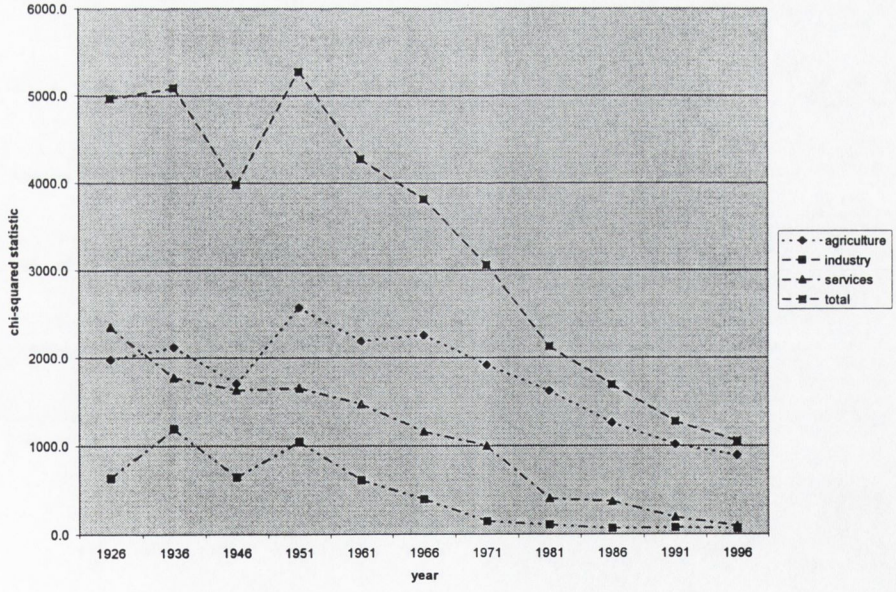


**Figure 7.4.2f Plot of chi-squared statistic for total employment; Mid-West region**

Figure 7.4.2g examines the chi-squared statistic for the West region. Here, the overall pattern is one of divergence of the sectoral employment patterns within the region i.e., the sectoral makeup in Mayo and Galway has become increasingly dissimilar over the sample. Moreover, the pattern has been very volatile, with periods of strong convergence being followed by strong divergence. However, given that there are only two counties in the region, this is as we might have expected.

Turning to the sectors, which also display marked volatility, this time it is the industrial sector that differs from the other two. Agricultural sector disparity has become stronger over the sample period, while in the services sector it has also increased, although only slightly. In the services sector, on the other hand, the proportion employed has become increasingly similar in Mayo and Galway.

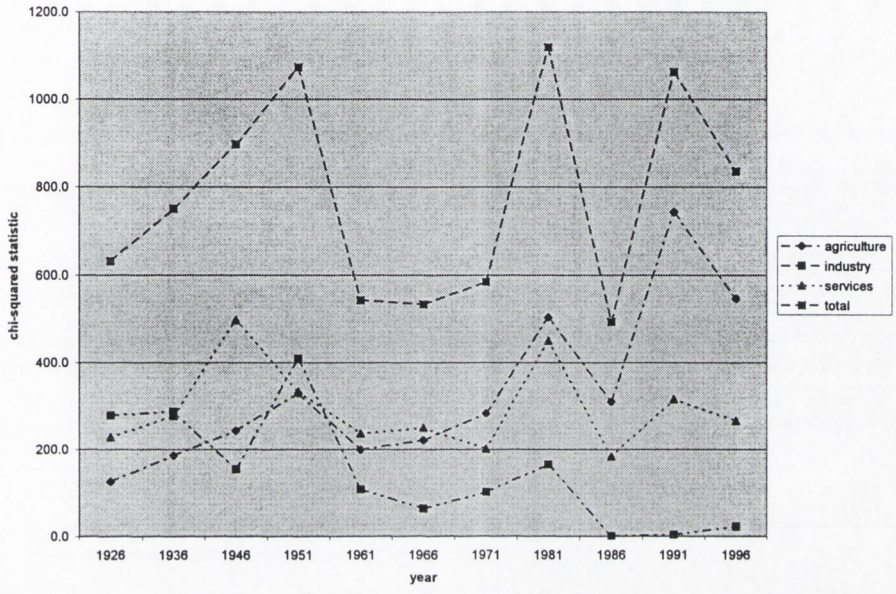


**Figure 7.4.2g Plot of chi-squared statistic for total employment; West region**

Finally, the chi-squared statistic for total employment in the South West region is considered in Figure 7.4.2h. The pattern suggests an initial period of instability, but from 1951, the value of this statistic has declined suggesting that the employment at the county level is approaching that of the regional level over time. The level of disparity increased in both the agricultural and industrial sectors up until 1966. From then there has been a continuous convergence in agriculture and, while the industrial sector also saw some convergence up until 1981, there has been a slight divergence since then. For the services sector, apart from an initial period of divergence at the very start of the sample, there has been continuous convergence since then.

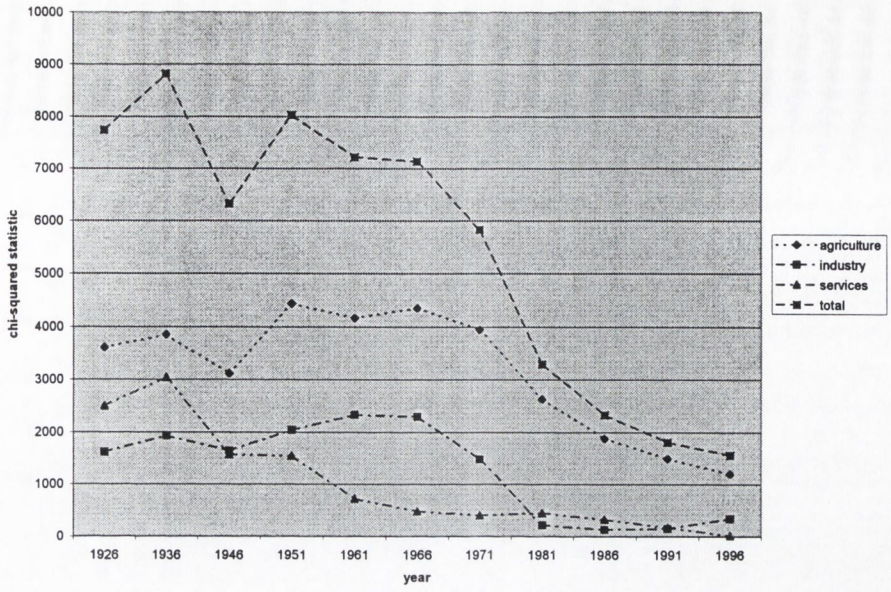


**Figure 7.4.2h Plot of chi-squared statistic for total employment; South West region**

In summary, the overall pattern of the chi-squared statistics acted broadly in the same way as the variance of productivity-enhanced employment, except for Donegal North West, where, although the chi-squared statistic showed little overall change over the sample period, there was still a marked reduction of the variance of the productivity-enhanced employment variable.

## 7.5 TESTING FOR CONVERGENCE WITHIN THE SIX PLANNING REGIONS

This section will discuss and present the results from an econometric analysis of absolute convergence for six of the eight planning regions. It will be recalled from the previous chapter that absolute convergence is examined by regressing the growth rate of the economic welfare variable in question -- this time employment and productivity-enhanced employment -- on its initial level. The coefficient on the independent variable is used to determine the intra-regional speeds of convergence. Due to the paucity of data at a county level, it will not, however, be possible to augment the regression equations with other explanatory (or control) variables.[22]

The following sub sections comment on the regression results for a convergence study of employment and productivity-enhanced employment at the intra-regional level for six of the eight planning regions. (The data are given in Appendix F, section F.5.) In all cases the growth rate of the dependent variable, either employment or productivity-enhanced employment is regressed on its initial level, plus a constant.

[22] Moreover, the relatively low number of counties in each region precludes the use of too many explanatory variables.

### 7.5.1 Convergence in Employment

Table 7.5.1a examines the regression results for each of the six regions for the employment variable. The equation tested is:

$$\ln \Delta e_i = \alpha + \beta \ln e_i \qquad \textbf{7.5.1a}$$

where $ln\Delta e_i$ refers to the growth rate in employment and i refers to the six regions; $lne_i$ refers to the initial level of employment in each i region in 1926

**Table 7.5.1a Results from regression study**

| Region | Number of observations | Constant | Coefficient on dependent variable | $R^2$ |
|---|---|---|---|---|
| East | 40 | -0.03<br>(-0.15) | 0.01<br>(0.49) | 0.01<br>-0.02 |
| South East | 50 | 0.09<br>(0.31) | -0.01<br>(-0.34) | 0.00<br>(0.02) |
| North East | 30 | 2.13<br>(2.23) | -0.21<br>(-2.26) | 0.15<br>(0.12) |
| Midlands | 50 | 0.33<br>(0.74) | -0.04<br>(-0.81) | 0.01<br>(0.01) |
| Donegal/NW | 30 | -0.45<br>(-1.02) | 0.04<br>(0.87) | 0.03<br>(0.01) |
| Mid-West | 30 | -0.37<br>(-0.76) | 0.03<br>(0.74) | 0.02<br>(0.02) |

The outcome from the regressions indicates that just one region, the North East, shows a statistically significant convergence of employment across its counties. The value of the coefficient (0.21) suggests that total convergence is 21 percent -- or that convergence is occurring at a rate of 3 percent per annum and that it would take 23 years for complete convergence to occur.[23] This finding however contradicts the plot of variance pattern for the North East region, which suggested a pattern of divergence for the majority of the study period. However, the pattern of variance for agricultural and industrial employment suggested convergence for the majority of the study period and this may be reflected in the empirical results. On the other hand, the goodness of fit as summarised by the $R^2$ value is very low, calling into question the robustness of the regression results. Convergence is not statistically significant for any of the other regions, thus according more closely with what would be expected given the variance of total employment plots discussed earlier. Indeed the remaining regions fall into two categories with respect to the regression results; those that have the expected negative sign on the dependent coefficient, albeit an insignificant coefficient and those that have an incorrect *a priori* sign and insignificant coefficient. The South East and Midlands fall into the former category while the East, Mid-West and Donegal/North West occupy the latter category.

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[23] A coefficient of 0.21 indicates total convergence of 21 percent. Per annum convergence is computed using the following formula: $x=(1.21)^{1/6.36}$ where 6.36 is the average number of years between each time period. Complete convergence would require n years such that $(1+0.03)^n=2$. This in turn implies that $n=23=\ln(2)/\ln(1.03)$.

### 7.5.2 Convergence in the Productivity-Enhanced Employment Rate

Table 7.5.2b examines the results for each of the six regressions examining convergence in the productivity-enhanced employment rate. The regression equation is:

$$\ln \Delta A_i = \alpha + \beta \ln A_i \qquad \textbf{7.5.2a}$$

where $lnAA_i$ refers to the growth rate in productivity enhanced employment and i refers to the six regions; $lnA_i$ refers to the initial level of productivity enhanced employment in each i region in 1926

**Table 7.5.2b Results from regression study**

| Region | Number of observations | Constant | Coefficient on dependent variable | $R^2$ |
|---|---|---|---|---|
| East | 40 | 0.28<br>(2.03) | -0.08<br>(-1.73) | 0.07 |
| South East | 50 | 0.09<br>(0.31) | -0.01<br>(-0.34) | 0.00 |
| North East | 30 | 0.27<br>(2.33) | -0.07<br>(-1.76) | 0.10 |
| Midlands | 50 | 0.30<br>(2.79) | -0.09<br>(-2.15) | 0.09 |
| Donegal/NW | 30 | 0.28<br>(1.66) | -0.08<br>(-1.08) | 0.04 |
| Mid-West | 30 | 0.33<br>(1.38) | -0.09<br>(-1.13) | 0.04 |

Unlike the intra-regional regression results for total employment, the coefficients on the dependent variable, the initial rate of the productivity-enhanced employment rate, for each region return the expected *a priori* negative sign. Although the coefficients are insignificant in three of the regions, namely the South East, Mid-West and Donegal/North West regions, the remaining regions (East, North East and Midlands) all display statistically significant results. Total convergence is broadly similar for each of these latter three regions, averaging 7 percent in total, suggesting that convergence is occurring at a rate of 1 percent per annum in all three regions. Based on these values, it would take 57 years for complete convergence in the East, 65 years for complete convergence in the North East and 51 years in the Midlands region.

The above regression results for productivity-enhanced accord closely with our earlier analysis of the variance of this variable for the six regions. The variance analysis showed strongest convergence in the East, North-East and Midlands, while the South East, which displayed the weakest convergence in the econometric results, also displayed the weakest and most erratic convergence performance in the variance analysis.

## 7.6 CONCLUSION

This chapter described and analysed employment change at the intra-regional level over the 1926 to 1996 period. Changes in the level and pattern of total employment, agricultural, industrial, services and productivity-enhanced employment were examined for the counties within each of the eight planning regions. Reference was also made to changes in the population of these counties over the same time period.

The chapter began by considering an index of employment change from 1926 for the 26 counties of the Republic. Just five counties, Dublin, Cork, Limerick, Louth and Waterford had increased their employment share relative to the level in 1926. The analysis indicated a distinction in the employment performances of all of the counties between the pre and post 1971 period. Population change within the regions showed a similar watershed.

The pattern of employment change within six of the regions was discussed with reference to the variance of total employment and its components and the productivity-enhanced employment rate. Owing to the low number of counties in the West and South West regions, the percentage share of these variables was instead examined for each time period. After using the Bartlett test to show that the variance varied significantly over time within most regions for each employment category, it was seen that the pattern of total employment diverged within all regions except the South East. In terms of the sectors, while the agricultural sector saw broad convergence within most regions, only the counties of the East region saw convergence in the industrial sector and only this region, the Mid-West and the South East saw convergence in services employment, albeit from 1971. To complement the above analysis, the chapter then looked at intra-regional demographic patterns. Although, as might be expected, there is a close relationship between overall employment and population developments, the variance of population was more stable than that of employment over the study period.

The chapter showed that convergence in the productivity-enhanced employment rate took place in each region over the 1926 to 1996 period, with such convergence being particularly strong in the latter part of the sample period across most regions. It was unsurprising then to find that the chi-squared analysis, which examines the extent to which the employment structure at the county level is mirroring that at the regional level acted broadly in the same way as the variance of productivity-enhanced employment. An exception was the Donegal/North West region, where although the chi-squared statistic showed little overall change over the sample period, there was still a marked reduction of the variance of its productivity-enhanced employment rate.

While the results of the foregoing identified successful and unsuccessful counties, the published data does not permit us to pursue the reasons for such differences in county level performances in

any great depth. Nevertheless, it was possible to use econometric analysis to examine the rate of convergence, if any, with the six regions for both employment and productivity-enhanced employment. The results for the employment study showed that the North East region displayed statistically significant convergence (with an annual rate of 3 percent). The results from the productivity-enhanced employment rate analysis showed those three regions -- the East, Midlands and North East -- experienced statistically significant convergence (at a rate of about 1 percent per annum in each case). The amount of time required for complete convergence to take place would therefore be considerable in each case - 23 years in the case of the employment study for the North East region and more than 55 years on average for the three regions in case of productivity-enhanced employment.

# Chapter Eight

# THE APPROACH OF IRISH REGIONAL POLICY - 1950 TO 1999

## 8.1 INTRODUCTION

The chapter examines the approach of regional policy in the Republic of Ireland from the 1950s paying close attention to the role played by regional disparity in formulating policy. The material is organised chronologically to the present.[1] There were few formal policy measures prior to the 1950s, despite the documented evidence of regional disparity.[2]

Moreover, there has never been a government White Paper on regional development, although the regional dimension has never been far from the minds of policy makers and planners. Regional policy has up to now been largely associated with national development plans,[3] national programmes and also with Government statements on regional policy (in 1965, 1969 and 1972[4]). Both the second and third programmes referred to the need to maintain a significant rural population through:

> The most *intensive use of land within the limits set by market possibilities so that the maximum number of people can be retained in agriculture, consistent with social and economic progress; second to create viable farm units in small farm areas with minimum disturbance of the population and third to ensure as far as practicable, that those who leave agriculture have adequate employment opportunities in other sectors of the economy* (Second Programme for Economic Expansion, 1964; p. 102 and Third Programme, 1969; p. 168).

The need to achieve a "more balanced distribution of industry between the different parts of the country" (Second Programme, p. 163) so as to achieve "an equitable sharing of economic progress, both among individuals and regions" (Third Programme, p. 16) is also an objective (and in retrospect, more realistic) of these respective programmes. O'Farrell (1970a) criticised the regional aspect of the Third programme for economic development as having a "frustrating lack of

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[1] Such an approach has been also taken in previous reviews of regional policy (e.g. Eustace, 1980; Bannon and Lombard, 1996).
[2] O'Hagan (1981) refers to the justified preoccupation with agricultural development. Moreover, the change of government in 1932 and the ensuing protectionist phase did not include any policy of industrial dispersal.
[3] Indeed the current 1999 National Development Plan is a case in point, see section 8.1.5.
[4] NESC (1975) reproduces these statements.

clarity and precision" (p. 76). Moreover, references to the regional issue in subsequent statements are largely framed in aspirational terms and no attempt is made to link them with definite national policy objectives. O'Farrell (1970a) argued that national planning policy undermined regional policy in that it failed to identify strategic regional targets. In a similar vein, the annual reports of the then Industrial Development Authority could also be criticised for stating the objectives of regional policy in vague and aspirational terms. While job creation targets were identified and pursued in earlier reports, it was not clear how these targets related to overall national industrial policy. Moreover, the coverage given to the regional issue in recent IDA/Forbairt annual reports is quite scant compared with coverage in the 1970s.

Despite such ill-defined IDA coverage, regional policy has predominantly been effected through industrial policy, specifically through the promotion of manufacturing. Eustace (1980), for example, contends that the "prime objective of development policy in Ireland has been to secure a structural transformation of the economy through the expansion of the manufacturing sector" (p. 114).

The 1950s are an appropriate starting point for the examination of regional policy.[5] The drive to industrialise[6] was both national and regional in focus from this date.

### 8.1.1 The 1950s

In the 1950s there was widespread concern with the low level of participation by Ireland's labour force in industry and the general lack of investment in the economy. The perceived importance at a political level of industrial development for the country and the regions was attested to by the setting up of the Industrial Development Authority, which was established by the government in 1949 and given statutory backing under the Industrial Development Authority Act (1950). While its initial aim was to promote industry throughout the entire country without favouring any particular area or region, "it was hoped that the Authority would have regard to the need to promote industrial development outside the main centres of population" (NESC, 1975; p. 20).

The regional focus of industrial development was made explicit in the Undeveloped Areas Act of 1952 which was spatially selective and specifically targeted the counties of Sligo, Leitrim, Roscommon, Mayo, Galway, Clare, Donegal, Kerry and West Cork.[7] These counties were

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[5] The Congested Districts Board of 1841 designated counties west of the river Shannon, Kerry and West Cork for special assistance. This designation was upheld in the 1952 Undeveloped Areas Act, section 8.1.1.

[6] We do, of course, recognise that there are regional implications of other national policies such as in the agricultural, income, tourism and environmental areas.

[7] These counties comprised the major proportion of the "congested areas" as defined by the Congested Districts Board in 1841. These areas were so termed because of their poor resource endowment, which included the quality of soil and land configuration and the average size of agricultural holding.

characterised by a heavy reliance on agriculture, a poor industrial structure, high levels of emigration and an unbalanced demographic structure. For these regions, grants of up to 50% were made available for the cost of machinery and equipment and grants of up to 100% were available for the cost of land and building plus grants for labour training and the construction and repair of certain infrastructural facilities. These grants were administered by An Foras Tionscail, which was set up under the 1952 Act, to administer non-repayable grants towards the cost of establishing industries in the "undeveloped areas". Thus regional policy was informed by the regional disparity described in this thesis. The main policy instrument used was the micro policy instruments of capital subsidies.

Subsequent industrial grants Acts of 1956 and 1959 extended the grants system to the rest of the country, except Dublin. The extension of the grants system was in response to the fact that the overall economy continued to perform poorly. The aim of the 1956 Industrial Grants Act was to help reduce the country's reliance on manufactured imports, increase industrial exports and increase industrial employment throughout the country. To this end, the Act allowed for the IDA to award grants of up to two thirds the cost of buildings where the grant was less than £50,000. The regional focus of industrial policy in the 1950s was maintained by the operation of a differential grant system (according to region) which ranged from 10 to 15 percentage points (Eustace, 1980).

In 1959, the 1956 Industrial Grants Act was repealed and superseded by the Industrial Grants Act of 1959. NESC (1975) identifies three reasons for this repeal:

- the 1956 Act did not provide grants for new projects by existing firms. Consequently, industrial development was being hindered, as experience had suggested that industrial progress was more likely to come through the growth of existing concerns than through the establishment of new concerns;
- there was a need for much more rapid industrialisation than had been achieved so far; and
- there was a need to attract export industries from abroad and Ireland was now facing strong competition for such industries from many European countries.

In summary, the 1959 Act sought to broaden the coverage of the 1956 Act by awarding grants for expansion purposes to existing firms and by seeking to increase the pace of industrialisation and the attraction of industries which would enter export markets (NESC, 1975). The 1959 Act narrowed the gap between the grant differential for the "undeveloped areas" and the rest of the country and transferred grant-giving powers from the IDA to An Foras Tionscail. An Foras Tionscail was empowered to award grants in areas other than those covered by the Undeveloped Areas Act (1952). Grants were available for up to two thirds of the cost of land and buildings and up to one third the cost of machinery and equipment where the grant would be less than £250,000.

The narrowing of the grant differential which came from extending the scope of the grants under the 1959 Industrial Grant Act was justified in the White Paper, Economic Development, because *in our present circumstances, with virtually the whole country undeveloped, it seems wasteful to subsidise remote areas specially by providing more extensive grants. Special subsidisation of this kind entails additional burdens on the community as a whole and retards progress in the most suitable areas where concentrated effort could give better results* (Economic Development, 1958; paragraph 4803, p. 160).

Other developments in the 1950s included the Finance Act of 1956 which introduced a five year 50% tax-relief scheme for company profits deriving from new export sales and exports sales from Irish manufactured goods (Eustace, 1980). The 1950s also witnessed the setting up of Gaeltarra Eireann in 1957 and the Shannon Free Airport Development Company in 1959. Gaeltarra Eireann fulfilled an economic and cultural role and the Shannon Free Zone - which qualified for Export Sales Relief - was instrumental in attracting new industry, both indigenous and foreign owned. Gaeltarra Eireann (currently Udaras na Gaeltachta) operated independently of, but in co-operation, with the IDA.

By the end of the 1950s the drive to industrialise the entire country was fully operational. Industrial Development Acts reflected this emphasis and both the IDA and An Foras Tionscail were instrumental in the fostering of industrial enterprises by the giving of grants. However, at the end of the 1950s the commitment to achieve overall national economic performance diluted the regional dimension to industrial policy. The view at the time seemed to be that these two goals of reducing regional disparity and achieving national performance were mutually exclusive.

### 8.1.2 The 1960s

The legislation for the Undeveloped Areas Act (1952) and the Industrial Grants Acts (1956 and 1959) was due to expire in 1963[8] and it was decided to extend the legislation beyond that date by making significant changes. The introduction of the amendments in 1963 saw the distinction between the two parts of the country (i.e. the western counties and Kerry and West Cork and the rest of the country except Dublin) abolished for grants in excess of a quarter of a million pounds. Adaptation grants to help industry prepare for free trade conditions were henceforth available to <u>all</u> areas of the country at a rate of up to 25% of the costs incurred. The amending Acts also abolished the distinction between the undeveloped areas and the rest of the country for grants given for land, buildings, machinery and equipment and provided grants for training and infrastructure.

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[8] The Undeveloped Areas Act (1952) was initially agreed for a seven year period, but was extended and continued in existence until it was repealed by the Industrial Development Act of 1969.

The issue of growth centres; introduced into the development literature by Perroux (1950) attracted much debate across Europe in the 1960s. In the Republic of Ireland, the government commissioned a number of reports that favoured a growth centre approach to industrial policy. The study for the Limerick region compiled by Lichfield (1966) favoured a centralised approach with Limerick, Ennis and the Shannon Free Zone forming the central growth area and Nenagh, Roscrea, Thurles acting as subsidiary centres. The Wright report (1967) for Dublin proposed that the growth of Dublin be accommodated in new towns westward of Dublin as Dublin's growth was accepted as inevitable. The Buchanan Report (1968) recommended that, over a twenty year period (1966-1986), seventy five per cent of new industrial employment be concentrated in nine urban centres which would be known as development centres. These would encompass Dublin - the national capital; two national growth centres -Limerick and Cork; and six regional centres - Sligo, Dundalk, Drogheda, Galway, Athlone and Waterford. Buchanan considered the prospects for: agriculture, other natural resources, tourism, transport, public utilities, counties, development centres, employment, population and industrial development based on a study of socio-economic disparities.

The Buchanan Report ranked the counties into three categories. These categories refer to; (1) the development potential of agriculture, (2) growth potential counties, and (3) development centres, see columns 2-4 of Table 8.1.2a below.

Counties were grouped in establishing the relative potential of the different parts of the country for increasing agricultural production and the incomes derived from it.[9] The groupings were based on a consideration of the soil quality and suitability, existing land use and output per acre, agricultural incomes, the proportion of holdings under 50 acres, the number of workers per 100 acres and the proportion of young men in agriculture. Group 1 has the greatest scope for increasing incomes through higher output per acre and group 5 has the least scope indicating that higher incomes could only come about through a further reduction in the numbers employed.

The second category (column 3) identified by Buchanan was counties with growth potential. This category, aimed to identify those counties with the greatest potential for future growth based on past performance across a number of indicators such as population and employment change, income levels and communications and the standard of provision of housing, education, health and sanitary facilities, shops and entertainment. Again, the groups are ranked from group 1 having the most potential for growth to group 5 having the least.

[9] At the time of the report (1968), agriculture accounted for "about one third of employment, nearly one fifth of national income and over half of total exports" (pr. 13).

**Table 8.1.2a Classification of counties based on Buchanan methodology.**

| Group | Agriculture | Growth Potential Counties | Development Centres |
|---|---|---|---|
| 1 | Dublin, Meath, Kildare, Carlow, Wexford, Waterford, Kilkenny, Tipperary South, Tipperary North, Limerick, Mid and East Cork | Dublin | Waterford, Dundalk, Galway, Drogheda |
| 2 | Louth, Laois, Westmeath, Offaly, Roscommon, East Galway | Louth, Waterford, Cork, Wicklow | Sligo, Tralee |
| 3 | North Kerry, Wicklow, Cavan, Longford, East Donegal, East Mayo | Limerick, Carlow, Kildare, Meath, Tipperary, Westmeath, Offaly, Kilkenny | Wexford, Kilkenny, Athlone, Mullingar, Clonmel, Carlow, Ennis |
| 4 | Sligo, Clare | Wexford, Laois, Sligo, Kerry, Galway, Clare, Longford | Tullamore, Bray, Thurles, Monaghan, Cavan, Letterkenny, Arklow |
| 5 | Leitrim, West Donegal, West Mayo, West Galway, West Cork, South Kerry | Monaghan, Mayo, Donegal, Cavan, Roscommon, Leitrim | Ballina, Castlebar, Enniscorthy, Cobh, Mallow, Portlaoise, Navan, Killarney, Ballinasloe, Dungarven, Youghal |

Source: Compiled from the Buchanan Report, 1968.

The final category (column 4) in Table 8.1.2a relates to the idea of "development centres". At that time, the government had adopted this concept as a policy tool, but had not decided on the number or composition of centres. Buchanan included all towns with a 1961 population of 5,000 or more[10] in classifying the five categories of development centres referred to in Table 8.1.2a. Towns were assigned to each group based on their population trends, existing functions, shopping and social facilities, location relative to other centres and also on the criteria for assessing the suitability of a place for the location of an industrial estate as laid down by the Committee on Development Centres. [11] These centres were viewed at the time as a major part of the solution to the social and economic disparity within the country. However, Buchanan and partners were careful to indicate that none of the towns fared "equally well under all the criteria and that the rankings should be regarded as giving only a very tentative indication of a town's development potential" (pr. 30).

The Committee on Industrial Organisation (CIO), in their 1963 report on industrial grants policy to the government, argued strongly for a concentrated (i.e. growth centre) approach to industrial development. They stated that special inducements should be given to new enterprises to encourage their establishment in the selected centres of development. In their submission to government, the CIO report juxtaposed the disadvantages of dispersal alongside the advantages of concentration. However, the CIO did not endorse a total concentration approach, favouring instead that "the decentralisation policy should be operated in such a way as to give maximum support to the general policy of economic development under free trade conditions. It believed that this could

[10]Except the established centres of Dublin, Cork and Limerick.
[11]The criteria suggested were size of town, labour availability, infrastructural facilities, communications, existing industry and the provision of services for a rural hinterland.

be done by selecting a small number of centres of major industrial development and by giving a higher grant in the chosen centres" (NESC, 1975; p. 46).

The 1965 Government statement[12] on regional policy was the beginning of the official response to the growth centre approach. The thrust of the response was a favouring of both concentration and dispersion - with the latter for social objectives as well as economic. Eustace (1980) notes that such a response was typical across Europe as the real difficulty for government was not the concentration argument *per se* but the fact that the government might be seen to discriminate in favour of particular towns. This was all the more acute in a small country like Ireland. "As a result, the government, although it appeared to welcome the report, found difficulty in facing up to its more unpleasant implications and in due course a somewhat more equivocal position has become established in governmental attitudes" (Eustace, 1980; p. 118). Despite a number of calls from the National Industrial and Economic Council (NIEC) on the government to establish its position vis-à-vis growth centres, the result was a weak endorsement of the growth centre policy suggested by the Buchanan Report -- "the consultants 'growth centres' recommendations should be further considered in the context of proposals for regional development generally" (1969 Government statement on regional policy[13]).

A number of regional administrative structures were put in place during the 1960s. Nine planning regions were defined in 1964; a regional development committee was set up in 1965 that was representative of all government departments; and the regional development organisations were set up in the 1968 to 1969 period. These organisations were non-statutory, co-ordinating bodies, which did not have executive functions but could act as a forum for discussion or joint action by their constituent bodies. There have been mixed views on the effectiveness of the regional development organisations (RDOs). The 1976 NESC report found that the RDOs had largely been ineffective.[14]

- they (the RDOs) have not been adequately supported by all the bodies concerned;
- either as a cause or a consequence of the lack of support noted above they have neither statutory recognition or powers;
- they have not been backed by regional executive agencies (the one exception being the Mid West region);
- in some instances the boundaries of the regions have been unsuitable;
- there has not been effective co-ordination or monitoring of the regional development organisations from the centre; and

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[12] See NESC (1975).
[13] See NESC (1975).
[14] On the other hand, Bannon and Lombard (1996) viewed the RDOs as having made a positive contribution to policy co-ordination at the regional level.

- following the completion of their original reports, the regional development organisations have not been given any specific tasks to perform. (NESC, 1976; p. 15).

The final distinguishing feature of the decade was the introduction of the 1969 Industrial Development Act. "The objective of the Act was to update, integrate and to clarify the incentives available for manufacturing projects over the whole country" (NESC, 1975; p. 25). The changes that the Act introduced and which represented a renewed emphasis on regional policy were as follows:

- An Foras Tionscail was merged with the IDA.
- Division of the country into designated/non designated for grant purposes.[15]
- Designated areas qualified for: standard grants of up to 40% of the cost of land, buildings, machinery and equipment plus re-equipment grants of up to 35%, grants of up to 20% for exceptional cases, grants toward research costs of up to 50% or £15,000 (whichever was less) and grants for interest payments on loans and for factory rents.
- Non designated areas qualified for the same grants, except that standard grants were for up to 25% and re-equipment grants of up to 25%.

The 1960s certainly could be termed the high period of Irish regional policy. Considerable debate and discussion marked the period in the pursuit of a regional development strategy and structure. To this end, a considerable literature was made available on regional development and a number of organisations concerned with regional development came into being. Regional disparity was specifically addressed in the context of a policy of concentration/dispersion and with the introduction of the designated/non-designated areas in the 1969 Industrial Development Act. This Act "represented a considerable improvement on previous enactments" (NESC, 1975; p. 26) insofar as regional policy was concerned. The final thrust of policy, as enacted by the 1969 Industrial Development Act, recognised the inequality within the nation by dividing the country into designated and non-designated areas for industrial development purposes.

### 8.1.3 The 1970s

The growth centre debate spilled over into the 1970s and, the Government statement on regional policy in 1972 represented the end to the debate. The 1972 statement endorsed the IDA regional industrial plans, which specified job targets for forty-seven town clusters, thus continuing the tradition of dispersion. O'Neill (1973) strongly criticised the government's decision; *having sat on the fence between the rival factions of Centralist and Dispersionists for a long time, the then*

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[15] Donegal, Sligo, Leitrim, Roscommon, Mayo, Galway, Kerry, Longford, Cavan, Monaghan, Clare (excluding Shannon) and parts of Limerick, Cork, Offaly, Meath, Tipperary and Waterford were defined as "designated" under the 1969 Act.

*government in the Republic appeared to reject the growth centre approach in 1972 and to publicly once again endorse a policy of dispersion* (O'Neill, 1973).

Government had thus opted for a middle-of-the-road policy. The concentration/dispersion approach of the IDA regional industrial Plans covered the period from 1973 to 1977. The thrust was to actively promote the less developed regions over the more developed regions and in particular over the East region (p. 57). To this end, the Plan had two main categories of objectives that reflected the function of the IDA to "foster industrial development at both national and regional levels in order to achieve economic and social goals including those pertaining to employment". The two main categories of objectives were:

- A. Objectives deriving directly from the functions and responsibilities of the IDA with respect to industrial development
- B. Objectives deriving from the wider demographic, social and economic goals which are not within the direct and exclusive field of responsibility of the IDA, but which, nevertheless, form part of the framework within which IDA activities are carried out (page 39, IDA Industrial Plans).

Employment objectives were identified for category A, while demographic and social and community objectives were identified for category B. Both category A and B objectives are reproduced in Table 8.1.3a below.

**Table 8.1.3a Category A + B Objectives from the IDA Regional Industrial Plans**

| Cateogry A | Category B |
|---|---|
| 1. Employment Objectives | (1) Demographic Objectives |
| (i) 55,000 gross (38,000 net) increase in manufacturing jobs over the period of the plans. This includes the increase in manufacturing jobs in Gaeltacht areas provided for in the recent report commissioned by the Minister for Finance – "Gniomh don Ghaeltacht: An Action Programme for the Gaeltacht".<br>(ii) Net and Gross regional job targets.<br>(iii) Sub-regional job targets. | (i) To aid in the achievement of increasing population levels in all regions in the longer term (i.e. by 1986)<br>(ii) To help ensure that emigration rates for all regions over the plan period are less than for either of the two periods 1961-1966 and 1966-1971.<br>(iii) To help in slowing down the population increase in the Dublin area to the equivalent natural increase. |
| 2. Industrial Objectives<br>*(i) Type of Industry*<br>In general the main objective involves the selective encouragement and promotion of those industries with some or all of the following characteristics:<br>(a) Low capital intensity<br>(b) High male labour content<br>(c) High usage of Irish raw materials, services and natural resources.<br>(d) High potential for inter-industry linkages.<br>(e) High profitability.<br>(f) Strong growth prospects in output and international trade.<br>(g) High-skill labour content.<br>*(ii) Type of Industrialist/Company*<br>The general principle is to seek out industrialists/companies with the following characteristics and encourage them to establish enterprises in Ireland:<br>(a) Irish owned or with substantive participation by Irish principals.<br>(b) Originating from outside the European Community but seeking to establish enterprises within the enlarged Community.<br>(c) International companies which allow for subsidiaries in countries such as Ireland high degree of independence in the policy and decision-making fields.<br>(d) Commercial strength and economic stability by reference to liquidity, profitability and growth criteria.<br>(e) Engaged in suitable industry types by reference to the list of desirable characteristics listed in 2(i) above. | (2) Social and Community Objectives<br>(i) To help maintain and improve the existing pattern of community settlements.<br>(ii) To aid in the provision of employment opportunities within commuting distance, i.e. involving a travel-to-work time of not more than about 30 minutes.<br>(iii) To spur development in the smaller centres by encouraging the location of small industrial units in them.<br>(iv) To facilitate the provision of employment opportunities in Gaeltacht areas (in co-operation with the organisation charged with responsibility for this task).<br>(v) To contribute to the development of selected towns as growth centres, which provide the requisite facilities and form a base for larger scale, high technology industry with potential for rapid and sustained growth.<br>(vi) To contribute to the development in each region of a number of centres providing a wide range of higher order social, shopping, commercial, sporting and cultural facilities.<br>(vii) To encourage where appropriate the "clustering" of geographically and functionally related towns to form a stronger base for industrial and social development. |

Source: IDA Regional Industrial Plans, 1973-1977, Part 1, p. 39 and 40.

The regional industrial structure agreed in the 1969 Local Government Act was implemented in 1973 and regional offices of the IDA were set up in the nine planning regions - the East, West, South East, South West, North East, North West, Midlands, Mid-West and Donegal. These offices had responsibility for the co-ordination of industrial/regional policy in each of their regions.

Despite the mounting national pressures arising from the oil price increases during the 1970s, the regional issue did not (at least initially) fade into the background. The setting up of the IDA

regional offices enforced the distinction between the designated and non-designated areas for grant-giving purposes and, more importantly, served to illustrate the importance of the regional issue in national industrial policy.

### 8.1.4 The 1980s

Regional policy was effectively sidelined in the 1980s as national concerns began to occupy increasing importance. Policy makers became increasingly focused on overall national economic performance in the face of an increasing debt-to-GNP ratio, and high rates of inflation and unemployment. Accordingly, in contrast with earlier periods where industrial policy favoured dispersion of activity throughout the regions, developments in the 1980s led to the fostering of a concentrated approach.

First, the publication of the Telesis Report in 1982 favoured a national approach to industrial policy, which would promote key business functions such as marketing and distribution and research and development. Future industrial development would rely on both foreign owned and indigenous firms in the Irish economy. Telesis identified a key role for the small firm sector[16] in promoting an indigenous base in the Irish manufacturing sector. The NESC (1985) report viewed this approach as having implications for the location of industry. The key business functions favoured by Telesis would lead to higher infrastructural demands which the NESC felt, should be met by concentrating on a number of locations as opposed to "upgrading many locations". Concentrating on a limited number of locations would attract high quality foreign firms and have positive spin-off effects for domestic firms. The NESC did not earmark such locations and instead referred once more to the centres proposed by Buchanan (1968) and on the establishment of a development centre within each planning region.

Furthermore, the recommendations on the designation of areas for industrial policy in the NESC 1985 report were based on a needs/potential framework and the conclusion of the Report was that *there are compelling reasons for adopting a more concentrated approach to industrial location. The Council believes that an approach to regional policy with the greater emphasis on potential would contribute to economic growth to a greater extent and should be accorded higher priority* (NESC, 1985; p. 47).

Third, the 1986 Industrial Development Act reflected the national concern with macroeconomic issues. The focus of the Act was on employment and employment creation throughout the whole country, rather than in specific regions, through both foreign owned and indigenous enterprises.

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[16] The small firm sector consists of those firms employing less than 50 employees.

Finally, the RDOs, which had been set up over the period 1968 to 1969, were abolished in 1987 in the context of widespread public expenditure cuts.

Regional policy occupied a back seat during the eighties. The deteriorating overall national macroeconomic performance instead became the main concern of policy makers. The 1986 Industrial Act, which was the outcome from the Telesis Report of 1982 and the 1984 White Paper on Industrial Policy abolished the distinction between designated areas (DAs) and non-designated areas (NDAs) for large industry,[17] but retained the distinction for small industry. The prime focus, as stated above, was on industrial development for the entire country.

### 8.1.5 The 1990s

There have been a number of important developments, both at the national and regional level during the 1990s. First, in the early part of the decade, the issue of national industrial development was brought centre stage as a result of recommendations made in the 1990 Review of Industrial Performance. In this review, the then Minister for Industry and Commerce highlighted that Irish industry was characterised by major scale diseconomies, a low presence in international markets and a weak indigenous base.

Table 8.1.5a demonstrates the weak indigenous base to Irish manufacturing industry, the small size of the average indigenous firm and the low presence of such firms in international markets. Indeed, 1996 data shows little improvement for these variables, see footnote 15. The average size of establishment is much greater for the foreign owned firm (129 persons) than for the indigenous firm (29 persons). Gross output and net output per person engaged are also higher for the foreign owned firms.[18]

**Table 8.1.5a Duality within Irish Manufacturing Industry[19].**

| Variable | Foreign Owned | Indigenous |
|---|---|---|
| Average size of establishment (persons per establishment) | 129 | 29 |
| % Gross output exported | 88.3 | 49.6 |
| Gross output per person engaged (£000) | 163.5 | 93.4 |
| Wages & Salaries per person engaged (£000) | 16 | 13 |
| Net Output per person engaged (£000) | 93.5 | 30.8 |

Source: Compiled from Census of Industrial Production, 1993.

[17] An enterprise employing 50 people or more.
[18] These variables need to be treated with caution because of transfer pricing - their true value may be lower than that stated in Table 8.1.5a.

The concern over the poor level of industrial performance led to the publication of the Culliton Report in 1992. This Report represented a change in emphasis from the Telesis Report a decade earlier in that it favoured the development of an environment in which industry could flourish. Accordingly, its recommendations related to the tax system, to the industrial development agencies, to the fostering of enterprise and to training and education in bringing about a more favourable environment for job creation. The regional industrial plans from two decades earlier that favoured the bringing of jobs to the people were completely at odds with the proposals in the Culliton Report.

Once more however, the regional dimension to the national industrial plans was largely absent and any regional focus relied on the industrial development agencies. Forbairt has taken up the challenge in seeking to promote industrial clusters at the regional level in order to enhance regional and industrial development. Efforts are being made to foster a furniture cluster in the North East region and to strengthen the operation of the linkage programme in the West region. The Minister for Enterprise and Employment has also identified a regional dimension to IDA (Industrial Development Agency) industrial policy. In a recent press statement, he stated that the new IDA Ireland policy involved:

- financial incentives (which) will now be biased in favour of smaller regional locations with higher grant levels as appropriate to each individual case;
- the participation of private sector investors in stimulating and supporting a major programme of advance factory construction at key locations; and
- working in partnership in local authorities to have available quality serviced sites at priority locations for new industrial investment.

Second, although regional development was referred to in the 1994 National Development Plan, the reference was rather vague, referring solely to "the objective of balanced regional development" while not defining this in any way. However, the concept of clustering, which was identified in the Culliton Report as an avenue for industrial and regional development was highlighted and a key role for the development agencies and local authorities in fostering the development of clusters at the regional and sub-regional level was identified.

Moreover, changes took place in the spatial definition of the regions. The Regional Authorities came into operation in 1993 having been established under the Local Government Act of 1991.

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[19] The 1996 figures for these variables are 146 and 31 for average size of establishment, foreign and indigenous respectively 91% and 50% of gross output exported, foreign and indigenous respectively; 226.6 and 101.4 gross output per person engaged, foreign and indigenous respectively; 17.6 and 14.3 wages and salaries per person engaged, foreign and indigenous respectively and 131.3 and 34.6 net output per person engaged, foreign and indigenous respectively.

Their primary function was to co-ordinate the provision of public services in their regions.[20] Each Regional Authority was required to produce a regional report. For example, the Dublin Regional Authority identified a four-strategy approach for Dublin - Dublin as a living city region, Dublin as a metropolitan region, Dublin as the national capital and Dublin as a leading European city. The Regional Authorities are also charged with reviewing the implementation of the funds from the Community Support Framework and by making recommendations to the monitoring committees. Members of the regional authority are from the constituent county or borough authorities.[21] The Regional Authority is advised and assisted by an Operational Committee. Each Committee is chaired by the Cathaoirleach of the Regional Authority and comprises local authority managers and the Chief Executive of various public bodies. In addition, each Committee is extended to include local authority members, farmers, employers, trade unions and relevant Government Departments for Structural Funds purposes (Government of Ireland, 1996; p. 36).

It has been suggested that the role of the Regional Authorities could be more significant as a result of recent changes introduced in the document *Better Local Government - A Programme for Change* (Department of Environment, 1996). These changes envisage a further integration of the Regional Authorities into the local government framework. However, the more recent division of the country into two major regional blocs[22] (one eligible and one ineligible) for Objective 1 European Union funds raises questions as to the precise future role of the Regional Authorities.[23]

The Local Government Act of 1991, which set up the regional authorities was amended in 1999 to establish two new regional authorities to be known as the Border, Midland and Western Regional Assembly and the Southern and Eastern Regional Assembly respectively. These two new bodies will have functions in relation to:

- the management of regional programmes, which are to be put in place under the National Development Plan;
- monitoring the general impact of all EU programmes of assistance in their areas; and
- working with the Regional Authorities to promote the co-ordination of public services within their region.

The Regional Assemblies will be concerned with the:

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[20] There are eight regional authorities -Dublin, the Mid-East, Mid-West, South West, South East, Border, West and Midlands. See Appendix G, section G.1 for a list of the counties in each region.

[21] Irish local government comprises 114 directly elected authorities in five legal classes – County Councils (29); County Borough Corporations (5); Borough Corporations (5); Urban District Councils (49) and Town Commissioners (26) (Government of Ireland, 1996; p. 33).

[22] Thus the Republic of Ireland has gone from a single NUTS11 region to two NUTS11 regions with the regional authorities constituting the NUTS111 level.

[23] Fitzpatrick Associates (1999) see the regional authorities as occupying a spatial co-ordination role mid-way between the centre and local authority level.

- general welfare and development of their respective regions;[24]
- the programmes, plans, policies proposals and objectives of :
  (i) a Minister of the Government
  (ii) a local authority
  (iii) a regional authority established by the Order of 1993,
  (iv) a regional assembly,
  (v) an appropriate public authority;
- the resources that are available or are likely to be available, for the provision of public services and the need to secure the most beneficial, effective, and efficient use of such resources;
- the implications for the other regions of the services of public authorities in or relating to its region; and
- in the case of the Border, Midland and Western Regional Assembly, the need for co-ordination with the Western Development Commission. (p. 10/11 Local Government Act, 1991 (Regional Authorities Establishment) Order, 1999.

The Minister for Finance asked the NUTS11 Groups of Regional Authorities to prepare composite Regional Development Strategies for each of the two new regions. The Strategies, which were prepared as an input to the National Development Plan, 2000-2006, were drafted by the consultancy firm Fitzpatrick Associates and supported by a Steering Group[25] together with a nominated County Manager from each Region (Border, West, Midlands, the Mid-East, Dublin and South East, South West and Mid-West). The Regional Strategies were also guided by Regional Authority Submissions.[26] The overall objective of the Fitzpatrick Reports, as they have come to be called, was to prepare a single prioritised strategic plan for the new NUTS11 Border, Midlands and Western Region and a parallel plan for the Southern and Eastern region. The plan was designed to

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[24] This will include the physical, economic, social, demographic, infrastructural and environmental situation of the region, its development potential and the protection or improvement of its environmental, heritage, amenity and cultural resources (including arts facilities) (p. 10 Local Government Act, 1991 (Regional Authorities Establishment Order, 1999).

[25] The Steering Group involved the Regional Authority Cathaoirligh and Directors.

[26] Border Regional Authority, *'The Border Region: Special Region, Special Time, Special Status'*, Cavan, June 1998.
Midland Regional Authority, *'Submission for Structural and Cohesion Funds for the Period 2000-2006'*, Tullamore, June 1998.
Mid-West Regional Authority, *'Priorities for Post-1999 Structural & Cohesion Fund Investment'*, Nenagh, June 1998.
South West Regional Authority, *'Regional Submissions on the Development Priorities for the 200-2006 European Community Support Framework'*, Ballincollig, June 1998.
West Regional Authority, *'West Regional Development Plan, Structural & Cohesion Funds 2000-2006'*, Galway, June 1998.
South East Regional Authority, *'Submission to National Development Plan for Structural & Cohesion Funds for the Period 2000-2006*, June 1998.
Dublin Regional Authority, *'Working for the Region's Future: Submission by the Dublin Regional Authority for Post 1999 Structural and Cohesion Funds'*, July 1998.
Mid-East Regional Authority, *'Priorities for Post-1999 Structural and Cohesion Fund Investments for the Mid-East Region'*, June 1998 (Fitzpatrick Associates, 1999).

present a development strategy for the Region and prioritise investment measures contained in the existing regional authority submissions.

The proposed development strategy was one of "spatial focus". Unlike the spatial focus recommendations of previous reports such as the Buchanan Report (1968), the development strategy proposed the targeting of investment packages for different types of areas. It was, therefore, a policy of "horses for courses". The strategy involved "integrated packages" of investment for four/five distinct types of area within the regions, see Table 8.1.5b below.

**Table 8.1.5b Spatial Typography of the regional assemblies.**

| Border, Midlands and Western Regional Assembly | Southern and Eastern Regional Assembly |
|---|---|
| Large Urban Growth Centres | Large Urban Areas |
| Proposed New Urban Growth Centres | Disadvantaged Urban Areas |
| Other Towns and Proximate Rural Areas | Other Cities & Towns & Rural Hinterlands |
| Disadvantaged & Remote Rural Areas | Disadvantaged Rural Areas |
| | Remote Areas |

The "large urban growth centres" category referred to Galway city in the Border, Midlands and Western Regional Assembly and to Dublin, Cork, Limerick and Waterford in the Southern and Eastern Regional Assembly. The "proposed new growth centres" category in the first column of Table 8.1.5b referred to Athlone and Sligo (larger regional centres) and to Letterkenny/Derry and Castlebar (which form an "outer ring " of centres to help address the problems of remoter parts of the Region). The "disadvantaged urban areas" category referred to areas within Dublin, Cork, Limerick and Waterford.[27] The "other towns and proximate rural areas" category in the Border, Midland and Western group referred to the relatively weak urban structure in the Midlands and North-Western part of the region. The "disadvantaged and remote rural areas" referred to the islands along the Western seaboard and remote areas. "Other towns and cities and attached rural areas" in the Southern and Eastern regional assembly area referred to the strong urban structure within that area, which is linked to the surrounding rural areas. The "weaker rural areas" included North-west Kildare, North-west Meath, parts of North and South Tipperary, South and East Limerick, South-west Wexford, the Duhallow area of North Cork, North Kerry, North and East Clare, West Waterford, Wicklow Mountain area and smaller pockets in South Kildare, South Wicklow, Carlow. West Cork, South Kerry and West Clare were regarded as the only "remote and disadvantaged" area of the region (Fitzpatrick Associates, 1999, p. 8). Finally, the Coastal Zone and Gaeltacht speaking areas were described as special zones - the former is under pressure from a development and tourism perspective, while the latter has been "identified as playing a special role in the promotion of the (Irish) language" (p. 9).

The investment proposals in the strategy involved:

- an increased share for the regions in National Development Plan funding in the 2000-2006 period, involving a total package of $7.7bn for the Border, Midlands and Western Region and an increase from 8.2 billion in the last round of the CSF to 14.3 billion in the next for the Southern and Eastern region;
- a substantial rise in the absolute level of investment across all sectors;
- reprioritisation of investment in percentage share terms, principally towards infrastructure investment (and away from direct grants to enterprise in the Southern and Eastern Region).

The overall development objectives as laid out in the Fitzpatrick Reports are given in Table 8.1.5c. The Fitzpatrick Reports envisaged a more integrated approach involving central government departments and local authorities in achieving the developmental objectives set out in Table 8.1.5c.[28]

**Table 8.1.5c Overall development objectives for the Regional Assemblies**

| Border, Midlands & Western Regional Assembly | Southern and Eastern Regional Assembly |
|---|---|
| Maintain the pace of unemployment reduction, especially long-term unemployment | Maintain and improve the quality of life, in a sustainable manner, for all those who wish to live and work in the region; |
| Contribute to the national objective of more spatially balanced economic activity in Ireland and within the Region; | Consolidate and build on the region's recent economic performance, especially regarding reductions in employment and long-term unemployment; |
| Promote North-South co-operation | Develop Cork, Limerick and Waterford, and other urban centres as a means of alleviating further congestion in Dublin; |
| Facilitate the presence in the Region of key drivers of modern economic growth - high quality infrastructure and services, highly skilled labour and a good environment. | Address emerging issues of sustainability and bottlenecks to growth including infrastructure and skilled labour provision; |
| | Distribute economic growth and its benefits throughout the region; |
| | Target social exclusion in urban and rural deprived areas; |
| | Maintain a strong, vibrant, economically viable rural economy and a sustainable rural environment; |
| | Maintain the region's position as the power house of national economic development, while contributing to the national objective of more spatially balanced economic activity in Ireland; |
| | Promote North-South co-operation. |

[27] See Drudy and Punch (1999) for an exposition of disadvantaged urban areas.

[28] "It will necessitate greater integration between the traditionally separate strands of physical and economic planning, between the top-down and bottom-up planning approaches and between planning for urban centres and the rural areas affected by these centres (Fitzpatrick Associates, 1999; p.3).

The Reports conclude with strategies for each sector. Four sectors were identified - the productive sector (encompassing agriculture, rural development and forestry; fisheries; industry; service enterprise; tourism; research and technology development); infrastructure (encompassing transport; environmental services; telecoms; energy; urban and village renewal), human resources and local development/social exclusion. A table in each report outlined how these strategies might be achieved for the two regions.

Finally, the 1990s were also characterised by the increasing involvement of local players in regional development, which reawakened interest in regional disparity. Part of this interest stemmed from the availability of monies from the EU Structural Funds for regional development. Thus the role which European regional policy plays in the Irish context is an important one that should not be overlooked. The involvement of European regional policy in Ireland has also shifted the focus of Irish regional policy from a "top down" to "bottom up" approach. The approach has emphasised the role of local development organisations in regional and local planning. The Interim Report from the Devolution Commission[29] (Government of Ireland, 1996) outlines the key elements of the local development approach:

- an area-based approach to tackling local problems tailored to the particular needs and resources of the area;
- a multi-sectoral approach to addressing problems, which involves participants from the public, private and voluntary sectors;
- a strategic approach to developing local potential, with a strong emphasis on integrated planning and implementation;
- providing local structures with the necessary resources and authority to achieve their strategic objectives;
- co-ordination of national policies to ensure coherence of policy-making and commitment to policy change and subsidiarity; and
- effective linkages between local and central structures to ensure those difficulties identified at local level shape central policymaking (Government of Ireland, 1996; p. 36).

The report identified six main players involved in local development. These are: the County Enterprise Boards; the Partnership Companies; Area Development Management Ltd.; LEADER; County Tourism Committees; and County Strategy Groups. Apart from County Enterprise Boards,[30] the remaining agencies operate outside the structure of local government. The aim of

[29] At the request of the Government, the Minister for the Environment prepared this report which makes recommendations on how the distinct role of elected members relative to the officials of local authorities and other bodies engaged in public service delivery could best be supported and on how socio-economic development at a local level could best be fostered.

[30] Membership of the County Enterprise Boards includes a local authority manager and four elected members.

these groups is to achieve development based on a partnership approach between statutory agencies, business interests and community groups. The County Enterprise Boards (of which there are thirty-five) are charged with preparing an enterprise plan for their area which outlines a strategy to create more viable business by identifying local strengths and resources. Business, individual entrepreneurs, small and micro enterprises[31] and community groups are the targeted groups.

Partnership Companies are charged with preparing and implementing local development plans for their areas. Each Plan consists of a social and economic profile of the area, which in turn helps inform the area's specific requirements. "The target groups are the socially excluded, the long term unemployed, and those at risk of becoming long term unemployed, particularly disadvantaged groups such as travellers, homeless people, those with disabilities, disadvantaged women and young people at risk" (Government of Ireland, 1996; p. 37). At present, 35 areas have been designated as partnership areas in which 38 partnership companies will operate, 20 urban partnership companies and 18 rural. Boards of Partnership companies comprise State agencies, social partners and the local communities. Local authorities are represented at official level on all boards.

Area Development Management Ltd. (ADM) channels funds to the Partnership Companies, Community Groups and Sectoral Organisations. ADM was established by the European Commission and the Government in 1992 and is now formally responsible for managing the part of the Local Urban and Rural Development Programme relating to disadvantaged areas and communities.

LEADER's function is to make funding available to rural groups to implement a business plan which covers investment in training, rural tourism, SMEs, marketing and processing of local produce, the environment and technical assistance. The LEADER groups, of which there are 36, (some covering just part of a county and others covering a number of counties) are autonomous legal entities operating under an agreement signed with the Department of Agriculture, Food and Forestry.

The function of the County Tourism Committees is twofold: first to stimulate and co-ordinate projects in the tourism sector and, second, to formulate county tourism action plans which provide an input to the County Enterprise Boards Action Plans and the Regional Tourism Organisations plans.

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[31] Small businesses are those employing up to 50 employees while micro businesses are those employing up to 10 employees.

The efforts and initiatives of the above local development organisations are co-ordinated by the County Strategy Groups under which counties are grouped together.[32] The Groups are established under the terms of the Operational Programme for Local Urban and Rural Development. The functions of the County Strategy Groups as referenced in the Interim Report of the Devolution Commission (Government of Ireland, 1996), are as follows:

- to maximise the potential of the Local Development Programmes for the county;
- to identify issues which have implications for the operation and evaluation of local development policy and, through the Liaison Team, to bring such matters to the Department of the Taoiseach;
- to exchange information on the aims, objectives and strategies of each member organisation in order to avoid overlap, duplication or competition between the organisations and to ensure that significant service gaps are addressed;
- to ensure that scarce resources available to member organisations are used in the most effective manner; and
- to ensure that the full range of supports provided by the member organisations (including their arrangements for linkage to the national-level programmes provided by mainstream agencies) are coherent, readily identifiable and accessible.

The most recent National Development Plan[33] (NDP) in identifying key national objectives for investment[34] envisages the delivery of these objectives through four inter-regional programmes[35] and two regional programmes. The latter two programmes refer to a regional development programme for the Border, Midland and Western Region and the Southern and Eastern Region. The NDP identifies challenges that face the two regions (see Appendix G, Section G.2) and proposes a development strategy that will address these challenges. *"The Government's objective for regional policy in the NDP is to achieve more balanced regional development in order to reduce the disparities between and within the two Regions and to develop the potential of both to contribute to the greatest possible extent to the continuing prosperity of the country. Policy to secure such development must be advanced in parallel with policies to ensure that this development is sustainable with full regard to the quality of life, social cohesion and conservation of the environment and the natural cultural heritage."* (p. 43).

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[32] These groupings differ from the counties covered by the Regional Authorities.
[33] National Development Plan, 2000-2006.
[34] Investment will be concentrated on the following six key priority areas: economic infrastructure, primarily roads, public transport and the environment; employment and human resource development; productive sector investment; rural development; social inclusion; social capital (housing and health capital) (National Development Plan 2000-2006, 1999; p. 38).
[35] The four inter-regional programmes refer to an economic and social infrastructure programme, an employment and human resource development programme, a productive investment programme and a rural development programme.

Although this statement is reminiscent of previous regional policy statements in past programmes and plans, the 2000-2006 NDP identifies a strategy to achieve regional balance. This strategy relies heavily on the further development of regional Gateways[36] and the "focused development, as Regional Gateways, of a limited number of strategically-placed centres" (p. 43). The latter would form a second tier of larger urban centres to the main Gateways (Dublin, Cork, Limerick/Shannon, Galway and Waterford). The choice of locations for development will be a key element of regional policy over the period of the NDP. The choice will be based on an area's potential to "stimulate growth in the towns, villages and rural areas throughout their zones of influence and on the quality of their transport connections to other parts of the country" (p. 44). Only a limited number of locations will be selected. This will facilitate a concentration of resources and investment, which is considered necessary. This is not to say that development will be confined to these areas and their hinterlands. The NDP highlights the role of the "zones of influence" surrounding these Gateways and the need to develop a tier of hubs that will be relevant at the county or local level. The NDP also identifies the employment and living potential of smaller towns, villages and rural areas and the need to include this in an overall regional development policy. Finally, the capacity constraints that currently mark the Dublin region and to a lesser extent the other major urban centres (Waterford, Limerick, Cork and Galway) need to be tackled in order to achieve overall regional development.

The regional development strategy outlined in the NDP is reminiscent of the growth centre approach favoured by Buchanan (1968), although the terminology has changed. Moreover, the "zones of influence" might be interpreted as positive spread effects identified by Hirschman (1958) and others (see chapter two).

## 8.2 Conclusion

Policy was examined chronologically for the decades from the 1950s to the present. At that time, policy addressed regional disparity by introducing spatially selective industrial grants. Developments in the 1960s and 1970s further endorsed and expanded the regional policy measures in place from the 1950s. Several new ideas and structures marked the 1960s and early 1970 periods. The concept of growth centres, which was receiving significant research attention in the international literature was hotly debated during this time and resulted in a number of Government commissioned reports. In particular, the Buchanan report (1968) favoured the adoption of a growth centre strategy to regional development. The Government however, favoured a more dispersed

[36] The term refers to centres that have "a strategic location relative to the surrounding territory, possess good social and economic infrastructure and support services and have the potential to open up their zones of influence to further development by providing transport links with contiguous zones" (NDP, p. 43). The

policy and its statement on regional policy in 1972, which pledged the bringing of jobs to the people and restricting the growth of Dublin to its natural rate of population increase ended the debate. A number of regional structures were put in place and chief among these were the planning regions, which were defined for the administration of industrial development policy. Industrial development policy provided the main conduit of regional policy from the beginning.[37]

While regional policy was in its heyday during these two decades, it has come to the forefront once more in the 1990s, having occupied a backseat position to national objectives during the decade of the 1980s. The decade has witnessed a change in ideas from a 'top-down' to a 'bottom-up' approach to regional policy, which recognises and legislates for the input of local agents and agencies. Furthermore, new regional structures have been put in place that have closer links to local government. The first of these was the introduction in 1994 of eight regional authorities, which had been established under the Local Government Act of 1991. These were thought to more accurately represent regional imbalance in the country by recognising Dublin, the capital, as a region in its own right. More recently, the country has been divided into two regional blocs, one eligible and one ineligible for Objective I European Union funds. The first, which is known as the Eastern and Southern Regional Assembly comprises the "successful" regional authorities of Dublin, the Mid-East, South West, Mid-West and South East and the second which is known as the Midlands, Border and Western region and comprises the three regional authorities of the same names. Finally, the most recent thinking on regional policy argues for a 'gateway' approach to future regional development. This strategy, as outlined in the National Development Plan for 2000-2006 and discussed in the main text, bears a striking resemblance to the growth centre approach debated in earlier decades. The issue of regional disparity however remains a central aspect to ongoing policy proposals.

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identified Gateways are Dublin (a national Gateway) and Cork, Limerick/Shannon, Galway and Waterford (regional Gateways).

[37] The Undeveloped Areas Act (1952) and the Industrial Grants Acts of 1956 and 1959.

# Chapter Nine

# SUMMARY AND CONCLUSIONS

This chapter summarises and concludes the thesis. Regional disparity has been a long-term feature of the Irish economy and the thesis attempted to provide a comprehensive understanding of the issue by looking in general at the nature and causes of regional disparity and then as it applied to the Irish economy.

The nature and causes of regional disparity were first considered in the context of structural and location factors that contributed to the region's economic growth. The process of economic growth and its implications for regional disparity was then examined. It was argued subsequently that the new economic growth literature provided the most useful tool in examining the persistence of regional disparity over time.

The thesis then turned to an examination of the nature and causes of regional disparity within the Republic of Ireland over the 1926 to 1996 period. In adopting a long-run view, the thesis made a number of important contributions. First, relating the economic growth literature and in particular the recent developments in this literature to the Irish regional context was a new departure for Irish regional studies. Second, its original approach stemmed from the compilation of a very comprehensive inter-regional database for the regions in the Republic of Ireland. While statistics at the regional level have been collected for the Irish economy from the date of the first census in 1841, these have not been analysed in a systematic manner. Third, this study departed from previous studies in having applied statistical and econometric techniques to the data gathered at both the inter-regional and intra-regional level.

Drawing on a wide range of previous work, the nature and causes of regional disparity on an international scale were examined in detail in chapter two. It was shown that various indicators had been used to describe the nature of regional disparity. The description and examples indicated the pervasiveness of regional disparity and its causes were linked to a region's economic structure as summarised by employment, demography and industrial composition as well as geographical location in terms of urban/ rural and core/ periphery mix.

A range of theories have attempted to explain the existence and persistence of regional disparity. One notable approach is the theory of circular and cumulative causation whereby countries/economies with favourable initial conditions for economic growth occupy leader positions and maintain these positions over time. By the same token, countries/economies with unfavourable conditions for economic growth occupy a laggard position, which is also maintained over time. From this perspective, there is no automatic tendency for convergence of lagging and leading regions under this approach. Similarly, structural and location factors endogenous to a region would account for growth centres in some regions. Spread (e.g. higher investment in surrounding regions) and backwash (e.g. labour shortages in surrounding regions) effects emanating from this growth centre tend to impact on surrounding regions. Finally, under the export-led approach, the initial spurt of economic growth, which favoured leader regions and disfavoured lagging regions, was thought to stem from export growth. Economies with buoyant export sectors would benefit from increased output and foreign earnings so long as they maintained a favourable balance of payments position.

An alternative view of regional disparity dismissed it as a short-term occurrence. This interpretation has more in common with the neo-classical approach to economic growth. An in-depth consideration of the neo-classical growth model as first developed by Solow (1955), showed that, in effect, the classical/neo-classical approach does not allow for the persistence of regional disparity over time. Under the neo-classical approach, in the long run flexible factors of production ensure that lagging regions catch up with leading regions. The theoretical construct of the steady state indicated that all economies would have equal growth rates at this point. Neo-classical regional disparity studies have concentrated instead on the factors that would prevent regions from reaching their steady state position.

It was then argued that the new economic growth literature provided the most useful insights into the existence and persistence of regional disparity. First, it goes some way towards bridging the gap between the process of circular cumulative causation and the long-run implications of the neo-classical growth model. It has brought to centre stage the convergence/divergence debate that had traditionally separated the alternative and neo-classical approaches to explaining economic growth. Second, this area of economic research has witnessed the development of several rigorous economic growth models from which a variety of variables capable of explaining economic growth emerge. Many of these variables had already been identified in the 'structural' causes of regional disparity. The chapter concluded with an analysis of economic growth studies at the country and regional level that focused on the ancillary or causal factors promoting convergence between regions. Although it has been argued that convergence at the regional level does not rely on these ancillary, or causal variables

because of the homogeneity in structural characteristics between regions, most regional studies included such variables in explaining convergence patterns, an approach that was also adopted in this thesis.

Continuing with the literature review, chapter three examined the contribution of previously published regional studies for the Republic of Ireland. Although not all of the studies were concerned with the examination of regional disparity *per se*, the conclusions and data analysis provided valuable insights on the level of disparity at particular time periods from the 1960s to the present for a number of regional divisions of the country.

Chapter four considered the methodological issues necessary in undertaking a comprehensive long run study of regional disparity in the Republic of Ireland. First, the spatial unit was selected. Planning regions, which have been superseded by regional authorities, operating more recently through two regional assemblies, were chosen as the most appropriate statistical unit for the consideration of the inter-regional problem in Ireland, while individual counties were chosen as the basis of the intra-regional analysis. Second, the available regional data was identified and discussed in terms of the time period, spatial area and variables covered. From this, a detailed data set that included 32 indicators of economic wellbeing was constructed. In order to provide a long run economic analysis of these indicators that would also comment on and explain the persistence of regional disparity over time, a number of statistical and econometric techniques were identified.

Chapter five provided a socio-economic profile of the eight planning regions in the Republic of Ireland. 32 variables covering demographics, employment, unemployment, industrial composition, output, investment, income and education were used to analyse the relative and absolute position of the various regions over time across the 32 variables. The data covered various sub-periods within the 1926-1996 sample and the entire 1926-1996 period also. Findings suggested a continuing divide between the East and the rest of the country across many of the indicators examined. However, while the ranking of the regions changed little for some variables such as population and total employment, significant changes had occurred across the regions for other variables such as industrial employment, unemployment and migration.

Following the preliminary informal analysis of the data, a formal analysis, examining three concepts of convergence was undertaken in chapter six. The first, sigma convergence, focused on the patterns of disparity across the regions over time. Second, tests of absolute convergence examined the speed at which economic welfare variables (i.e. the productivity enhanced employment rate and disposable

income) converged, or otherwise, over time. Finally, conditional convergence analysis identified the reasons underlying such convergence outcomes.

Tests of sigma convergence included first examining the data for independence of variance using the Bartlett test of homogeneity of variance and then plotting the variance of the logs of the variables to ascertain periods of convergence (decreasing variance) and divergence (increasing variance). The results indicated patterns of divergence in (i) total employment, (ii) agricultural employment and (iii) service sector employment across the planning regions over the 1926 to 1996 period. On the other hand, while industrial employment also showed divergence up until 1966, it has seen a sustained period of convergence since then. Convergence was also present over the entire sample period for the productivity enhanced employment rate, reflecting the convergence that had taken place among regions in their employment mix. Turning to the income measure, sigma analysis indicated that disposable income converged over the 1973 to 1987 period (1973 is the first year for which regional income data are available) with divergence then occurring up until 1994, the latest year for which data have been published.

For the absolute convergence analysis, a regression of the relevant variables on their initial levels ascertained the presence and speed of absolute convergence. The findings suggested that the productivity enhanced employment rate and disposable income per capita income converged across regions in Ireland over the 1926 to 1996 period at rates of 1.2 percent and 2.9 percent per annum respectively (or full convergence across the regions within 58 years and 24 years respectively). While the former convergence rate was somewhat lower than the rate suggested by the international studies reviewed (approximately 2 percent per annum); it was, nevertheless, a statistically significant finding. On the other hand, while the income convergence rate was much higher, it was not statistically significant at the 10 percent level.

Conditional convergence analysis was then used to help uncover the causal factors underlying the above convergence findings. Variables considered included education, investment, agricultural employment, service employment, unemployment, policy and urban population. It is interesting to note that when each of these variables were regressed separately on the growth rates of productivity enhanced employment and disposable income the results that would be expected *a priori* emerged for the majority of the variables.

Subsequently, using a general to specific approach, it was shown that, for productivity enhanced employment, the higher the agricultural employment share and the unemployment rate in a region, the

lower its rate of convergence to the national average, while higher industrial investment rates tended, to promote convergence.

In terms of the negative growth factors, higher agricultural employment might, other things being equal, be expected to be associated with a greater need for restructuring, while regions with higher unemployment would generally be expected to have greater structural rigidities to address. The positive impact of investment is clear and must be related, at least in part, to industrial policy across the regions.

As for disposable income per head, while agricultural employment share and unemployment once again enter with the expected negative signs, this time the education rate is the factor that promotes convergence. Moreover, using the assumption that the above causal factors are held constant across the regions, the convergence rates in both welfare variables would have been significantly higher, at 6.0 percent and 4.8 percent for productivity enhanced employment and disposable income respectively (or full convergence after 12 and 15 years respectively).

The positive evidence for convergence across the regions belied the disparity within the regions. Chapter seven examined intra regional disparity in employment and the productivity enhanced employment rate. Measuring the economic health of the counties in terms of employment change from 1926 identified just five successful counties- Louth in the North East region, Waterford in the South East, Limerick in the Mid-West, Cork in the South West and Dublin in the East. Much of the 'bad' performance of the remaining counties was due to large decreases in agricultural employment that had not been compensated by offsetting employment increases in the other sectors. This situation was particularly severe in the pre-1971 period and for the counties of Donegal and Leitrim in the North West/Donegal region, Mayo in the West, Longford and Offaly in the Midlands and Wexford in the South East. The significant increases in industrial and service employment taking place in the post 1971 period contributed to positive employment change in all counties except Leitrim, Cavan, Roscommon and Mayo.

However, because of the shakeout that has occurred in the agricultural sector, the composition of employment has become more similar across the regions over the sample period and, accordingly, it was not surprising that the disparity in the productivity enhanced employment rate within each region had been decreasing from 1966. This rate of convergence -- 1 percent per annum -- was found to be statistically significant for the East, North East and Midlands region although the evidence for the remaining regions was not found to be statistically significant.

As for employment, only the North East had experienced a statistically significant rate of convergence, where the counties have been found to converge at a rate of 3 percent per annum. However, the pattern of disparity in employment and its components within the regions offered mixed results. For the most part, agricultural employment was converging within each region, while industrial employment converged only within the East region. Increasing disparity in service employment was the norm within all regions except the East and even here convergence had only been in effect from 1971. These varying patterns of convergence and divergence were mirrored in the disparity pattern for total employment within the regions. The exception was a sustained period of divergence for the counties in the Donegal/North West region and sustained convergence from 1971 for the counties of the East region.

The final chapter, chapter eight examined a chronology of regional policy from the 1950s. The main policy instrument considered was that of industrial policy. Government statements and the form of policy taken in each of the decades were examined in this context. Significant developments have taken place in the approach and administration of regional policy in the 1990s and the chapter concluded with their description.

In conclusion, the thesis made a number of contributions to the issue of regional disparity in general and in the Republic of Ireland in particular. The study of regional disparity would appear to have suffered from an overtly static approach that concentrated on description rather than explanation. Regional disparity was described by differences in key indicators of economic welfare that oftentimes stemmed from a region's structural and location characteristics. For the most part, the analysis did not seek to explain regional disparity by linking it to changes taking place in these factors. The failure to adopt a dynamic approach clouded the distinction between the existence and persistence of regional disparity.

Furthermore, theories, such as the process of circular cumulative causation that provided compelling reasons for why such disparities might persist failed to generate testable models. On the other hand, the alternative approach, the neo-classical growth model offered even less insight, attributing the causes of economic growth to exogenous factors and dismissing the presence of regional disparity in the long run. However, the convergence concept, which has benefited from significant theoretical and empirical research in the new growth literature provided the most useful tool in examining the nature and causes of regional disparity. First, it takes on board the structural factors that have been long identified by regional economists in causing regional disparity. These factors, which relate to a region's economic structure have been extended to include 'new' variables such as human capital and

have been instrumental in explaining the reasons why convergence has taken place or has failed to take place among regions.

Having demonstrated the relevance of the convergence aspect of the new growth literature to regional disparity, the thesis contributes to the tests of convergence discussed in the text and to sigma convergence in particular by introducing the Bartlett test of homogeneity of variance. The thesis proposes and uses this test as a precursor to the formal test of sigma convergence. The latter relies on the pattern of statistical measures of deviation, which oftentimes incorporate the variance. No other study has tested the underlying data for independence of variance. Rejection of the Bartlett test ensures that the variance of the variable in question is independent from one period to the next. It therefore facilitates greater confidence in the sigma test result.

Turning to the Republic of Ireland, previous regional studies for which regional disparity was a feature concentrated also on simply describing the level of disparity at particular points in time. In providing a more comprehensive story, this thesis through the construction of a detailed database dating from 1926 for a number of variables, with start dates of 1946, 1966, 1973 and 1979 for others has made possible the detailed statistical and econometric analysis of Irish regional disparity. This facilitated both a long-term description and explanation of regional disparity. The type of analysis carried out in this thesis offers one way of ensuring a more informed view of regional disparity by differentiating between description and explanation.

First, informal analysis of the data of the type undertaken in previous studies, albeit for much shorter time periods continues to identify differences between the East and the rest of the country despite some change in the ranking of the regions for other variables. Moreover, significant disparity continues at the intra-regional level. It is reassuring however that the current National Development Plan recognises these levels of disparity and has put forward measures to address these, which have been discussed in the text. Indeed the informal analysis of the data as presented in this thesis concurs with the current description of regional disparity that recognises the Southern and Eastern regional assembly on the one hand and the Border, Midlands and Western regional assembly on the other. However, this is merely descriptive and should not be taken as a true reflection of regional disparity.

Thus applying the formal tests of convergence to two economic welfare variables-disposable income and productivity-enhanced employment-showed first that convergence has been taking place across the Irish planning regions in disposable income from 1973 and in the productivity-enhanced employment rate from 1926. Second, it was possible to explain the reasons why convergence has been taking

place. Changes in a region's structure as summarised by the share of agricultural employment in each region, its unemployment rate, its education rate (for the disposable income study), and its investment rate (for the productivity-enhanced employment study) account for the convergence patterns in these economic welfare variables. Third, while the thesis did not identify the source of structural change or its catalyst, it is likely that regional policy played a not insignificant part given the manner in which it sought to address regional disparity. A major finding of the thesis has been the significant changes that have taken place in the mix of employment at the regional level. The thesis showed that the sectoral mix of employment in agriculture, industry and services has become more similar across the regions over time. Manufacturing employment, which is the major component of industrial employment and through which regional policy has principally operated has been highly effective in bringing about this positive structural change. This has been most evident from the 1970s period. Moreover, the disposable income study, which dates from 1973, endorses this finding.

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# Appendix A

## Section A.1

The equations of the model taken from Armstrong and Taylor (1993, pp. 79-81 inclusive) are as follows:

$$q = a + \lambda y_{-1} \quad \textbf{A.1a}$$

$$p = w - q \quad \textbf{A.1b}$$

$$x = b_0 p + b_1 p_f + b_2 z \quad \textbf{A.1c}$$

$$y = c_o x \quad \textbf{A.1d}$$

where:

q = productivity;
a = autonomous productivity growth,
$\lambda$ = a coefficient known as the Verdoorn coefficient;
p= price inflation (domestically),
w= cost inflation (domestically),
x = growth of exports;
$p_f$ = price inflation in competitor regions,
z = growth in world income,
y= output growth that is some function $c_o$ of exports.

Substituting A.1a, A.1b and A.1c into Equation A.1d gives the equilibrium rate of output growth in the domestic region:

$$y = c_o[ - b_0 (w - a - \lambda y_{-1}) + b_1 p_f + b_2 z \quad \textbf{A.1e}$$

Rearranging:

$$y = c_o[ - b_0 (w - a) + b_1 p_f + b_2 z] + c_o b_0 \lambda y_{-1}$$

end up with the equilibrium growth rate in the Dixon/Thirlwall model where

$$y = \alpha_0 + \alpha_1 y_{-1} \quad \textbf{A.1f}$$

where:

$$\alpha_0 = c_o[ - b_0 (w - a) + b_1 p_f + b_2 z]$$

$$\alpha_1 = c_o b_0 \lambda$$

The long run equilibrium growth rate will be constant and will be given as:

$y=y_{-1}$ and therefore Equation A.1f becomes:

$$y=\alpha_0+\alpha_1 y \quad \textbf{A.1g}$$

Solving for y gives:

$$y = \frac{\alpha_0}{1-\alpha_1} \quad \textbf{A.1h}$$

This is the equilibrium growth rate in the Dixon-Thirlwall model.

## Section A.2

Given a simple production function of the form:

$Y=F(K,L)$

Where $Y$ refers to output, $F$ is the production function, $K$ is capital and $L$ is labour.

The standard neo-classical conditions are as follows:

(a) With $K>0$ and $L>0$, $F(\bullet)$ exhibits positive and diminishing marginal product with respect to each input:

$$\frac{\delta F}{\delta K} > 0 \qquad \frac{\delta^2 F}{\delta K^2} < 0$$

$$\frac{\delta F}{\delta L} > 0 \qquad \frac{\delta^2 F}{\delta L^2} < 0$$

(b) $F(\bullet)$ exhibits constant returns to scale;

$$F(\lambda K, \lambda L) = \lambda \cdot F(K, L) \text{ for all } \lambda > 0$$

(c) The marginal product of capital or labour approaches infinity as capital or labour goes to 0 and approaches 0 as capital or labour goes to infinity, i.e.:

$$\lim_{K \to 0}(F_K) = \lim_{L \to 0}(F_L) = \infty$$

$$\lim_{K \to \infty}(F_K) = \lim_{L \to \infty}(F_L) = 0$$

## Section A.3

The change in capital stock over time is given by:

$$\dot{K} = 1 - \delta K = s \cdot F(K, L) - \delta K$$

where δ is the rate of depreciation of the capital stock, $s$ refers to the fraction of output that is saved and the dot over $K$ denotes the rate of change of capital stock over time.

Dividing both sides by $L$ gives:

$$\dot{K}/L = s \cdot f(k) - \delta k$$

Writing as a function of $k$ by using the condition that $\dot{k} \equiv \frac{d(K/L)}{dt} = \dot{K}/L - nk$ where $n = \dot{L}/L$ and substituting this into the expression for $\dot{K}/L$ and rearranging gives: $\dot{k} = s \cdot f(k) - (n + \delta) \cdot k$ which is the fundamental differential equation of the Solow-Swan model.

## Section A.4

Since $k$ is constant in the steady state, $y$ and $c$ are also constant at the values $y^*=f(k^*)$ and $c^*=(1-s)f(k^*)$ respectively, the per capita quantities, $k$, $y$ and $c$ do not grow in the steady state. However, changes in the level of technology, $f(\bullet)$; in the savings rate, $s$; in the rate of population growth, $n$ and in the depreciation rate, $\delta$, all have effects on economic growth and the per capita levels of the various quantities in the steady state, see Figures A.4a, A.4b, A.4c and A.4d.

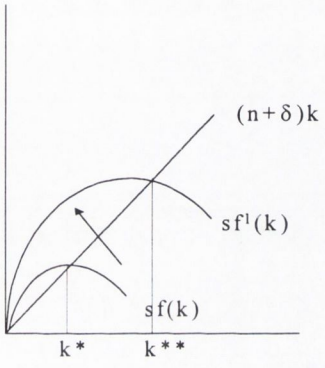


**Figure A.4a Change in the technology**

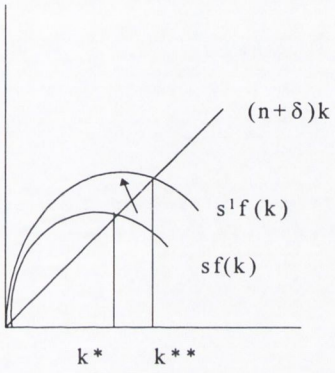


**Figure A.4b Change in the savings rate**

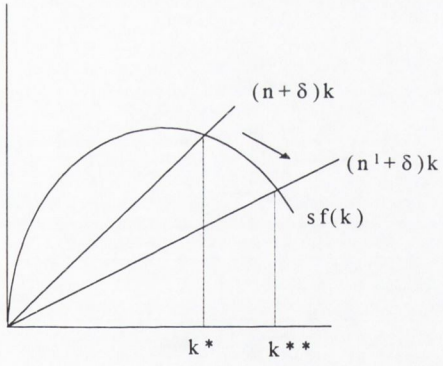


**Figure A.4c Change in population**

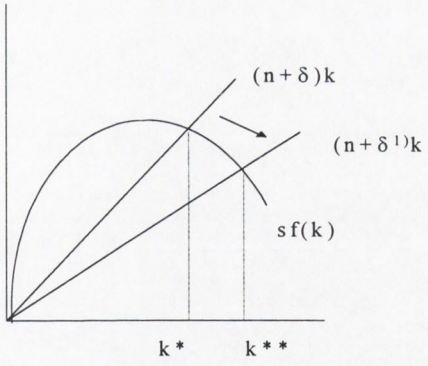


**Figure A.4d Change in depreciation**

## Section A.5

### Endogenous growth theory

The 1980s heralded a reawakening of interest in economic growth theory. The catalyst was a seminal paper by Romer (1986) that challenged the assumptions of the neo-classical growth model. In doing so, Romer concentrated his criticism on the reliance of exogenous (and therefore unexplained) technology to explain economic growth. Technology could not be explained in the neo-classical framework when perfect competition was assumed. Once capital and labour had been

paid their marginal products, there was nothing left to pay technology and therefore technology was assumed exogenous. Romer viewed as unsatisfactory the notion that long run growth was explained by a factor for which there was no satisfactory explanation, and, by implication, over which there was no control.

The chief culprit in such a model was the law of diminishing returns. Because of diminishing returns to a factor, the per capita growth rate was zero. Furthermore, the law of diminishing returns also implied that poor countries grew faster than rich countries and that economies grew faster the farther away they were from their steady state. Romer (1985) used the Summers and Heston (1982) data set to show that a regression of the growth rate of 114 countries on their initial level of income gave a positive coefficient, in stark contrast with the neo-classical model discussed in section 2.3.3, which suggests that a regression of the growth rate on the initial level of income would give a negative coefficient. Romer's conclusion was that the neo-classical model did not fit the data and, furthermore, that it was intellectually unsatisfactory.

The so-called AK model is the simplest example of endogenous growth[1]. This simple model assumes that output is a constant linear function of capital.

$$Y=AK$$
$$= sAk/k - (\delta+n)$$
$$= sA-(\delta+n) \qquad \textbf{A.5a}$$

where Y refers to output, K refers to capital, A refers to a positive constant that reflects the level of technology and $(\delta+n)$ refers to depreciation and population growth as before; s refers to savings. Thus sA no longer goes from infinity to zero as in section 2.3 but is represented by a straight line as shown in Figure a. If $sA>(\delta+n)$ then there is a positive growth rate as shown in Figure a below.

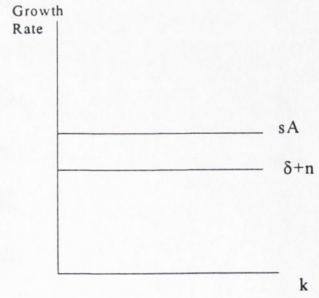


**Figure A.5a Assuming a linear function**

[1] The literature on endogenous growth theory has developed significantly from this simple one sector interpretation to include multi-sector growth models and advances in imperfect competition, industrial organisation, trade theory and economic geography. For example, Nijkamp and Poot (1998) cite the contribution made by endogenous growth theory to trade theory and policy, resulting in a "new international

The intuition behind this diagram is that diminishing returns to a factor (k) are absent. Thus growth does not automatically reach a saturation point as diminishing returns set in. The implications of this simple model can be summarised in three points:

1. Growth can be positive without having to simply assume that A grows exogenously
2. Increasing the savings rate implies that the growth rate will be higher
3. Changes in fertility/depreciation will have long-run effects on growth.

These summary points suggest a number of consequences for an underlying economy. In the context of this chapter, regional disparity is allowed to persist in such a framework and does not automatically disappear over time, as in the neo-classical framework. It is no longer necessarily true that poor countries grow faster than richer countries or that poor regions grow faster than rich regions. In summary, unlike the predictions of neo-classical theory, there is no automatic relationship between how poor an economy is and how rich it can grow. The growth equation displays perpetual growth. As long $sA > (\delta+n)$, the economy will continue to grow. The growth equation is given as:

$$\gamma k = sA(k)/k - (\delta+n) \qquad \textbf{A.5b}$$

where the growth rate of capital is equal to the difference between the (linear) savings function ($sA(k)/(k)$) and the depreciation + population growth rate.

The challenge then became to explain why the world might behave in this fashion. Critics questioned the absence of the labour factor in this growth equation. However, a seminal paper by Lucas in 1988 answered this question and explained why this growth equation was valid. Lucas (1988) and subsequent authors suggested a broader interpretation of capital that embodied a concept of labour known as productive labour. Lucas argued that there is no such thing as "raw" labour, and that all labour is productive by virtue of investment in labour – the prime component of which is education and training. Lucas suggested that human capital should replace the labour factor. Using this interpretation, K represents a much broader concept of capital that includes both physical and human capital. The only way to get constant returns to a factor when all that exists is K, is a linear function, $Y=AK$. Economic growth is now constrained by investment in K. Savings are the key determinant of growth and now include savings/investment in labour through efforts in education. Thus savings is now understood to represent an aggregate savings that includes all kinds of capital, both human and physical.

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economics" and similarly for a "new economic geography" that attempts to explain the spatial distribution of economic activity both in terms of urban systems and in terms of regional development" (p.9).

Other authors have further expanded upon the broader interpretation of capital that was introduced by Lucas. For example, Mankiw (1995) differentiates between human capital and knowledge and asserts that the former is more likely to encounter diminishing returns and the latter is less likely. Mankiw (1995) refers to knowledge as "society's understanding of how the world works" while "human capital refers to the resources expended transmitting this understanding to the labour force" (p. 298).

Furthermore, Hulten and Schwab (1993) define capital to include physical capital, human capital, infrastructure capital and knowledge capital. This is shown in the growth equation:

$$Q_{it} = A_{i0} B_{it}^{\eta} e^{\lambda^{it}} \cdot F^{i}[K_{it}, L_{it}, M_{it}, B_{it}] \qquad \textbf{A.5c}$$

where $Q_{it}$ refers to manufactured goods in region $i$ at time $t$; $A_{i0}$ refers to an index of the level of regional productive efficiency in the base year 0; $K_{it}$ refers to privately owned capital; $L_{it}$ refers to labour; $M_{it}$ refers to intermediate inputs and $B_{it}$ refers to public capital. Public capital influences output in two ways from c. First, it yields direct productive services and appears as an argument in Fi[ ]. Second, it acts as an "environmental" factor or system "spillover" which enhances the productivity of some or all of the private inputs. This spillover effect is endogenised within the model described by Hulten and Schwab (1993).

Romer (1986) suggested another reason why diminishing returns do not hold and why therefore equation A.5b was a valid equation for economic growth. His contribution built on Arrow's (1962) thesis of learning by doing. Over time, producers learn from one another and this process can serve to increase the overall level of productivity in the economy. The capital stock in the economy (broadly defined) will therefore be greater than before and the overall level of technology will have improved. Firms may also actively increase the number of capital goods in the economy by expenditure on research and development (see Romer, 1990, Grossman and Helpman, 1991). Securing patents allows firms to collect monopoly profits on such research. This variant of technological progress will generate endogenous growth because there are no diminishing returns to the number of goods.

In summary, economic growth is endogenous in the types of models suggested by Lucas (1988) and Romer (1986). In the former, economic growth occurs from the externalities associated with a broader interpretation of capital, while in the latter, economic growth occurs through increasing returns to physical capital. The implication of such models is that they allow for persistent growth rates divergences across economies.[2]

However, the outcome from all endogenous growth models is not necessarily divergence and this is evident in work by Sala-i-Martin (1994) and Barro and Sala-i-Martin (1995) that considers whether an extended AK model can help to explain convergence. More recently, these two authors have constructed a theoretical model that incorporates "elements of endogenous growth with the convergence implications of the neo-classical growth model" (p. 1, 1997). In their model, growth rates converge through a process of technological diffusion from leader to follower countries through innovation in the former and imitation in the latter. Other authors (see de la Fuente, 1992) have also endogenised factors of economic growth in a neo-classical framework. This convention has arguably produced a much greater understanding of economic growth factors, which has informed the growth debate at a theoretical and empirical level.[3]

## Section A.6

The following paragraphs describe the convergence studies, the results for which are presented in Table 2.4.1a in the main text.

Evans and Karras (1996) The estimated equation is:

$$g_n = \alpha + \beta y_{n0} + \gamma' x_n + v_n$$

where $g_n \equiv (y_{nT} - y_{n0})/T$ and refers to the average growth rate of per capita output for economy $n$ between periods 0 and T, $x_n$ is a vector of variables that control for permanent cross-country differences in either levels or growth rates of per capita output, $\alpha$ and $\beta$ are parameters, $\gamma$ is a parameter vector and $v_n$ is an error term with a zero mean and finite variance. Two data sets are considered – the 48 contiguous US states and 54 countries from the Summers and Heston (1991) data set. The latter uses the updated 1993 data set and refers to all countries for which data is available, excluding centrally planned economies and oil exporters. The dependent variable for the first data set is growth rates in per capita output and the independent variable is real per capita personal income. The control variables refer to four dummy variables, which are 1 for the indicated states and 0 for all other states: the six New England states; the three Mid Atlantic states, Delaware and Maryland; the 5 Great Lakes states; the 11 states of the South plus West Virginia, Kentucky and Oklahoma and the 11 Rocky Mountain and Pacific states. For the second data set, the dependent and independent variables are growth rates in output per worker and real GDP per worker respectively. The control variables refer to the ratios of gross domestic investment, real government consumption, the average fraction of the population aged 12-17 enrolled in secondary

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[2] Endogenous growth theory enables a role for positive governmental policy. For example, the level of A (technology) may be increased by the elimination of a governmental distortion.

[3] The work on endogenous growth theory has been largely theoretical, due in part to the difficulties with providing an empirical measure of knowledge (Mankiw, 1995).

schools and the "other" (Table 2.4.1a) category which refers to the ratio of real exports and imports to real GDP and the average growth rate of the labour force.

De la Fuente (1995) The estimated equation is:

$$q'_{it} = \Gamma_0 + \lambda^* 0.02^* t - \lambda q_{it} + \Gamma_k \ln \frac{sk_{it}}{n_{it} + 0.05} + \Gamma_h \ln \frac{sh_{it}}{n_{it} + 0.05} +$$

$$\lambda \frac{\gamma\theta_i - 0.02}{\varepsilon}[1 + [\frac{\varepsilon}{n + 0.05} - 1]e^{-\varepsilon t}] + \lambda((x_0 - a_{10}) + (a_{10} - a_{i0}))[\frac{\varepsilon}{n + 0.05} - 1]e^{-\varepsilon t}$$

where: qit refers to growth rate of income per capita; λ is the convergence coefficient; n is the average rate of growth of the labour force; sk/sh are rates of investment in physical and human capital; i is a country sub-index; investment in technological capital is given as θ, best practise technology is given as (x0-a0) which is written as the sum of the gap with respect to the leader (a10-ai0)) and the sum of the distance between the leader and the technological frontier (x0-ai0). The speed of technological catch up is measured by the coefficient ε. The model developed in the text is a growth model that incorporates the main elements of growth; physical and human capital and technical progress. The latter is endogenised in the model by allowing it to be a function of spending on research and development. It is also a measure of technological backwardness. A number of specifications of the baseline equation above are run for 21 OECD countries over the period 1963-1988. The various specifications take into account period dummies and/or the change in the rate of unemployment. Thus the overall model incorporates "factor accumulation, R&D investment, neo-classical convergence, technological catch-up and cyclical perturbation" (de la Fuente, 1995). The values given to the parameters in the basic equation reflect values from the literature. Both neo-classical convergence and technological catch-up favour the poorer countries of the group, especially at the start of the period. The size of this effect decreases over time. Technological diffusion was the largest source of growth differentials in the early sub-periods. The elimination of catch-up opportunities may account for the slow-down in growth and the weak convergence results in recent years.

Button and Pentecost (1995) The estimated equation is:

$$[Y_{iT} - Y_{iT-j}](1/j) = \alpha + \beta Y_{iT=j} + \beta_{ERM}[ERM \cdot Y_{iT-j}] + \gamma_{AEM} A_i + \gamma_q N_q + \varepsilon_i$$

$Y_{iT}$ is the natural log of GDP per head relative to the EU average in region $i$ at time $j$. $A_i$ is agricultural employment (i.e. the structural variable in Table 2.4.1a), defined as the proportion of each region's employed population that works in agriculture, $ERM_i$ is a slope dummy with 1 reflecting national membership in the ERM and $N_q$ is a vector of q-country dummies with Denmark the omitted country. The term on the left-hand side refers to the average per annum growth rate in GDP per capita between T and T-j. In addition, the authors report results on: an unconditional

model; a conditional model including Greece and variations of the conditional models which exclude the ERM dummy and include the structural and country dummies and also for excluding the structural and country dummies and including the ERM dummy. Results are reported in each case for the model including Greece and excluding Greece. The model reported in the text excludes Greece.

Neven and Gouyette (1994) The estimated equation to which the entries in Table 2.4.1a correspond is:

$$(1/T)\log(y_{i,t} / y_{i,t-T}) = a - \log(y_{i,t-T})(1 - e^{-\beta T})/T + u_{i,t}$$

This equation is known as the Barro regression and represents the transition process of output per capita in region i at time t, ($y_{it}$) and over the period T. β is the rate of convergence. The independent variable is the growth rate of GDP per head in PPP. The dependent variable is GDP per head in PPP. Control variables include: human capital - measured by school enrolment; a structural variable, which is a proxy for industrial structure and is measured by $S_{it} = \sum_j W_{jt-T} \log(y_{j,t-T})$ (where $W_{jt}$ is the share of employment in sector j (NACE 1 level) at time t-T, and $y_{jt}$ is the output in sector j at time t at the national level) and country dummies. Various versions of a convergence model are estimated. The entire sample refers to 171 EU regions but due to data availability and reliability, only 142 regions are used in the unconditional convergence study. A conditional model containing country dummies and the industrial structure variable is estimated for 110 regions and the conditional model referred to in Table 2.4.1a uses 85 regions and includes country dummies, human capital and industrial structure as control variables. A separate model is estimated which models convergence as a Markov process embodying the methodology proposed by Quah (1992).

Barro and Lee (1993) The 46 countries comprises 23 low growth countries and 23 high growth countries. The selection is based on a consideration of the growth rates of real per capita GDP. The technique of instrumental variables is also used. "The basic empirical framework relates the real per capita growth rate to two kinds of variables, first: initial levels of state variables such as the stock of physical capital and the stock of human capital in the forms of educational attainment and health and second: control or environmental variables" (p. 12). The investment variable is defined as the ratio of real gross domestic investment to GDP. The government variable used is the ratio of government consumption (measured net of spending on defense and education) to GDP. Th e "other" variables include; the black-market premium on foreign exchange, and the country's average number of revolutions per year. Lagged values of these variables are used as instruments to circumvent the "likely endogenity" (p. 12) of these latter two variables.

Helliwell (1992) The estimated equation is:

$$\ln(GDPa85) - \ln(GDPa60) = a + a_1 \ln(scale) + a_2 \ln(GDPa60) +$$
$$a_3(\ln(1/GDP) - \ln(n+g+\delta)) + a_4(\ln(school) - \ln(n+g+\delta))$$
$$where: a_2 = -(1-e^{-\lambda 25})$$
$$a_3 = (1-e^{-\lambda 25})(\alpha/(1-\alpha-\beta)$$
$$a_4 = (1-e^{-\lambda 25})(\beta/(1-\alpha-\beta)$$

and where n refers to the growth of the labour force, g refers to the growth rate of technology and δ refers to the depreciation rate. The time frame is 25 years and λ is the neo-classical convergence coefficient equal to (n+g+δ)(1-α-β). The scale coefficient allows for knowledge spillovers that may create increasing returns to scale at the national level. The growth rate of GDP per adult is regressed on the initial level of GDP per adult, and investment in physical and human capital. The model is estimated for the global economy (98 observations), the OECD (22 observations) and Asia (13 observations). The model shows conditional convergence for the global and OECD sample. An extended model incorporating measures of openness (non-tariff barriers, black market exchange premiums and the average share of total revenues over total imports) and democratisation provide greater insight to the Asian growth experience from 1960.

Barro and Sala-i-Martin (1992) The estimated equation is:

$$\frac{1}{T} \cdot \log(\frac{y_{i,t_0}+T}{y_{i,t_0}}) = B - (\frac{1-e^{-\beta T}}{T}) \cdot \log(y_{i,t_0}) + u_{i,t_0,t_0+T}$$

where the extreme RHS variable is a distributed lag of the error terms, uit, between dates $t_0$ and $t_{0+T}$. The constant term is $B = x + [(1-e^{-\beta T})/T] \cdot [\log(\hat{y}^*) + xt_0]$. The neo-classical growth model is used as a framework to study convergence across the 48 US states. Two data sets are considered: personal income since 1840 and gross state product from 1963. Country dummies are included for the South, Mid-West and West and a variable that measures the sectoral composition of income in each state. Labour income, including income from self employment is divided into 9 categories: agriculture; mining; construction; manufacturing; transportation and public utilities; wholesale and retail trade; finance, insurance and real estate; services; and government and government enterprises. The sectoral composition variable is given as: $s_{it} = \sum_{j=1}^{9} w_{ijt} \cdot \log(\frac{y_{jt+T}}{y_{jt}})$

where $w_{ijt}$ is the weight of sector j in state I's personal income at time t and yjt is the national average of personal income that originates in sector j at time t, expressed as a ratio to national population at time t. As noted in the notes to Table 2.4.1a, these control variables are used in the regressions for sub-periods only and not for the entire sample.

Mankiw, Romer and Weil (1992) The estimated equation is

$$\ln[\frac{Y(t)}{L(t)}] = \ln A(0) + gt - \frac{\alpha+\beta}{1-\alpha-\beta}\ln(n+g+\delta) + \frac{\alpha}{1-\alpha-\beta}\ln(s_k) + \frac{\beta}{1-\alpha-\beta}\ln(s_h)$$

where Y is output, L is labour, A is the level of technology, n and g represent the growth rates of labour (L = population) and technology (A), s is investment, δ is depreciation, $s_h$ is human capital accumulation defined as the percentage of the working age population that is in school. The dependent variable is the growth rate of real GDP and the independent variable is real GDP. The control variables are human capital, investment and "other" variables encompassing government and private consumption and population. The speed of convergence is not estimated. The above equation shows how income per capita depends on population growth and the accumulation of physical and human capital. The paper also estimates the model without human capital and considers the data in an endogenous growth model framework.

Barro and Sala-i-Martin (1991) Estimated equation is:

$(1/T)\log(y_{i,t}/y_{i,t-T}) = a - \log(y_{i,t-T})(1-e^{-\beta T})/T + other\ variables$ where $y_{i,t-T}$ is per capita gross domestic product (GDP) in region i at the beginning of the subperiod; yit is per capita GDP at time t; T is the length of the interval and the other variables are country dummies and the shares of agriculture and industry in employment or GDP at the start of the time period. Control variables are the country dummies and structural variables, which refer to shares of agriculture and industry in employment at the start of the subperiod, (i.e. 1950=1960, 1960-1970 and 1970-1980) based on a three way division of employment into agriculture, industry and services. The equation outlined above is estimated without any control variables. It is also estimated using the country dummies without the structural variables. The data in Table 2.4.1a show the results from using the country dummies and the structural variables. The paper also considers the convergence of the 48 US regions; these results are reported above and need not be repeated here.

Dowrick and Nguyen (1989) The estimated equation for the average annual rate of growth in GDP is: $\bar{q} = c + a(I/Q) + bl_i - \delta \ln Y_{i0} * + \varepsilon_i$;

where q refers to the average rate of growth of GDP, I/Q is the average annual share of investment in output; l is the level of employment, and Y is the initial level of output per employed worker relative to the leading country. The authors estimate this model for the OECD countries to show that economic growth exhibits parameter stability over three decades. The paper has two objectives. The first is to assess whether income levels across the OECD countries have converged since 1950 and then to assess whether this convergence can be "explained by differences in the rate of growth of factor intensities or TFP catch-up" (p. 1011). The second objective is to reassess how individual OECD countries have performed over the study period. Table 2.4.1a in the text shows the results from a regression analysis of relative growth.

De Long, J. Bradford (1988) The estimated equation is;

(1979 Income – True 1870 Income) = $\alpha + \beta$(True 1870 Income) + $\varepsilon_i$ where

(Estimated 1870 Income) = (True 1870 Income) + $\eta_i$

The paper challenges Baumol's (1986) results on convergence for 16 countries from the Maddison (1982) data set. De Long criticises Baumol for not including all 22 countries in the data set and for his use of OLS. De Long contended that confining the sample to 16 successful countries biased the results towards convergence. The larger sample included those countries that looked like they would be successful based on the available data in 1870. Using maximum likelihood and extending the sample to the full 22 countries, de Long shows that convergence did not hold. The central $\rho$ value of 1 ($\rho = 0$ is the same as estimating an OLS regression and $\rho = 2$ reverses the order of the dependent and independent variables) returned a slope coefficient ($\beta$) 0.110 with a standard error of 0.283 which shows that convergence did not take place. De Long extends the analysis to include an *ex ante* measure of democracy (for $\rho = 1$ again, $\beta = 0.164$ with a standard error of 0.454) and an *ex ante* measure of religion (for $\rho = 1$ again, $\beta = -0.470$ with a standard error of 0.248). The results show that democracy is not correlated with economic growth while religion is. The paper highlights some reasons for these results.

Baumol (1986) The estimated equation is:

Growth rate (1870-1979) = 5.25 – 0.75ln(GDP per work hour, 1870). The paper concentrates on the convergence properties of productivity over the period 1870 to 1979 for 16 countries. The data is from Maddison (1982). Baumol (1986) contends that the high correlation coefficient (-0.75) between the rate of growth and its initial level may be due to the public good property of productivity policy. There are large spillovers from leader economies to follower economies in productivity enhancement policies. The successful adoption of which will depend on a country's level of industrialisation. For the most part, Baumol believes that each country has a "predestined relative place along the growth curve" (p. 1077). He identifies "convergence clubs" based on a plot of 1950-1980 real growth rates on 1950 levels for 72 countries (Summers and Heston data set) and including the Maddison data from 1950 also. The 16 countries in Baumol (1986) form their own convergence club. The centrally planned economies also appear to form a convergence club, although the results are not as robust. Finally, the remaining countries are clustered together but show no relationship/convergence among themselves or with any of the other groups. This group includes the less developed countries.

## Section A.7

The results from the MRW model are presented in Table A.7a below, which compares a simple growth model with an "augmented model" encompassing human capital. The model developed is an augmented Solow model that provides an explicit role for human capital and is given by:

$$\ln[\frac{Y(t)}{L(t)}] = \ln A(0) + gt - \frac{\alpha+\beta}{1-\alpha-\beta}\ln(n+g+\delta) + \frac{\alpha}{1-\alpha-\beta}\ln(s_k) + \frac{\beta}{1-\alpha-\beta}\ln(s_h)$$

Y refers to output; L refers to labour; A refers to the level of technology; n is the growth rate of labour and g is the growth rate of technology; $\delta$ is the depreciation rate; $s_k$ refers to investment in physical capital while $s_h$ refers to investment in human capital.

The equation shows how income per capita depends on population growth and accumulation of physical and human capital. The model predicts coefficients that are functions of the factor shares. MRW (1992) discuss values of these coefficients and suggest an $\alpha$ value of 1/3 and a $\beta$ value between 1/3 and 0.5. The equation is estimated for three samples of countries. Both restricted and unrestricted regressions[4] are estimated using OLS.

**Table A.7a Comparison of Results from the basic Solow and augmented Solow models.**

| | **Estimated Textbook Solow Model** | | | **Estimated Augmented Solow Model** | | |
|---|---|---|---|---|---|---|
| **Sample** | Non-oil | Intermediate | OECD | Non-oil | Intermediate | OECD |
| **Observations** | 98 | 75 | 22 | 98 | 75 | 22 |
| **Constant** | 5.48 | 5.36 | 7.97 | 6.89 | 7.81 | 8.63 |
| | (1.59) | (1.55) | (2.48) | (1.17) | (1.19) | (2.19) |
| **Ln(1/GDP)** | 1.42 | 1.31 | 0.50 | 0.69 | 0.70 | 0.28 |
| | (0.14) | (0.17) | (0.43) | (0.13) | (0.15) | (0.39) |
| **Ln(n+g+δ)** | -1.97 | -2.01 | -0.76 | -1.73 | -1.50 | -1.07 |
| | (0.56) | (0.53) | (0.84) | (0.41) | (0.40) | (0.75) |
| **Ln(school)** | | | | 0.66 | 0.73 | 0.76 |
| | | | | (0.07) | (0.10) | (0.29) |
| **$R^2$** | 0.59 | 0.59 | 0.01 | 0.78 | 0.73 | 0.76 |
| **s.e.e.** | 0.69 | 0.61 | 0.38 | 0.51 | 0.45 | 0.33 |
| **Implied α** | 0.60 | 0.59 | 0.36 | 0.31 | 0.29 | 0.14 |
| | (0.02) | (0.02) | (0.15) | (0.04) | (0.05) | (0.15) |
| **Implied β** | | | | 0.28 | 0.30 | 0.37 |
| | | | | (0.03) | (0.04) | (0.12) |

standard errors are in parentheses
Source: from Mankiw, Romer and Weil (1992).

[4] The unrestricted regression results are reported here.

# Appendix B

## Section B.1

**Table B.1a Personal Income and Population, 1960.**

| County | Income Arising[1] | | Emigrants remittances | | Social security & other transfer payments | | Other adjustments[2] | Personal income | Population | Personal Income per head |
|---|---|---|---|---|---|---|---|---|---|---|
| | £ | % | £ | % | | % | £ | £ | £ | £ |
| Carlow | 5743 | 80 | 103 | 1 | 575 | 8 | 764 | 7185 | 33461 | 215 |
| Dublin | 185334 | 113 | 1510 | 1 | 10922 | 7 | -33135 | 164631 | 714231 | 231 |
| Kildare | 12454 | 85 | 81 | 1 | 986 | 7 | 1182 | 14703 | 64673 | 227 |
| Kilkenny | 10977 | 81 | 171 | 1 | 999 | 7 | 1438 | 13585 | 62167 | 219 |
| Laoghis | 7469 | 80 | 51 | 1 | 711 | 8 | 1049 | 9280 | 45476 | 204 |
| Longford | 3621 | 68 | 385 | 7 | 628 | 12 | 663 | 5297 | 31113 | 170 |
| Louth | 12559 | 103 | 232 | 2 | 1181 | 10 | -1816 | 12156 | 67680 | 180 |
| Meath | 11382 | 78 | 199 | 1 | 1011 | 7 | 1920 | 14512 | 65450 | 222 |
| Offaly | 8440 | 82 | 155 | 2 | 763 | 7 | 962 | 10320 | 51631 | 200 |
| Westmeath | 8151 | 75 | 247 | 2 | 949 | 9 | 1495 | 10842 | 53055 | 204 |
| Wexford | 12460 | 80 | 143 | 1 | 1392 | 9 | 1587 | 15582 | 84076 | 185 |
| Wicklow | 9260 | 78 | 140 | 1 | 953 | 8 | 1568 | 11921 | 58752 | 203 |
| Clare | 9623 | 77 | 452 | 4 | 1280 | 10 | 1080 | 12435 | 74418 | 167 |
| Cork | 60896 | 92 | 1583 | 2 | 5044 | 8 | -1622 | 65901 | 331485 | 199 |
| Kerry | 15927 | 78 | 1070 | 5 | 2104 | 10 | 1409 | 20510 | 117562 | 174 |
| Limerick | 23094 | 84 | 717 | 3 | 2464 | 9 | 1120 | 27395 | 134024 | 204 |
| Tipperary | 21202 | 80 | 510 | 2 | 2155 | 8 | 2554 | 26424 | 124932 | 212 |
| Waterford | 13456 | 86 | 291 | 2 | 994 | 6 | 955 | 15696 | 71896 | 218 |
| Galway | 20467 | 76 | 1072 | 4 | 2654 | 10 | 2757 | 26950 | 150982 | 178 |
| Leitrim | 4106 | 72 | 479 | 8 | 630 | 11 | 494 | 5709 | 34193 | 167 |
| Mayo | 14128 | 74 | 1349 | 7 | 2371 | 12 | 1353 | 19201 | 125180 | 153 |
| Roscommon | 7673 | 75 | 380 | 4 | 1017 | 10 | 1153 | 10223 | 60126 | 170 |
| Sligo | 7544 | 80 | 283 | 3 | 908 | 10 | 726 | 9461 | 54227 | 174 |
| Cavan | 7399 | 78 | 483 | 5 | 993 | 11 | 584 | 9459 | 57638 | 164 |
| Donegal | 13702 | 78 | 657 | 4 | 2056 | 12 | 1211 | 17626 | 115488 | 153 |
| Monaghan | 6433 | 77 | 254 | 3 | 860 | 10 | 849 | 8396 | 48084 | 175 |
| Total | 513500 | 91 | 13000 | 2 | 46600 | 8 | -7700 | 565400 | 2832000 | 200 |

Source: from Attwood and Geary, 1963, pp. 11 and pp. 21.

[1] Income arising is the summation of income arising in five main sectors: agriculture, forestry, fishing; industry; distribution and transport; public administration and defense and other domestic (including rent).
[2] Other adjustments refer to; undistributed profits of companies and profit paid abroad, national debt interest and interest from investments abroad, pensions from abroad, government trading and investment income and redistribution of profits internally (Attwood and Geary, 1963, p. 23).

**Table B.1b Personal Income 1965**

| County | Income Arising £ | (%) | Emigrants Remittances £ | (%) | Current transfers from public authorities £ | (%) | Personal income £ | Population* | Personal income per head £ |
|---|---|---|---|---|---|---|---|---|---|
| Carlow | 7688 | 89 | 159 | 2 | 760 | 9 | 8605 | 33593 | 256 |
| Dublin | 283979 | 94 | 1707 | 1 | 17289 | 6 | 302976 | 795047 | **381** |
| Kildare | 17229 | 92 | 173 | 1 | 1231 | 7 | 18633 | 66404 | 281 |
| Kilkenny | 14975 | 91 | 194 | 1 | 1206 | 7 | 16374 | 60463 | 271 |
| Laoighis | 9079 | 90 | 82 | 1 | 895 | 9 | 10055 | 44595 | 225 |
| Longford | 5197 | 83 | 279 | 4 | 801 | 13 | 6277 | 28989 | 217 |
| Louth | 18652 | 91 | 240 | 1 | 1602 | 8 | 20493 | 69519 | **295** |
| Meath | 15281 | 91 | 174 | 1 | 1304 | 8 | 16759 | 67323 | 249 |
| Offaly | 11007 | 90 | 204 | 2 | 1053 | 9 | 12263 | 51717 | 237 |
| Westmeath | 11679 | 88 | 265 | 2 | 1256 | 10 | 13202 | 52900 | 250 |
| Wexford | 18244 | 89 | 298 | 1 | 1865 | 9 | 20406 | 83437 | 245 |
| Wicklow | 14897 | 91 | 211 | 1 | 1206 | 7 | 16314 | 60428 | 270 |
| Clare | 16010 | 88 | 446 | 2 | 1653 | 9 | 18109 | 73597 | 246 |
| Cork | 92490 | 91 | 1794 | 2 | 7832 | 8 | 102116 | 339703 | **301** |
| Kerry | 23302 | 86 | 922 | 3 | 3028 | 11 | 27253 | 112785 | 242 |
| Limerick | 36266 | 90 | 883 | 2 | 3061 | 8 | 40210 | 137357 | **293** |
| Tipperary | 30254 | 90 | 551 | 2 | 2841 | 8 | 33646 | 122812 | 274 |
| Waterford | 20379 | 92 | 277 | 1 | 1566 | 7 | 22221 | 73080 | **304** |
| Galway | 29272 | 86 | 1096 | 3 | 3789 | 11 | 34157 | 148340 | 230 |
| Leitrim | 5225 | 82 | 217 | 3 | 957 | 15 | 6399 | 30572 | 209 |
| Mayo | 19867 | 80 | 1555 | 6 | 3395 | 14 | 24817 | 115547 | 215 |
| Roscommon | 10444 | 85 | 448 | 4 | 1362 | 11 | 12254 | 56228 | 218 |
| Sligo | 10050 | 87 | 304 | 3 | 1202 | 10 | 11556 | 51263 | 225 |
| Cavan | 11092 | 87 | 422 | 3 | 1218 | 10 | 12733 | 54022 | 236 |
| Donegal | 19258 | 83 | 929 | 4 | 3102 | 13 | 23289 | 108549 | 215 |
| Monaghan | 9360 | 88 | 268 | 3 | 1006 | 9 | 10635 | 45732 | 233 |
| Total | 761176 | 90 | 14100 | 2 | 66478 | 8 | 841755 | 2884002 | 292 |

* refers to 1966 population.
Source: Ross, 1969.

**Table B.1c County Activity Rates, males, by Age Group, 1961 -numbers gainfully occupied as % total population.**

| County | All Ages | 14-19 | 20-24 | 25-34 | 35-44 | 45-54 | 55-64 | 65+ |
|---|---|---|---|---|---|---|---|---|
| Ireland | 58.00 | 56.19 | 89.98 | 96.86 | 97.44 | 96.42 | 88.88 | 51.52 |
| Dublin C.B. | 56.2 | 60.7 | 88.4 | 96.0 | 98.0 | 97.2 | 87.5 | 33.7 |
| Cork C.B. | 56.2 | 56.7 | 93.2 | 98.6 | 98.4 | 97.3 | 86.9 | 30.3 |
| Louth | 56.4 | 59.6 | 93.3 | 96.4 | 97.1 | 96.7 | 88.4 | 40.0 |
| Waterford C.B. | 55.5 | 58.2 | 96.1 | 96.6 | 95.8 | 94.0 | 85.9 | 28.6 |
| Limerick C.B. | 53.5 | 49.6 | 94.3 | 97.6 | 96.9 | 96.5 | 86.9 | 38.4 |
| Wicklow | 56.6 | 58.3 | 90.3 | 97.2 | 98.8 | 96.4 | 87.4 | 42.7 |
| Clare | 61.0 | 52.6 | 92.2 | 97.4 | 97.5 | 96.4 | 88.9 | 57.7 |
| Longford | 60.1 | 52.6 | 92.6 | 98.5 | 98.6 | 97.4 | 91.2 | 60.1 |
| Roscommon | 63.5 | 54.2 | 92.0 | 97.1 | 98.0 | 97.0 | 93.2 | 70.1 |
| Kerry | 58.4 | 52.2 | 91.0 | 96.5 | 96.7 | 95.0 | 87.6 | 47.7 |

Source: Table 51, Buchanan Report, 1968; Technical Volume 1, p. 76.

**Table B.1d County Activity Rates, Females, by Age Group, 1961 -numbers gainfully occupied as % total population.**

| County | All Ages | 14-19 | 20-24 | 25-34 | 35-44 | 45-54 | 55-64 | 65+ |
|---|---|---|---|---|---|---|---|---|
| Ireland | 20.44 | 46.64 | 67.18 | 31.13 | 19.15 | 21.04 | 22.54 | 15.01 |
| Dublin C.B. | 28.6 | 69.2 | 76.2 | 39.7 | 29.0 | 30.2 | 26.0 | 10.5 |
| Cork C.B. | 24.8 | 59.7 | 73.5 | 35.3 | 26.1 | 26.1 | 22.2 | 9.4 |
| Louth | 24.3 | 63.5 | 74.1 | 36.3 | 23.4 | 21.3 | 22.4 | 13.8 |
| Waterford C.B. | 23.5 | 53.8 | 70.7 | 34.3 | 23.7 | 23.6 | 21.7 | 11.6 |
| Limerick C.B. | 21.0 | 48.7 | 68.1 | 30.8 | 21.0 | 22.2 | 21.4 | 11.3 |
| Wicklow | 19.8 | 49.1 | 64.6 | 29.8 | 18.7 | 20.4 | 19.3 | 13.7 |
| Clare | 15.9 | 29.5 | 61.6 | 28.2 | 13.0 | 16.4 | 21.0 | 16.2 |
| Longford | 15.7 | 31.2 | 58.1 | 27.7 | 13.9 | 16.1 | 20.8 | 16.1 |
| Roscommon | 15.4 | 25.9 | 59.2 | 26.2 | 12.1 | 17.1 | 21.9 | 18.5 |
| Kerry | 15.2 | 31.9 | 59.3 | 26.6 | 13.0 | 14.7 | 19.3 | 12.4 |

Source: Table 54, Buchanan Report, 1968; Technical Volume 1, p. 80.

**Table B.1e Activity rates for males and females in 33* towns**

| | Nos. Gainfully Occupied as % of Total Population | | | Deviation from National Average | | |
|---|---|---|---|---|---|---|
| | Males | Females | Persons | Males | Females | Persons |
| **Ireland** | 58.0 | 20.44 | 39.32 | | | |
| Dublin | 55.8 | 27.6 | 40.7 | -2 | +7 | +1 |
| Dun Laoghaire | 53.0 | 24.9 | 37.6 | -5 | +4 | -2 |
| Cork | 53.7 | 23.7 | 37.8 | -4 | +3 | -2 |
| Limerick | 53.5 | 21.4 | 36.6 | -5 | +1 | -3 |
| Waterford | 55.5 | 23.5 | 38.4 | -3 | +3 | -1 |
| Galway | 52.6 | 26.9 | 39.3 | -5 | +6 | 0 |
| Dundalk | 55.5 | 25.5 | 40.1 | -3 | +5 | +1 |
| Drogheda | 55.7 | 28.8 | 41.7 | -2 | +8 | +2 |
| Sligo | 49.4 | 22.4 | 35.2 | -9 | +2 | -4 |
| Bray | 54.3 | 23.8 | 37.9 | -4 | 3 | -1 |
| Wexford | 55.2 | 23.3 | 38.2 | -3 | +3 | -1 |
| Kilkenny | 47.5 | 21.8 | 34.2 | -10 | +1 | -5 |
| Tralee | 53.8 | 22.0 | 37.1 | -4 | +2 | -2 |
| Clonmel | 50.4 | 19.8 | 34.6 | -8 | -1 | -5 |
| Athlone | 53.4 | 21.0 | 37.1 | -5 | +1 | -2 |
| Carlow | 51.6 | 20.9 | 36.0 | -6 | 0 | -3 |
| Ennis | 45.5 | 22.6 | 33.7 | -13 | +2 | -6 |
| Mullingar | 41.7 | 19.7 | 30.3 | -16 | -1 | -9 |
| Killarney | 42.8 | 23.8 | 33.0 | -15 | +3 | -6 |
| Thurles | 45.3 | 20.3 | 32.7 | -13 | 0 | -7 |
| Enniscorthy | 47.7 | 18.5 | 32.5 | -10 | -2 | -7 |
| Tullamore | 51.0 | 23.9 | 37.0 | -7 | +3 | -2 |
| Cobh | 55.6 | 17.6 | 35.5 | -2 | -3 | -4 |
| Ballina | 50.2 | 19.2 | 34.4 | -8 | -1 | -5 |
| Ballinasloe | 35.3 | 21.6 | 28.6 | -23 | +1 | -11 |
| Mallow | 54.7 | 20.6 | 37.0 | -3 | 0 | -2 |
| Portalois | 44.5 | 19.4 | 31.8 | -14 | -1 | -8 |
| Castlebar | 38.2 | 22.1 | 29.9 | -20 | +2 | -9 |
| Arklow | 54.1 | 21.4 | 36.6 | -4 | +1 | -3 |
| An Uaimh (Navan) | 56.1 | 26.4 | 40.1 | -2 | +6 | +1 |
| Dungarvan | 49.6 | 21.3 | 35.0 | -8 | +1 | -4 |
| Youghal | 50.2 | 24.3 | 36.5 | -8 | +4 | -3 |
| Letterkenny | | | 31.4 | | | -8 |

Source: Regional Development in Ireland, Table 57, p. 88. Buchanan and Partners (1968)

* Although the text in the report referred to 34 towns, Table 57 did not give data on activity rates for Newbridge.

**Table B.1f Employment by location, 1962, 1967 and 1972, of Irish Firms in Survey Sample[3]**

| Region | 1962 | % change | A 1967 | B | % change | 1972 |
|---|---|---|---|---|---|---|
| Dublin | 32,347 | +8.5 | 35090 | 30890 | +7.5 | 33,211 |
| Cork & Limerick - Shannon - Ennis | 6,763 | +13.9 | 7,642 | 7,642 | +8.7 | 8,306 |
| Total above | 39,.110 | 10.9 | 42,732 | 38,532 | 7.7 | 41,517 |
| Other towns over 10,000 | 7,598 | +5.4 | 8,011 | 7,116 | +9.5 | 7,793 |
| Towns 5,000-10,000 | 4,874 | -4.4 | 4,659 | 4,225 | +3.9 | 4,390 |
| Towns under 5,000 | 11,998 | +9.1 | 13,095 | 12,721 | +12.3 | 14,282 |
| Total 10,000 & below | 24,470 | +5.3 | 25,765 | 24,062 | +10.0 | 26,465 |
| Total | 63,580 | +7.7 | 68,497 | 62,594 | +8.6 | 67,982 |

Source: Table 59, p. 93 Buchanan Report (1968).

**Table B.1g Summary Comparison of Firms in the Periphery and Core, 1973 and 1989**

| | 1973 | | | | 1989 | | | |
|---|---|---|---|---|---|---|---|---|
| | Irish | % of total | Foreign | % of total | Irish | % of total | Foreign | % of total |
| Western Periphery | 1699 | 42.5 | 223. | 38.7 | 3072 | 46.7 | 491 | 50.8 |
| Eastern Core | 2295 | 57.5 | 353 | 61.3 | 3503 | 53.3 | 476 | 49.2 |
| Total | 3994 | 100 | 576 | 100 | 6575 | 100 | 967 | 100 |

Source: Drudy (1991), Table 8.1, p. 156

**Table B.1h Gross gains and losses of manufacturing employment, 000s, 1973-1980**

| | Irish | | | Foreign | | | All firms | | |
|---|---|---|---|---|---|---|---|---|---|
| | Gains | Losses | Net change | Gains | Losses | Net change | Gains | Losses | Net change |
| Western Periphery | 34.3 | 28.1 | 6.2 | 34.5 | 16.3 | 18.1 | 68.8 | 44.5 | 24.4 |
| Eastern Core | 46.6 | 44.6 | 2.0 | 27.2 | 20.8 | 6.4 | 73.8 | 65.4 | 8.4 |
| Total | 80.9 | 72.7 | 8.2 | 61.7 | 37.2 | 24.5 | 142.7 | 109.9 | 32.7 |

Source: taken from Drudy (1991), Table 8.3, p. 161.

[3] There are two sets of figures for 1967. Those on the left refer to those firms who supplied figures for 1962 and 1967, but not for 1972, while those on the right refer to those firms that supplied figures for 1967 and 1972.

**Table B.1i Gross gains and losses of manufacturing employment, 000s, 1981-1989**

| | Irish | | | Foreign | | | All firms | | |
|---|---|---|---|---|---|---|---|---|---|
| | Gains | Losses | Net change | Gains | Losses | Net change | Gains | Losses | Net change |
| Western Periphery | 44.3 | 54.8 | -10.5 | 37.4 | 34.9 | 2.4 | 81.6 | 89.8 | -8.1 |
| Eastern Core | 62.5 | 89.9 | -27.4 | 34.5 | 40.5 | -5.9 | 96.9 | 130.3 | -33.4 |
| Total | 106.8 | 144.7 | -37.9 | 71.8 | 75.4 | -3.6 | 178.6 | 220.1 | -41.5 |

Source: taken from Drudy (1991), Table 8.4, p. 162.

**Table B.1j Regional Distribution of Industrial Employment and Economically active population; 1981-1995/6**

| | % share industrial employment | % share working population | % share industrial employment | % share working population |
|---|---|---|---|---|
| | 1981 | 1981 | 1995 | 1996 |
| Western Periphery | 41.6 | 44.9 | 45.6 | 43.9 |
| Eastern Core | 58.4 | 55.1 | 54.4 | 56.1 |
| Total | 100 | 100 | 100 | 100 |

Source: Killen and Ruane, 1998, Table 1, p. 20.

**Table B.1k Survival rate of sample companies to 1995 by region**

| | Indigenous | Foreign | All |
|---|---|---|---|
| | % | % | % |
| Western Periphery | 54.2 | 77.4 | 59.3 |
| Eastern Core | 61.7 | 70.0 | 69.2 |
| Total | 58.5 | 71.5 | 60.8 |

Source: Killen and Ruane, 1998, Table 6, p 23.

**Table B.1l Ranking of regions**

| | Population change 1966-1971 | Unemployment rate 1971 | Personal income level 1969 | % at work in industry 1971 | Percentage of total IDA expenditure in each region |
|---|---|---|---|---|---|
| East | 1 | 3 | 1 | 1 | 2 |
| North East | 2 | 5 | 4 | 2 | 5 |
| South West | 2 | 4 | 2 | 3 | 1 |
| South East | 4 | 1 | 4 | 5 | 4 |
| Mid-West | 5 | 7 | 3 | 4 | 3 |
| Donegal | 6 | 9 | 9 | 6 | 9 |
| Midlands | 7 | 2 | 6 | 7 | 8 |
| West | 8 | 8 | 7 | 9 | 6 |
| North West | 9 | 5 | 8 | 8 | 7 |

Source: Table 3.6, p. 32, IDA Regional Industrial Plans (1972)

**Table B.1m Changes in Manufacturing Employment – Actual v Estimates.**

| | Net Change in Manufacturing Employment April 1971-April 1977 | | | Actual net change as % of IDA estimates | |
|---|---|---|---|---|---|
| | Actual | | IDA Estimates | | |
| | ASE | LFS | | ASE | LFS |
| Donegal/North West | 1866 | 2446 | 3289 | 56.7 | 74.4 |
| West | 5511 | 4603 | 4000 | 137.8 | 115.1 |
| South West | 3467 | 1872 | 7022 | 49.4 | 26.7 |
| South East | 4667 | 2086 | 3200 | 145.8 | 65.2 |
| East | -6844 | -7667 | 10667 | - | - |
| North East | 622 | -997 | 3556 | 17.5 | - |
| Midlands | 3244 | 1145 | 2667 | 121.6 | 42.9 |
| Mid-West | 1733 | 4159 | 3822 | 45.3 | 108.8 |
| State | 14267 | 7647 | 38223 | 37.3 | 20.0 |

Source: Compiled from Table 4.3, pp. 45, NESC, 1982
Notes: Actual data for 1977 based on ASE - IDA Annual Survey of Employment and LFS - Revised Labour Force Survey estimates for 1977

**Table B.1n Industrial/Manufacturing Employment as a Proportion of the Workforce – Actual v Estimates.**

| | Industrial Employment as % of workforce, 1977 | | Manufacturing Employment as % of workforce, 1977 | |
|---|---|---|---|---|
| | Actual | IDA estimate | Actual | IDA estimate |
| Donegal & North West | 27.6 | 27.2 | 18.1 | 18.8 |
| West | 22.6 | 20.9 | 13.1 | 13.0 |
| South West | 31.7 | 34.5 | 21.1 | 24.6 |
| South East | 30.6 | 29.8 | 20.8 | 20.1 |
| East | 34.0 | 39.4 | 23.2 | 28.1 |
| North East | 33.8 | 38.2 | 25.1 | 29.8 |
| Midlands | 26.2 | 28.2 | 12.8 | 14.2 |
| Mid-West | 31.3 | 33.5 | 21.7 | 23.0 |
| State | 31.2 | 33.8 | 20.7 | 23.5 |

Source: Compiled from Table 4.5, pp. 48, NESC, 1982.

**Table B.1o Changes in Industrial Employment – Actual v Estimates**

| | Net Change in Industrial Employment 1971-1977 | Actual net Change as % IDA estimates | |
|---|---|---|---|
| | Actual | IDA estimates | |
| Donegal/North West | 2706 | 3644 | 74.3 |
| West | 5796 | 4711 | 123.0 |
| South West | 2589 | 8356 | 31.0 |
| South East | 2171 | 4000 | 54.3 |
| East | -6393 | 14400 | - |
| North East | -951 | 4000 | - |
| Midlands | 887 | 3467 | 25.6 |
| Mid-West | 3546 | 4533 | 78.2 |
| State | 10351 | 47111 | 22.0 |

Source: Compiled from Table 4.4, pp. 47, NESC, 1982
Notes: Actual data for 1977 based on LFS - Revised Labour Force Survey estimates for 1977

**Table B.1p Agricultural Employment – Estimates v Actual 1971-1977**

| | Annual Decline 1971-77 | | % of workforce employed in agriculture |
|---|---|---|---|
| | Actual | IDA estimates | Actual 1977 |
| Donegal & North West | 1333 | 903 | 36.2 |
| West | 1333 | 1288 | 41.9 |
| South West | 767 | 1141 | 26.3 |
| South East | 917 | 814 | 29.1 |
| East | 767 | 489 | 4.7 |
| North East | 600 | 593 | 28.9 |
| Midlands | 1150 | 963 | 37.0 |
| Mid-West | 1500 | 919 | 24.9 |
| State | 8367 | 7110 | 20.9 |

Source: Table 4.7, pp. 50, NESC, 1982.

**Table B.1q Service Employment – Estimates v Actual 1971-1977**

| | Annual Changes 1971-1977 | | % of workforce in services, 1977 |
|---|---|---|---|
| | Actual | IDA estimates | Actual |
| Donegal & North West | 70 | 133 | 36.2 |
| West | 689 | 489 | 35.5 |
| South West | 402 | 652 | 42.0 |
| South East | 187 | 445 | 40.3 |
| East | 6355 | 2919 | 61.3 |
| North East | 150 | 178 | 37.4 |
| Midlands | 167 | 296 | 36.9 |
| Mid-West | 879 | 519 | 43.8 |
| State | 8899 | 5631 | 48.0 |

Source: Table 4.8, pp. 51, NESC.

**Table B.1r Results for Hypothesis 2.**

| Point | Description | Results | Conclusion |
|---|---|---|---|
| (1) | Interpretation of "narrowing" | Decreasing gap in the development of the agricultural sector, urbanisation & level of service activities | Requires agreement on an acceptable time frame for "narrowing" to occur - this is a political decision and outside the scope of the study. |
| | | Increasing gap between industrial base & improving amenities | |
| | | Continuing gap between regions in investment terms | |
| (2) | Absolute dimensions of less developed regions – comparing 1961 & 1971 position of North West & West regions across socio-economic and investment factors | Improved industrial bas and amenities in both regions | No overwhelming evidence to suggest that the two regions have improved their position overall due to deteriorating agricultural sectors and employment climate |
| | | Urbanisation with a high level of service type activities in both regions | |
| | | Positive trend in investment | |
| | Relative dimension of less developed regions – comparing North West & West region with other regions | No improvement on socio-economic and investment factors | Disprove hypothesis |
| (3) | Comparison of East region with rest using standardised averages and regional factor scores | On the investment variable the divide between the East and the rest is increasing | No conclusive response |
| | | On the socio-economic variables, the divide between the East and the rest is decreasing | |

Source: Compiled from An Foras Forbartha, vol. 1.

**Table B.1s Indicators of regional disparity**

| | Unemployment in 1971 | | Deviations from national employment growth | Share of national employment growth | Share of national population growth | Per capita incomes: deviations from national average |
|---|---|---|---|---|---|---|
| | 000s | % | 1971-9 (%) | 1971-9 (%) | 1971-9 (%) | 1977 (%) |
| East | 20.0 | 4.9 | +4.8 | 56.6 | 49.6 | +15.4 |
| South West | 10.0 | 5.8 | +0.2 | 15.6 | 13.0 | +0.2 |
| South East | 8.4 | 6.9 | -2.4 | 7.8 | 9.8 | -4.7 |
| North East | 3.5 | 5.2 | -7.6 | 1.1 | 4.2 | -5.2 |
| Mid-West | 6.4 | 6.5 | -0.6 | 8.3 | 7.9 | -21.3 |
| Midlands | 5.1 | 5.9 | -5.3 | 3.2 | 5.1 | -13.9 |
| West | 4.6 | 4.8 | -1.8 | 6.9 | 5.9 | -23.4 |
| NW/Donegal | 6.6 | 9.3 | -8.3 | 0.5 | 4.5 | |
| Total | 64.6 | 5.8 | - | 100.0 | 100.0 | - |

Source: Drudy, (1982), Table 9.7, p. 210.

## Section B.2

11 of the 12 counties referred to by Ross as showing large declines in population are highlighted in bold; it was not possible to extract West Cork, the 12th county from the data.

**Table B.2a Population decline for the 26 counties 1961-1966**

| County | Percentage Change 1961-1966 |
|---|---|
| Carlow | 0.8 |
| Dublin | 10.7 |
| Kildare | 3.1 |
| Kilkenny | -2.0 |
| Laoghais | -1.1 |
| **Longford** | **-5.4** |
| Louth | 3.2 |
| Meath | 3.4 |
| Offaly | 0.4 |
| Westmeath | 0.1 |
| Wexford | 0.2 |
| Wicklow | 3.3 |
| **Clare** | **-0.1** |
| **Cork** | **2.8** |
| **Kerry** | **-3.2** |
| Limerick | 3.0 |
| Tipperary North | 0.3 |
| Tipperary South | -1.6 |
| Waterford | 2.3 |
| **Galway** | **-1.0** |
| **Leitrim** | **-8.7** |
| **Mayo** | **-6.3** |
| **Roscommon** | **-5.0** |
| **Sligo** | **-4.3** |
| **Cavan** | **-4.5** |
| **Donegal** | **-4.6** |
| **Monaghan** | **-2.9** |
| State | 2.3 |

Source: Compiled from the 1961 and 1966 Census of Population.

# Appendix C

## Section C.1

The following tables examine the proportionate share of the relevant variables in each region for the named data sources.

**Table C.1a Proportion of population in each age group for the 8 regions, 1996.**

| | | East | SW | SE | NE | NWD | West | MW | ML | State |
|---|---|---|---|---|---|---|---|---|---|---|
| 0-14 year olds | Census of Population | 37.5 | 14.9 | 11.1 | 5.7 | 6.0 | 8.4 | 8.8 | 7.5 | 100 |
| | Labour Force Survey | 37.8 | 14.7 | 11.0 | 5.6 | 6.1 | 8.1 | 8.8 | 7.9 | 100 |
| | | | | | | | | | | |
| 15-64 year olds | Census of Population | 40.3 | 15.0 | 10.6 | 5.2 | 5.5 | 8.0 | 8.7 | 6.8 | 100 |
| | Labour Force Survey | 40.3 | 15.0 | 10.6 | 5.3 | 5.4 | 8.1 | 8.7 | 6.6 | 100 |
| | | | | | | | | | | |
| 65+ year olds | Census of Population | 32.8 | 16.0 | 11.3 | 5.8 | 7.1 | 9.8 | 9.1 | 8.1 | 100 |
| | Labour Force Survey | 31.8 | 16.3 | 11.4 | 6.0 | 7.5 | 9.8 | 9.1 | 8.3 | 100 |

**Table C.1b Proportion of employment in each of the 8 regions, 1996.**

| | East | SW | SE | NE | NWD | West | MW | ML | State |
|---|---|---|---|---|---|---|---|---|---|
| Census of Population | 41.1 | 14.6 | 10.3 | 5.2 | 5.2 | 8.0 | 8.7 | 6.6 | 100 |
| Labour Force Survey | 41.7 | 14.7 | 10.3 | 5.2 | 5.1 | 7.7 | 8.5 | 6.9 | 100 |

**Table C.1c Proportion of agricultural employment in each of the 8 regions, 1996.**

| | East | SW | SE | NE | NWD | West | MW | ML | State |
|---|---|---|---|---|---|---|---|---|---|
| Census of Population | 10.9 | 19.1 | 16.2 | 8.0 | 7.7 | 13.7 | 12.1 | 12.2 | 100 |
| Labour Force Survey | 11.0 | 20.5 | 16.0 | 8.3 | 7.5 | 14.6 | 10.3 | 11.8 | 100 |

**Table C.1d Proportion of industrial employment in each of the 8 regions, 1996.**

| | East | SW | SE | NE | NWD | West | MW | ML | State |
|---|---|---|---|---|---|---|---|---|---|
| Census of Population | 35.8 | 14.9 | 11.7 | 6.4 | 6.1 | 7.6 | 10.0 | 7.5 | 100 |
| Census of Industrial Production | 35.7 | 14.7 | 11.6 | 6.9 | 6.4 | 7.7 | 10.8 | 6.1 | 100 |
| Labour Force Survey | 36.1 | 15.4 | 11.6 | 6.5 | 6.1 | 6.8 | 10.2 | 7.4 | 100 |

**Table C.1e Proportion of service employment in each of the eight regions, 1996.**

| | East | SW | SE | NE | NWD | West | MW | ML | State |
|---|---|---|---|---|---|---|---|---|---|
| Census of Population | 48.3 | 13.8 | 8.7 | 4.3 | 4.5 | 7.2 | 7.6 | 5.6 | 100 |
| Labour Force Survey | 49.4 | 13.3 | 8.7 | 4.1 | 4.2 | 7.0 | 7.4 | 5.9 | 100 |

**Table C.1f Share of unemployment rate in each region; 1996.**

| | East | SW | SE | NE | NWD | West | MW | ML | State |
|---|---|---|---|---|---|---|---|---|---|
| Census of Population | 41.0 | 14.1 | 11.1 | 5.3 | 6.9 | 8.0 | 7.6 | 6.0 | 100 |
| Labour Force Survey | 41.9 | 14.1 | 10.9 | 5.8 | 7.7 | 8.4 | 6.5 | 4.8 | 100 |
| Live Register | 39.0 | 14.6 | 11.1 | 6.0 | 6.7 | 9.1 | 7.6 | 6.0 | 100 |

# Appendix D

## Section D.1

The following table shows the regional share of natural increase relative to the state average for 1926 and 1996.

**Table D.1a Regional share of natural increase per 1000 population relative to state average, 1926 and 1996.**

| | 1926 | 1996 |
|---|---|---|
| East | 1.48 | 1.44 |
| South East | 0.81 | 0.88 |
| South West | 0.86 | 0.73 |
| Mid-West | 1.09 | 0.90 |
| West | 1.14 | 0.59 |
| Donegal/North West | 0.58 | 0.46 |
| Midlands | 0.73 | 0.67 |
| North East | 0.65 | 0.75 |
| State | 1 | 1 |

**Table D.1b Regional share of unemployment rates relative to state average, 1946 and 1996.**

| | 1946 | 1996 |
|---|---|---|
| East | 1.14 | 0.96 |
| South East | 0.78 | 1.06 |
| South West | 1.14 | 1.00 |
| Mid-West | 0.9 | 0.89 |
| West | 1.15 | 1.11 |
| Donegal/North West | 1.5 | 1.21 |
| Midlands | 0.41 | 0.89 |
| North East | 0.56 | 1.11 |
| State | 1 | 1 |

**Table D.1c Regional share of gross output relative to state average, 1979 and 1996.**

| | 1979 | 1996 |
|---|---|---|
| East | 0.786 | 0.984 |
| South East | 1.185 | 0.899 |
| South West | 1.495 | 1.407 |
| Mid-West | 1.098 | 1.034 |
| West | 0.863 | 0.687 |
| Donegal/North West | 0.711 | 0.407 |
| Midlands | 0.873 | 0.651 |
| North East | 1.206 | 1.537 |
| State | 1 | 1 |

**Table D.1d Regional share of net output relative to state average, 1979 and 1996.**

| | 1979 | 1996 |
|---|---|---|
| East | 0.92 | 1.10 |
| South East | 1.06 | 0.82 |
| South West | 1.37 | 1.46 |
| Mid-West | 1.04 | 0.81 |
| West | 0.94 | 0.72 |
| Donegal/North West | 0.60 | 0.31 |
| Midlands | 0.74 | 0.47 |
| North East | 1.07 | 1.50 |
| State | 1 | 1 |

**Table D.1e Regional share of wages and salaries relative to state average, 1979 and 1996.**

| | 1979 | 1996 |
|---|---|---|
| **East** | 1.068 | 1.105 |
| **South East** | 1.009 | 0.978 |
| **South West** | 1.045 | 1.047 |
| **Mid-West** | 0.999 | 1.032 |
| **West** | 0.881 | 0.857 |
| **Donegal/North West** | 0.763 | 0.709 |
| **Midlands** | 0.828 | 0.825 |
| **North East** | 0.892 | 0.925 |
| **State** | 1 | 1 |

**Table D.1f Regional share of investment relative to state average, 1979 and 1996.**

| | 1979 | 1996 |
|---|---|---|
| **East** | 0.68 | 1.19 |
| **South East** | 1.27 | 0.88 |
| **South West** | 1.91 | 1.37 |
| **Mid-West** | 1.14 | 1.10 |
| **West** | 0.64 | 0.67 |
| **Donegal/North West** | 0.56 | 0.31 |
| **Midlands** | 1.39 | 0.50 |
| **North East** | 0.72 | 0.74 |
| **State** | 1 | 1 |

**Table D.1g Regional share of GVA relative to state average, 1991 and 1996.**

| | 1991 | 1996 |
|---|---|---|
| **East** | 1.173 | 1.208 |
| **South East** | 0.909 | 0.894 |
| **South West** | 1.043 | 1.066 |
| **Mid-West** | 0.934 | 0.897 |
| **West** | 0.766 | 0.736 |
| **Border** | 0.835 | 0.770 |
| **Midlands** | 0.733 | 0.669 |
| **State** | 1 | 1 |

**Table D.1h** **Regional share of direct income per person relative to state average, 1973 and 1994.**

| | 1973 | 1994 |
|---|---|---|
| East | 1.176 | 1.263 |
| South East | 1.055 | 0.821 |
| South West | 1.029 | 0.880 |
| Mid-West | 0.920 | 0.859 |
| West | 0.771 | 0.896 |
| Border | 0.767 | 0.979 |
| Midlands | 0.783 | 0.871 |
| State | 1 | 1 |

**Table D.1i** **Regional share of disposable income per person relative to state average, 1973 and 1994.**

| | 1973 | 1994 |
|---|---|---|
| East | 1.093 | 1.160 |
| South East | 1.075 | 0.883 |
| South West | 1.039 | 0.925 |
| Mid-West | 0.965 | 0.917 |
| West | 0.848 | 0.936 |
| Border | 0.841 | 0.884 |
| Midlands | 0.850 | 0.929 |
| State | 1 | 1 |

**Table D.1j** **Regional share of expenditure per person relative to state average, 1973 and 1994.**

| | 1973 | 1994 |
|---|---|---|
| East | 1.146 | 1.175 |
| South East | 0.925 | 0.904 |
| South West | 1.007 | 0.899 |
| Mid-West | 0.940 | 0.927 |
| West | 0.880 | 0.933 |
| Border | 0.851 | 0.890 |
| Midlands | 0.885 | 0.826 |
| State | 1 | 1 |

**Table D.1k** **Regional share of direct taxes per person relative to state average, 1973 and 1994.**

| | 1973 | 1994 |
|---|---|---|
| East | 1.463 | 1.431 |
| South East | 0.777 | 0.773 |
| South West | 0.871 | 0.799 |
| Mid-West | 0.726 | 0.740 |
| West | 0.655 | 0.765 |
| Border | 0.615 | 0.712 |
| Midlands | 0.845 | 0.699 |
| State | 1 | 1 |

**Table D.1l Regional share of state transfers per person relative to state average, 1973 and 1994.**

| | 1973 | 1994 |
|---|---|---|
| **East** | 0.783 | 0.937 |
| **South East** | 0.981 | 1.076 |
| **South West** | 0.986 | 1.013 |
| **Mid-West** | 1.145 | 1.020 |
| **West** | 1.344 | 0.949 |
| **Border** | 1.268 | 1.132 |
| **Midlands** | 1.023 | 0.971 |
| **State** | 1 | 1 |

## Section D.2

**Table D.2a Regional unemployment rates, 1975, 1977, 1979 and 1983 to 1996.**

| | 1975 | 1977 | 1979 | 1983 | 1984 | 1985 | 1986 | 1987 |
|---|---|---|---|---|---|---|---|---|
| **East** | 9.1 | 9.2 | 6.8 | 14.4 | 15.9 | 18.4 | 18.6 | 18.6 |
| **South East** | 8.7 | 10.3 | 7.6 | 14.8 | 17.1 | 19.0 | 17.3 | 17.7 |
| **South West** | 8.9 | 6.6 | 6.2 | 13.3 | 14.7 | 14.6 | 17.3 | 16.8 |
| **Mid-West** | 9.2 | 9.0 | 6.8 | 14.5 | 13.2 | 14.9 | 14.9 | 16.1 |
| **West** | 9.0 | 6.8 | 5.3 | 11.0 | 13.6 | 16.4 | 12.9 | 12.7 |
| **Donegal/North West** | 13.1 | 12.5 | 13.1 | 19.9 | 21.8 | 22.6 | 20.7 | 23.7 |
| **Midlands** | 7.6 | 7.5 | 3.8 | 10.8 | 11.9 | 15.2 | 14.9 | 14.1 |
| **North East** | 10.6 | 8.3 | 4.9 | 13.6 | 17.1 | 16.3 | 19.4 | 19.5 |
| **State** | 9.3 | 8.8 | 6.9 | 14.0 | 15.5 | 17.4 | 17.4 | 17.6 |

Source: Labour Force Survey

**Table D.2a Regional unemployment rates, 1975, 1977, 1979 and 1983 to 1996, contd.**

| | 1988 | 1989 | 1990 | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 |
|---|---|---|---|---|---|---|---|---|---|
| **East** | 17.3 | 16.0 | 14.5 | 16.7 | 16.8 | 17.4 | 15.1 | 14.4 | 12.9 |
| **South East** | 18.5 | 15.8 | 13.9 | 16.2 | 19.0 | 17.0 | 18.8 | 15.0 | 13.5 |
| **South West** | 16.2 | 15.1 | 12.7 | 14.0 | 14.1 | 15.0 | 15.6 | 12.9 | 12.4 |
| **Mid-West** | 13.9 | 14.3 | 13.2 | 14.1 | 14.3 | 15.8 | 14.6 | 10.6 | 10.2 |
| **West** | 12.1 | 12.4 | 10.0 | 12.4 | 13.9 | 16.1 | 15.5 | 11.8 | 13.9 |
| **Donegal/North West** | 21.9 | 21.4 | 18.3 | 19.7 | 17.8 | 17.6 | 18.4 | 14.6 | 18.3 |
| **Midlands** | 13.5 | 14.9 | 12.1 | 14.0 | 16.5 | 16.0 | 13.5 | 10.8 | 9.3 |
| **North East** | 19.5 | 16.5 | 14.1 | 15.8 | 17.0 | 17.6 | 14.0 | 12.0 | 14.2 |
| **State** | 16.7 | 15.6 | 13.7 | 15.6 | 16.2 | 16.7 | 15.6 | 13.3 | 12.9 |

Source: Labour Force Survey

## Section D.3

**Table D.3a List of sectors comprising traditional, modern and natural resource establishments**

| Classification | Industrial Sectors |
|---|---|
| Traditional Industrial Establishments | Food<br>Drink and Tobacco<br>Textiles<br>Clothing<br>Timber<br>Paper |
| Natural Resource Industrial Establishments | Mining and Quarrying<br>Electricity |
| Modern Industrial Establishments | Manufacture of non-metallic mineral products<br>Chemicals<br>Metals and Engineering<br>Miscellaneous |

## Section D.4

**Table D.4a Weekly disposable income by quartile, 1973***

| | quartile 1 | quartile 2 | quartile 3 | quartile 4 | Total |
|---|---|---|---|---|---|
| **East** | 69.89 | 175.38 | 293.92 | 541.85 | 261.01 |
| **South East** | 71.33 | 173.79 | 313.70 | 652.52 | 252.11 |
| **South West** | 69.14 | 177.97 | 303.97 | 555.17 | 238.85 |
| **Mid-West** | 69.77 | 179.22 | 304.48 | 543.23 | 222.07 |
| **West** | 71.97 | 182.66 | 309.90 | 492.79 | 201.93 |
| **Border** | 71.02 | 180.38 | 293.74 | 544.56 | 193.02 |
| **Midlands** | 67.79 | 182.35 | 310.40 | 614.21 | 191.43 |
| **State** | 70.14 | 177.88 | 300.69 | 559.58 | 233.98 |

* 1973=1

**Table D.4b Weekly disposable income by quartile, 1980***

| | quartile 1 | quartile 2 | quartile 3 | quartile 4 | Total |
|---|---|---|---|---|---|
| **East** | 76.62 | 164.75 | 239.64 | 447.45 | 278.30 |
| **South East** | 77.30 | 167.65 | 249.67 | 426.54 | 218.56 |
| **South West** | 78.22 | 169.25 | 241.06 | 451.76 | 246.70 |
| **Mid-West** | 73.61 | 168.17 | 246.43 | 438.98 | 230.85 |
| **West** | 80.76 | 169.84 | 250.03 | 461.90 | 207.90 |
| **Border** | 78.79 | 169.04 | 249.76 | 428.55 | 200.65 |
| **Midlands** | 80.24 | 170.47 | 252.46 | 456.58 | 232.74 |
| **State** | 77.76 | 167.66 | 244.82 | 445.48 | 244.06 |

* 1973=1

**Table D.4c Weekly disposable income by quartile, 1987***

| | quartile 1 | quartile 2 | quartile 3 | quartile 4 | Total |
|---|---|---|---|---|---|
| East | 81.60 | 160.67 | 253.63 | 464.78 | 264.55 |
| South East | 83.68 | 164.48 | 258.72 | 461.29 | 228.93 |
| South West | 82.00 | 163.83 | 263.54 | 474.15 | 244.48 |
| Mid-West | 81.28 | 164.45 | 266.75 | 446.39 | 244.69 |
| West | 80.51 | 167.19 | 267.08 | 492.81 | 232.00 |
| Border | 83.07 | 164.33 | 261.13 | 481.58 | 209.72 |
| Midlands | 81.98 | 164.23 | 269.57 | 436.42 | 202.72 |
| State | 82.04 | 163.33 | 259.97 | 466.30 | 242.83 |

* 1973=1

**Table D.4d Weekly disposable income by quartile, 1994***

| | quartile 1 | quartile 2 | quartile 3 | quartile 4 | Total |
|---|---|---|---|---|---|
| East | 90.55 | 183.65 | 304.28 | 564.22 | 319.30 |
| South East | 91.74 | 177.16 | 302.03 | 521.96 | 247.23 |
| South West | 87.44 | 184.35 | 304.49 | 540.28 | 264.63 |
| Mid-West | 84.66 | 181.84 | 306.41 | 532.38 | 255.23 |
| West | 88.90 | 189.60 | 312.84 | 528.52 | 273.61 |
| Border | 89.90 | 185.99 | 315.19 | 518.47 | 252.94 |
| Midlands | 94.54 | 189.32 | 315.58 | 556.88 | 274.63 |
| State | 89.59 | 183.92 | 307.08 | 547.05 | 281.93 |

* 1973=1

**Table D.4e Proportion of households in each quartile, 1973**

| | quartile 1 | quartile 2 | quartile 3 | quartile 4 | total |
|---|---|---|---|---|---|
| East | 16.6 | 32.9 | 33.1 | 17.4 | 100 |
| South East | 26.9 | 33.9 | 24.0 | 15.1 | 100 |
| South West | 24.8 | 32.1 | 29.8 | 13.3 | 100 |
| Mid-West | 28.9 | 34.5 | 24.6 | 12.0 | 100 |
| West | 31.7 | 37.4 | 22.7 | 8.2 | 100 |
| Border | 37.1 | 33.9 | 20.9 | 8.1 | 100 |
| Midlands | 38.0 | 37.1 | 18.0 | 6.9 | 100 |
| State | 25.7 | 33.9 | 27.1 | 13.2 | 100 |

**Table D.4f Proportion of households in each quartile 1980.**

| | quartile 1 | quartile 2 | quartile 3 | quartile 4 | total |
|---|---|---|---|---|---|
| East | 18.4 | 17.7 | 24.5 | 39.4 | 100 |
| South East | 32.7 | 23.1 | 19.1 | 25.0 | 100 |
| South West | 26.9 | 17.9 | 25.7 | 29.5 | 100 |
| Mid-West | 29.5 | 19.5 | 24.8 | 26.3 | 100 |
| West | 36.4 | 24.4 | 20.4 | 18.6 | 100 |
| Border | 34.5 | 26.7 | 21.3 | 17.5 | 100 |
| Midlands | 31.1 | 22.1 | 21.3 | 25.5 | 100 |
| State | 26.6 | 20.5 | 23.2 | 29.7 | 100 |

**Table D.4g Proportion of households in each quartile, 1987**

| | quartile 1 | quartile 2 | quartile 3 | quartile 4 | total |
|---|---|---|---|---|---|
| **East** | 20.8 | 21.9 | 25.6 | 31.7 | 100 |
| **South East** | 27.5 | 25.9 | 25.5 | 21.1 | 100 |
| **South West** | 22.8 | 27.3 | 26.1 | 23.7 | 100 |
| **Mid-West** | 22.8 | 24.3 | 27.5 | 25.3 | 100 |
| **West** | 27.3 | 29.8 | 23.1 | 20.0 | 100 |
| **Border** | 33.7 | 29.8 | 19.3 | 17.1 | 100 |
| **Midlands** | 36.4 | 21.8 | 27.2 | 14.6 | 100 |
| **State** | 25.0 | 25.0 | 25.0 | 25.0 | 100 |

**Table D.4h Proportion of households in each quartile, 1994.**

| | quartile 1 | quartile 2 | quartile 3 | quartile 4 | total |
|---|---|---|---|---|---|
| **East** | 19.9 | 22.2 | 25.5 | 32.4 | 100 |
| **South East** | 28.6 | 27.9 | 25.1 | 18.4 | 100 |
| **South West** | 28.4 | 25.9 | 23.3 | 22.4 | 100 |
| **Mid-West** | 29.0 | 27.2 | 22.9 | 20.8 | 100 |
| **West** | 26.2 | 24.1 | 26.9 | 22.8 | 100 |
| **Border** | 30.0 | 26.6 | 23.8 | 19.6 | 100 |
| **Midlands** | 22.8 | 29.8 | 28.4 | 19.2 | 100 |
| **State** | 25.0 | 25.0 | 25.0 | 25.0 | 100 |

# Appendix E

## Section E.1

**Table E.1a Regional employment rates**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| **East** | 39 | 40 | 38 | 41 | 38 | 38 | 37 | 35 | 32 | 34 | 38 |
| **South East** | 42 | 41 | 39 | 40 | 36 | 36 | 34 | 31 | 30 | 31 | 34 |
| **South West** | 39 | 40 | 39 | 40 | 37 | 36 | 35 | 32 | 30 | 32 | 35 |
| **Mid-West** | 42 | 40 | 40 | 40 | 36 | 37 | 34 | 33 | 31 | 32 | 36 |
| **West** | 43 | 44 | 43 | 42 | 38 | 38 | 35 | 32 | 30 | 32 | 35 |
| **Donegal/NW** | 44 | 45 | 43 | 42 | 38 | 37 | 35 | 29 | 28 | 29 | 33 |
| **Midlands** | 43 | 43 | 44 | 42 | 39 | 38 | 35 | 32 | 30 | 32 | 35 |
| **North East** | 42 | 44 | 43 | 43 | 39 | 39 | 37 | 33 | 30 | 31 | 35 |
| **State** | 41 | 42 | 40 | 41 | 38 | 37 | 35 | 33 | 31 | 33 | 36 |

## Section E.2

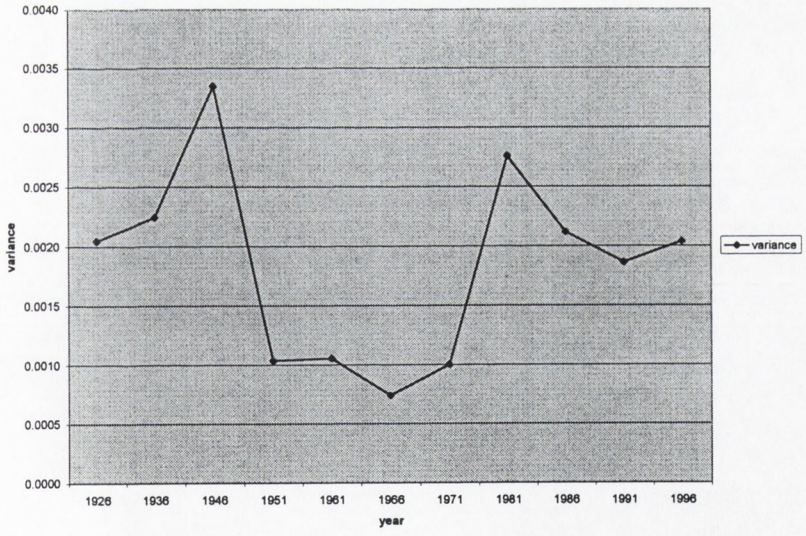


**Figure E.2a Variance of employment rates; 8 regions.**

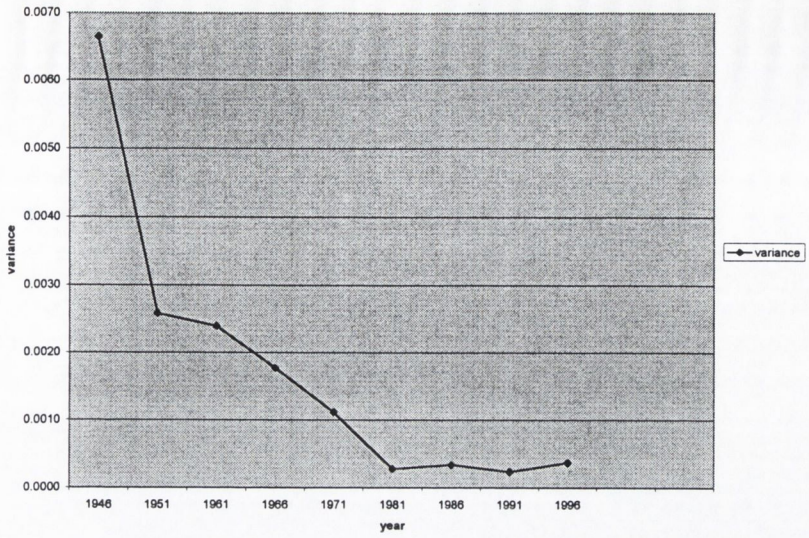


**Figure E.2b Variance of participation rates; eight regions.**

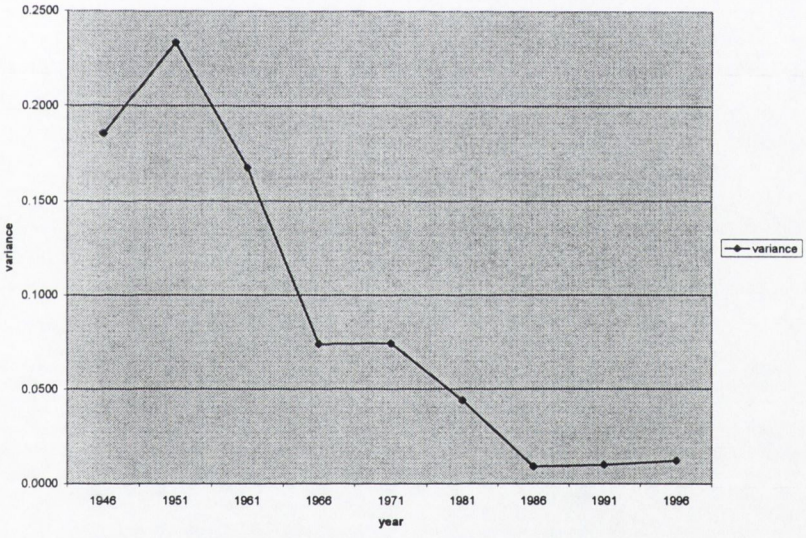


**Figure E.2c Variance of unemployment rates; eight regions.**

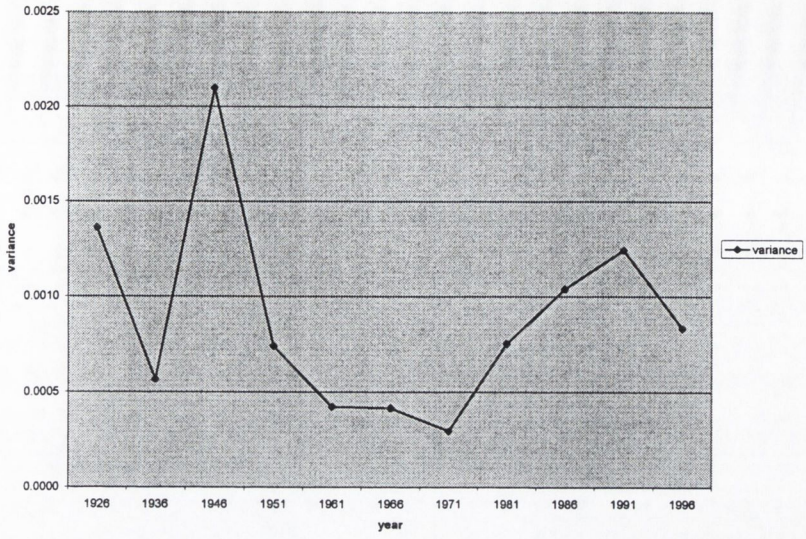


**Figure E.2d Variance of age rate; eight regions.**

## Section E.3

**Table E.3a Investment data; £10,000**

| | 1958 | 1959 | 1960 | 1961 | 1962 | 1963 | 1964 |
|---|---|---|---|---|---|---|---|
| **East** | 695.2 | 710.5 | 866.4 | 982.8 | 1375.2 | 1448.4 | 1823.7 |
| **South East** | 133.7 | 132.9 | 152.9 | 207.9 | 243.1 | 299.5 | 326.3 |
| **South West** | 316.0 | 302.1 | 443.1 | 529.1 | 255.6 | 970.0 | 695.4 |
| **Mid-West** | 95.8 | 100.3 | 120.8 | 139.5 | 211.5 | 239.7 | 320.8 |
| **West** | 59.7 | 64.0 | 75.5 | 247.0 | 284.4 | 215.3 | 273.7 |
| **Donegal/North West** | 124.9 | 71.2 | 68.7 | 53.7 | 88.9 | 77.3 | 86.8 |
| **Midlands** | 216.7 | 436.4 | 284.4 | 173.2 | 329.2 | 344.7 | 439.5 |
| **North East** | 87.5 | 93.8 | 124.4 | 243.6 | 238.4 | 468.0 | 706.2 |
| **State** | 1729.5 | 1911.1 | 2136.3 | 2576.7 | 3126.2 | 4062.9 | 4672.3 |

Source: An Foras Forbartha, 1978.

**Table E.3a Investment data; £10,000; contd.**

| | 1965 | 1966 | 1967 | 1968 | 1969 | 1970 | 1971 | 1972 |
|---|---|---|---|---|---|---|---|---|
| **East** | 1963.0 | 2734.7 | 2195.6 | 2045.5 | 3198.4 | 4479.5 | 4493.1 | 3833.5 |
| **South East** | 349.8 | 346.8 | 1013.4 | 837.1 | 812.6 | 1580.5 | 1544.9 | 1396.3 |
| **South West** | 865.2 | 776.6 | 807.3 | 1017.0 | 1753.3 | 2210.7 | 2258.2 | 2013.8 |
| **Mid-West** | 390.4 | 386.4 | 439.1 | 460.9 | 514.3 | 569.2 | 568.1 | 2315.0 |
| **West** | 357.2 | 133.7 | 187.1 | 213.5 | 256.4 | 435.5 | 452.3 | 541.0 |
| **Donegal/North West** | 111.3 | 95.5 | 177.9 | 155.1 | 204.9 | 849.1 | 844.1 | 542.6 |
| **Midlands** | 289.8 | 388.5 | 311.4 | 198.0 | 268.7 | 326.6 | 301.6 | 624.4 |
| **North East** | 415.3 | 463.6 | 408.3 | 446.9 | 649.0 | 603.7 | 598.9 | 2295.4 |
| **State** | 4742.0 | 5325.8 | 5540.0 | 5374.1 | 7657.7 | 11054.8 | 11061.2 | 13561.9 |

Source: An Foras Forbartha, 1978.

## Section E.4

Table E.4a shows the regression results for the following equation:

$$\ln \Delta A = \alpha + \beta \ln A + a \ln agr \qquad \textbf{E.4a}$$

where lnΔA refers to the growth rate of the productivity enhanced employment rate; lnA refers to the initial level of the productivity enhanced employment rate and α. β and a are coefficients, lnagr refers to the natural log of the share of agricultural employment.

**Table E.4a Regression results for productivity enhanced employment rate and agricultural employment**

| Dependent Variable: lnΔA<br>Method: Pooled Least Squares<br>Sample (adjusted): Census years from 1946 to 1996<br>Included observations: 5 after adjusting endpoints<br>Total panel (balanced) observations: 40 | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -0.19 | 0.08 | -2.50 | 0.02 |
| LnA | -0.32 | 0.08 | -3.91 | 0.00 |
| Lnagr | -0.08 | 0.03 | -2.87 | 0.00 |

| | | | |
|---|---|---|---|
| R-squared | 0.29 | Mean dependent variable | 0.06 |
| Adjusted R-squared | 0.26 | S.D. dependent variable | 0.08 |
| S.E. of regression | 0.07 | Sum squared residuals | 0.16 |
| F-statistic | 7.72 | Durbin-Watson statistic | 2.52 |
| Prob (F-statistic | 0.00 | | |

Table E.4b shows the regression results for the following equation:

$$\ln \Delta A = \alpha + \beta \ln A + a \ln edu \qquad \textbf{E.4b}$$

where the variables are the same as for equation E.4a and lnedu refers to the natural log of the education rate

**Table E.4b Regression results for the productivity-enhanced employment rate and education**

| Dependent Variable: lnΔA<br>Method: Pooled Least Squares<br>Sample (adjusted): Census years from 1946 to 1996<br>Included observations: 5 after adjusting endpoints<br>Total panel (balanced) observations: 40 | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -0.47 | 0.12 | -3.82 | 0.00 |
| LnA | -0.13 | 0.05 | -2.72 | 0.01 |
| Lnedu | 0.18 | 0.05 | 3.37 | 0.00 |

| | | | |
|---|---|---|---|
| R-squared | 0.34 | Mean dependent variable | 0.06 |
| Adjusted R-squared | 0.30 | S.D. dependent variable | 0.08 |
| S.E. of regression | 0.06 | Sum squared residuals | 0.15 |
| F-statistic | 9.52 | Durbin-Watson statistic | 3.16 |
| Prob (F-statistic | 0.00 | | |

Table E.4c shows the regression results for the following equation:

$$\ln \Delta A = \alpha + \beta \ln A + a \ln inv \qquad \textbf{E.4c}$$

where the variables are the same as for equation E.4a and lninv refers to the natural log of the investment rate

**Table E.4c Regression results for the productivity-enhanced employment rate and investment**

| Dependent Variable: lnΔA<br>Method: Pooled Least Squares<br>Sample (adjusted): Census years from 1946 to 1996<br>Included observations: 5 after adjusting endpoints<br>Total panel (balanced) observations: 40 | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -0.43 | 0.12 | -3.48 | 0.00 |
| LnA | -0.17 | 0.05 | -3.45 | 0.00 |
| Lninv | 0.06 | 0.02 | 2.99 | 0.01 |

| | | | |
|---|---|---|---|
| R-squared | 0.31 | Mean dependent variable | 0.06 |
| Adjusted R-squared | 0.27 | S.D. dependent variable | 0.08 |
| S.E. of regression | 0.07 | Sum squared residuals | 0.16 |
| F-statistic | 8.12 | Durbin-Watson statistic | 2.54 |
| Prob (F-statistic | 0.00 | | |

Table E.4d shows the regression results for the following equation:

$$\ln \Delta A = \alpha + \beta \ln A + a \ln urb \qquad \textbf{E.4d}$$

where the variables are the same as for equation E.4a and lnune refers to the natural log of the share of urban population.

**Table E.4d Regression results for the productivity-enhanced employment rate and urban population**

| Dependent Variable: lnΔA<br>Method: Pooled Least Squares<br>Sample (adjusted): Census years from 1946 to 1996<br>Included observations: 5 after adjusting endpoints<br>Total panel (balanced) observations: 40 | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -0.62 | 0.48 | -1.30 | 0.20 |
| LnA | -0.26 | 0.14 | -1.89 | 0.07 |
| Lnurb | 0.08 | 0.08 | 1.03 | 0.31 |

| | | | |
|---|---|---|---|
| R-squared | 0.16 | Mean dependent variable | 0.06 |
| Adjusted R-squared | 0.12 | S.D. dependent variable | 0.78 |
| S.E. of regression | 0.07 | Sum squared residuals | 0.19 |
| F-statistic | 3.57 | Durbin-Watson statistic | 2.34 |
| Prob (F-statistic | 0.04 | | |

Table E.4e shows the regression results for the following equation:

$$\ln \Delta A = \alpha + \beta \ln A + a \ln une \qquad \textbf{E.4e}$$

where the variables are the same as for equation E.4a and lnune refers to the natural log of the unemployment rate.

**Table E.4e Regression results for the productivity-enhanced employment rate and unemployment**

| Dependent Variable: lnΔA<br>Method: Pooled Least Squares<br>Sample (adjusted): Census years from 1946 to 1996<br>Included observations: 5 after adjusting endpoints<br>Total panel (balanced) observations: 40 | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | -0.19 | 0.09 | -2.02 | 0.05 |
| LnA | -0.12 | 0.05 | -2.26 | 0.03 |
| Lnune | 0.02 | 0.02 | 1.15 | 0.26 |

| | | | |
|---|---|---|---|
| R-squared | 0.17 | Mean dependent variable | 0.06 |
| Adjusted R-squared | 0.12 | S.D. dependent variable | 0.08 |
| S.E. of regression | 0.07 | Sum squared residuals | 0.19 |
| F-statistic | 3.72 | Durbin-Watson statistic | 2.52 |
| Prob (F-statistic | 0.03 | | |

## Section E.5

Table E.5a shows the regression results for the following equation:

$$\ln \Delta y = \alpha + \beta \ln y + a \ln agr \qquad \textbf{E.5a}$$

where lnΔA refers to the natural log of disposable income; lny refers to the initial level of disposable income and α. β and a are coefficients, lnagr refers to the natural log of the share of agricultural employment.

**Table E.5a Regression results for disposable income and agricultural employment**

| Dependent Variable: lnΔY<br>Method: Pooled Least Squares<br>Sample (adjusted): 1973, 1980, 1987 and 1994<br>Included observations: 3 after adjusting endpoints<br>Total panel (balanced) observations: 21 | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 3.33 | 1.26 | 2.64 | 0.02 |
| LnY | -0.49 | 0.20 | -2.48 | 0.02 |
| Lnagr | -0.08 | 0.03 | -2.33 | 0.03 |

| | | | |
|---|---|---|---|
| R-squared | 0.29 | Mean dependent variable | 0.13 |
| Adjusted R-squared | 0.21 | S.D. dependent variable | 0.09 |
| S.E. of regression | 0.08 | Sum squared residuals | 0.11 |
| F-statistic | 3.65 | Durbin-Watson statistic | 3.47 |
| Prob (F-statistic | 0.05 | | |

Table E.5b shows the regression results for the following equation:

$$\ln \Delta y = \alpha + \beta \ln y + a \ln edu \qquad \textbf{E.5b}$$

where the variables are the same as for equation E.5a and lnedu refers to the natural log of the education rate

**Table E.5b Regression results for disposable income and education**

| Dependent Variable: lnΔY<br>Method: Pooled Least Squares<br>Sample (adjusted): 1973, 1980, 1987 and 1994<br>Included observations: 3 after adjusting endpoints<br>Total panel (balanced) observations: 21 | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 1.16 | 0.96 | 1.21 | 0.24 |
| LnY | -0.23 | 0.16 | -1.49 | 0.15 |
| Lnedu | 0.20 | 0.08 | 2.52 | 0.02 |

| | | | |
|---|---|---|---|
| R-squared | 0.32 | Mean dependent variable | 0.13 |
| Adjusted R-squared | 0.24 | S.D. dependent variable | 0.09 |
| S.E. of regression | 0.08 | Sum squared residuals | 0.11 |
| F-statistic | 4.14 | Durbin-Watson statistic | 3.48 |
| Prob (F-statistic | 0.03 | | |

Table E.5c shows the regression results for the following equation:

$$\ln \Delta y = \alpha + \beta \ln y + a \ln inv \qquad \textbf{E.5c}$$

where the variables are the same as for equation E.5a and lninv refers to the natural log of the investment rate

**Table E.5c Regression results for disposable income and investment**

| Dependent Variable: lnΔY<br>Method: Pooled Least Squares<br>Sample (adjusted): 1973, 1980, 1987 and 1994<br>Included observations: 3 after adjusting endpoints<br>Total panel (balanced) observations: 21 | | | | |
|---|---|---|---|---|
| **Variable** | **Coefficient** | **Std. Error** | **t-Statistic** | **Prob.** |
| C | 1.45 | 1.13 | 1.29 | 0.21 |
| LnY | -0.22 | 0.19 | -1.13 | 0.27 |
| Lninv | 0.00 | 0.04 | 0.02 | 0.99 |

| | | | |
|---|---|---|---|
| R-squared | 0.07 | Mean dependent variable | 0.13 |
| Adjusted R-squared | -0.03 | S.D. dependent variable | 0.09 |
| S.E. of regression | 0.09 | Sum squared residuals | 0.15 |
| F-statistic | 0.71 | Durbin-Watson statistic | 3.06 |
| Prob (F-statistic | 0.50 | | |

Table E.5d shows the regression results for the following equation:

$$\ln \Delta y = \alpha + \beta \ln y + a \ln urb \qquad \textbf{E.5d}$$

where the variables are the same as for equation E.5a and lnurb refers to the natural log of the share of urban population.

**Table E.5d Regression results for disposable income and urban population**

| Dependent Variable: lnΔY<br>Method: Pooled Least Squares<br>Sample (adjusted): 1973, 1980, 1987 and 1994<br>Included observations: 3 after adjusting endpoints<br>Total panel (balanced) observations: 21 | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 3.26 | 1.64 | 1.99 | 0.06 |
| LnY | -0.60 | 0.32 | -1.91 | 0.07 |
| Lnurb | 0.14 | 0.10 | 1.44 | 0.17 |

| | | | |
|---|---|---|---|
| R-squared | 0.17 | Mean dependent variable | 0.13 |
| Adjusted R-squared | 0.08 | S.D. dependent variable | 0.09 |
| S.E. of regression | 0.09 | Sum squared residuals | 0.13 |
| F-statistic | 1.84 | Durbin-Watson statistic | 3.41 |
| Prob (F-statistic | 0.19 | | |

Table E.5e shows the regression results for the following equation:

$$\ln \Delta y = \alpha + \beta \ln y + a \ln une \qquad \textbf{E.5e}$$

where the variables are the same as for equation E.5a and lnune refers to the natural log of the unemployment rate.

**Table E.5e Regression results for disposable income and unemployment**

| Dependent Variable: lnΔY<br>Method: Pooled Least Squares<br>Sample (adjusted): 1973, 1980, 1987 and 1994<br>Included observations: 3 after adjusting endpoints<br>Total panel (balanced) observations: 21 | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 1.45 | 1.11 | 1.3 | 0.21 |
| LnY | -0.22 | 0.18 | -1.18 | 0.25 |
| Lnne | 0.00 | 0.04 | 0.00 | 0.10 |

| | | | |
|---|---|---|---|
| R-squared | 0.07 | Mean dependent variable | 0.13 |
| Adjusted R-squared | -0.03 | S.D. dependent variable | 0.09 |
| S.E. of regression | 0.09 | Sum squared residuals | 0.15 |
| F-statistic | 0.71 | Durbin-Watson statistic | 3.07 |
| Prob (F-statistic | 0.50 | | |

Table E.5f shows the regression results for the following equation:

$$\ln \Delta y = \alpha + \beta \ln y + a \ln serv \qquad \textbf{E.5f}$$

where the variables are the same as for equation E.5a and lnserv refers to the natural log of the share of service employment.

**Table E.5f Regression results for disposable income and the share of service employment**

| Dependent Variable: lnΔY<br>Method: Pooled Least Squares<br>Sample (adjusted): 1973, 1980, 1987 and 1994<br>Included observations: 3 after adjusting endpoints<br>Total panel (balanced) observations: 21 | | | | |
|---|---|---|---|---|
| Variable | Coefficient | Std. Error | t-Statistic | Prob. |
| C | 1.71 | 0.95 | 1.80 | 0.09 |
| LnY | -0.46 | 0.18 | -2.57 | 0.02 |
| Lnserv | 0.32 | 0.12 | 2.64 | 0.02 |

| | | | |
|---|---|---|---|
| R-squared | 0.33 | Mean dependent variable | 0.13 |
| Adjusted R-squared | 0.26 | S.D. dependent variable | 0.09 |
| S.E. of regression | 0.08 | Sum squared residuals | 0.11 |
| F-statistic | 4.48 | Durbin-Watson statistic | 3.75 |
| Prob (F-statistic | 0.03 | | |

Table E.5g shows the regression results for the following equation:

$$\ln \Delta y = \alpha + \beta \ln y + a \ln pol \qquad \textbf{E.5g}$$

where the variables are the same as for equation E.5a and lnpol refers to the natural log of policy (industrial grants per head).

**Table E.5g Regression results for disposable income and policy**

| Dependent Variable: lnΔY<br>Method: Pooled Least Squares<br>Sample (adjusted): 1973, 1980, 1987 and 1994<br>Included observations: 3 after adjusting endpoints<br>Total panel (balanced) observations: 21 | | | | |
|---|---|---|---|---|
| **Variable** | **Coefficient** | **Std. Error** | **t-Statistic** | **Prob.** |
| C | 1.45 | 1.09 | 1.33 | 0.20 |
| LnY | -0.21 | 0.18 | -1.14 | 0.27 |
| Lnpol | -0.04 | 0.05 | -0.74 | 0.47 |

| | | | |
|---|---|---|---|
| R-squared | 0.10 | Mean dependent variable | 0.13 |
| Adjusted R-squared | 0.00 | S.D. dependent variable | 0.09 |
| S.E. of regression | 0.09 | Sum squared residuals | 0.14 |
| F-statistic | 1.00 | Durbin-Watson statistic | 3.35 |
| Prob (F-statistic | 0.39 | | |

# Appendix F

## Section F.1

**Table F.1a Population change in each county; 1926-1971 and 1971 to 1996.**

| | 1926-1971 % change | 1971-1996 % change |
|---|---|---|
| Carlow | -0.7 | 21.6 |
| Dublin | 68.5 | 24.0 |
| Kildare | 24.0 | 87.4 |
| Kilkenny | -13.4 | 22.3 |
| Laoghis | -12.2 | 16.7 |
| Longford | -29.1 | 6.7 |
| Louth | 19.7 | 22.7 |
| Meath | 13.7 | 52.8 |
| Offaly | -1.5 | 14.0 |
| Westmeath | -5.7 | 18.0 |
| Wexford | -9.9 | 20.8 |
| Wicklow | 15.1 | 54.5 |
| Clare | -21.1 | 25.2 |
| Cork | -3.5 | 19.1 |
| Kerry | -24.4 | 11.6 |
| Limerick | 0.1 | 17.5 |
| Tipperary North | -8.9 | 6.6 |
| Tipperary South | -14.9 | 8.9 |
| Waterford | -1.6 | 22.4 |
| Galway | -11.9 | 26.4 |
| Leitrim | -49.3 | -11.7 |
| Mayo | -36.6 | 1.7 |
| Roscommon | -35.9 | -3.1 |
| Sligo | -29.6 | 10.7 |
| Cavan | -36.2 | 0.5 |
| Donegal | -29.0 | 19.5 |
| Monaghan | -29.0 | 10.9 |
| State | 0.2 | 21.6 |

## Section F.2

The following subsection contains the graph of the variance of employment and its components for six of the eight planning regions.

## F.2.1 East region

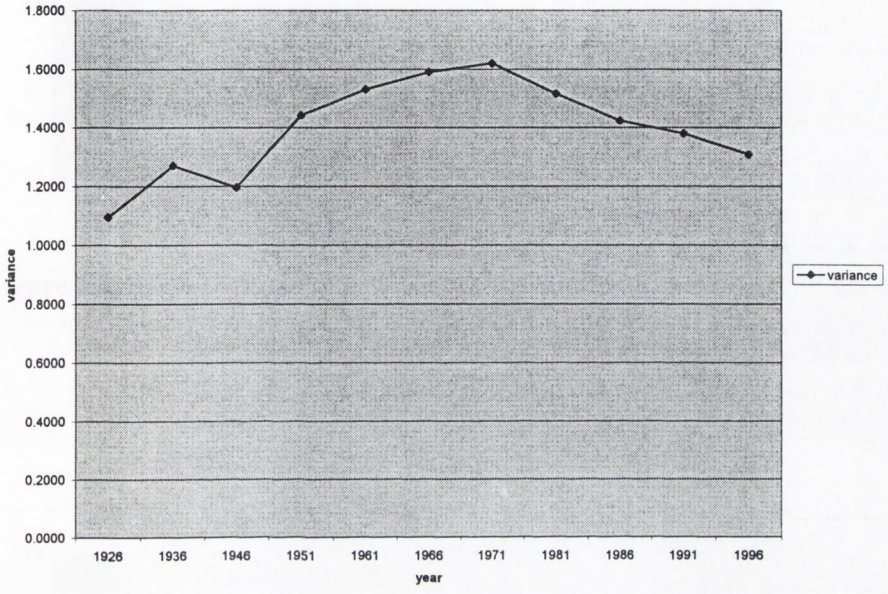


**Figure F.2.1a Variance of total employment; East region**

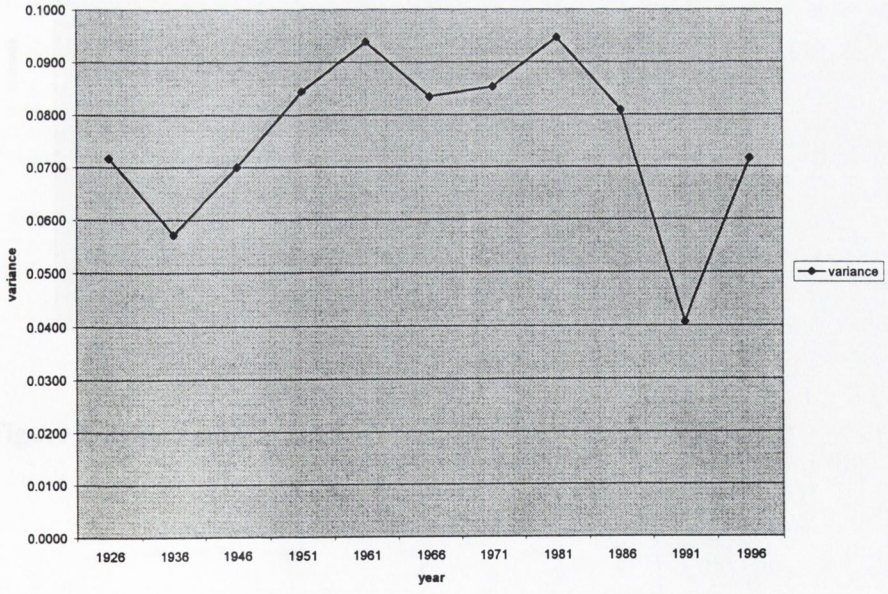


**Figure F.2.1b Variance of agricultural employment; East region**

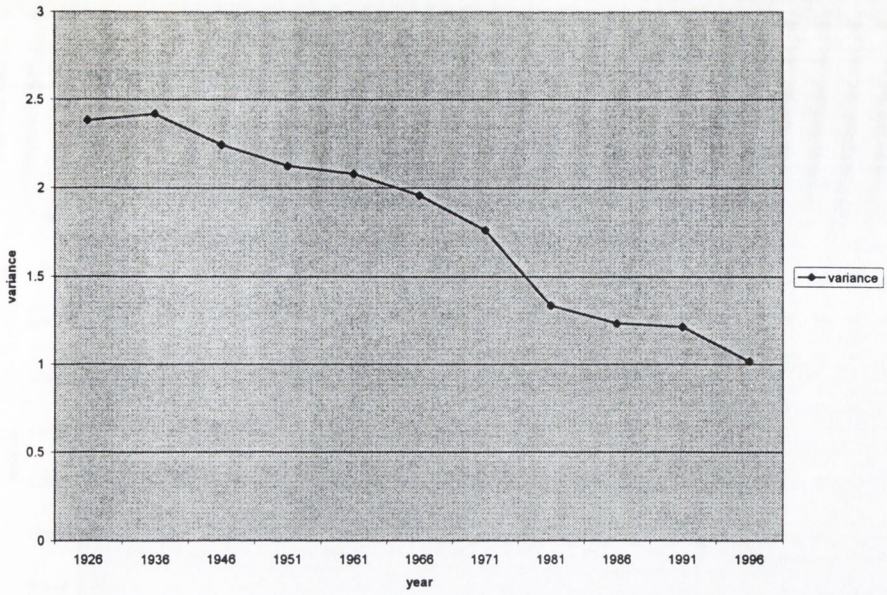


**Figure F.2.1c Variance of industrial employment; East region**

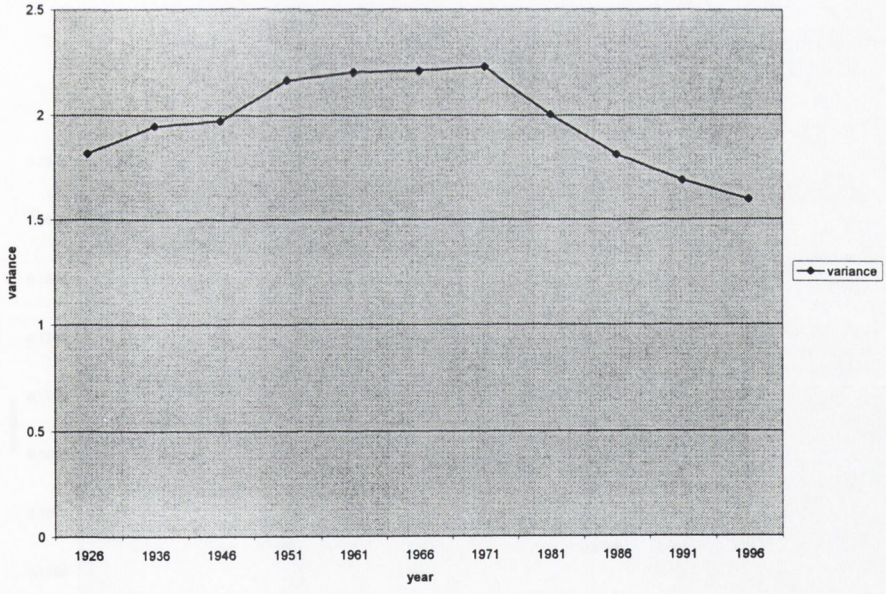


**Figure F.2.1d Variance of service employment; East region**

## F.2.2 South East Region

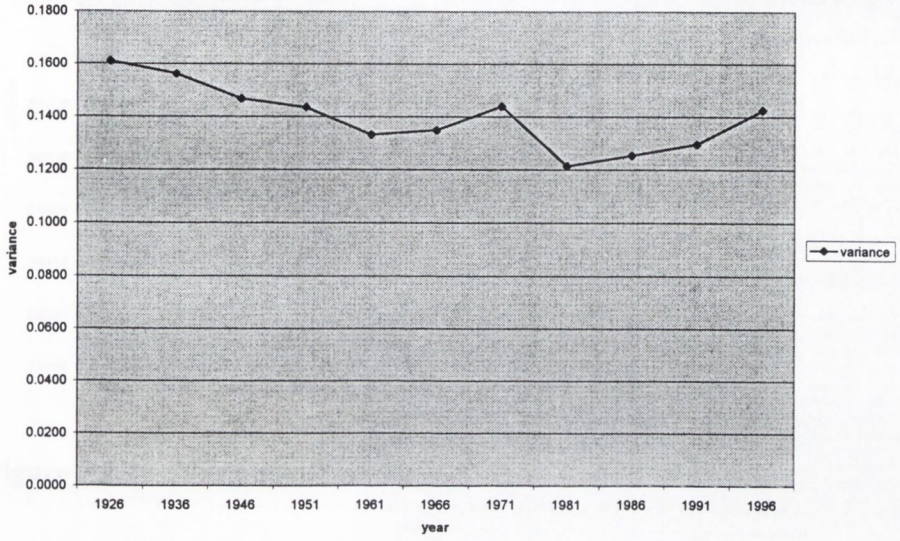


**Figure F.2.2a Variance of total employment; South East region**

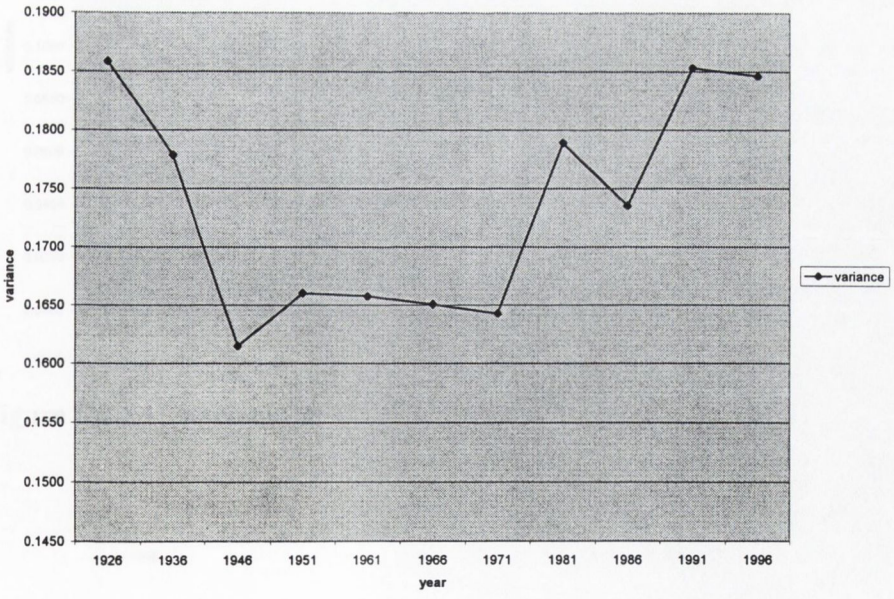


**Figure F.2.2b Variance of agricultural employment; South East region**

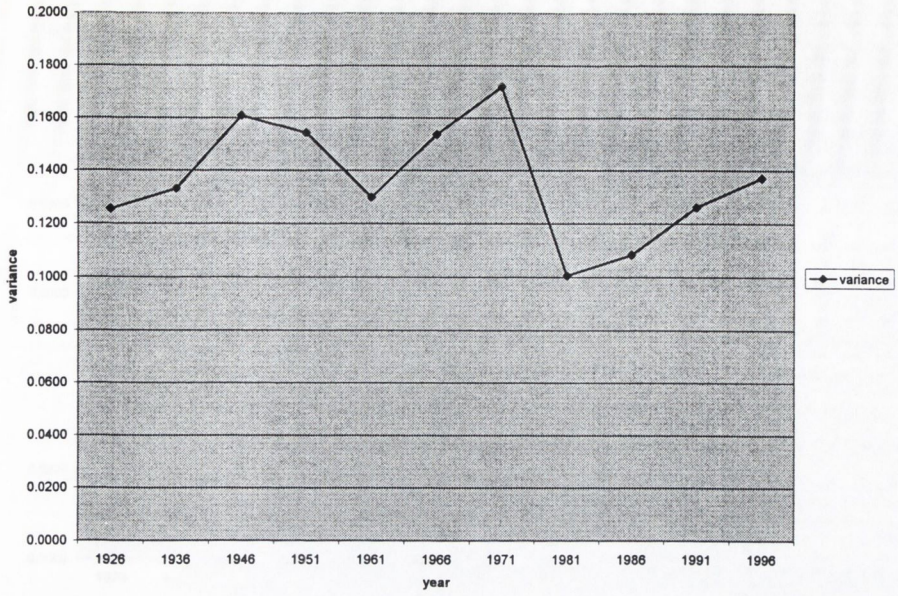


**Figure F.2.2c Variance of industrial employment; South East region**

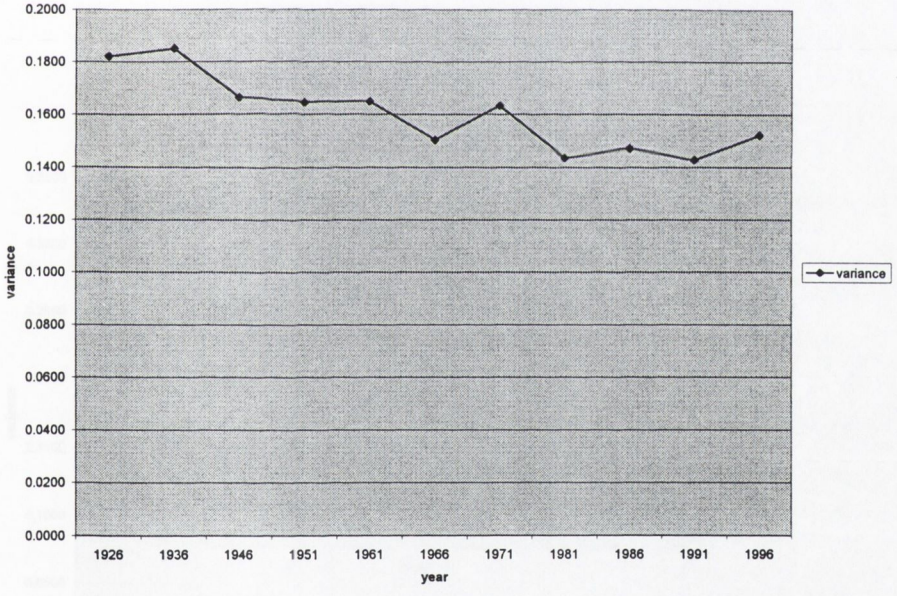


**Figure F.2.2d Variance of service employment; South East region**

## F.2.3 North East Region

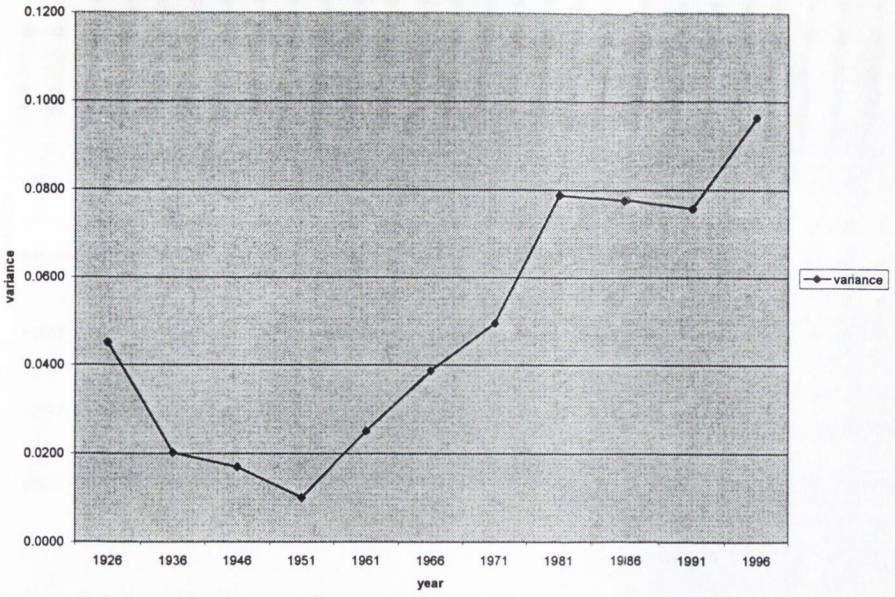


**Figure F.2.3a Variance of total employment; North East region**

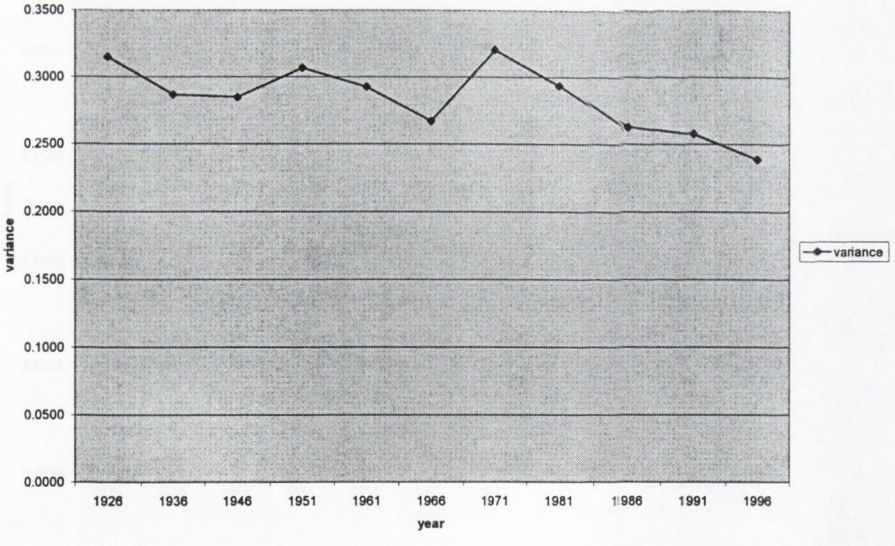


**Figure F.2.3b Variance of agricultural employment; North East region**

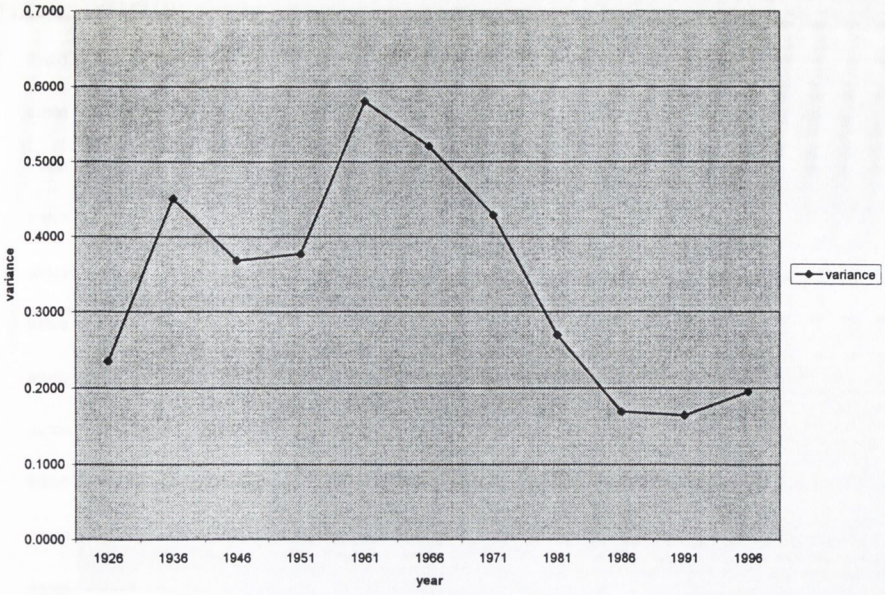


**Figure F.2.3c Variance of industrial employment; North East region**

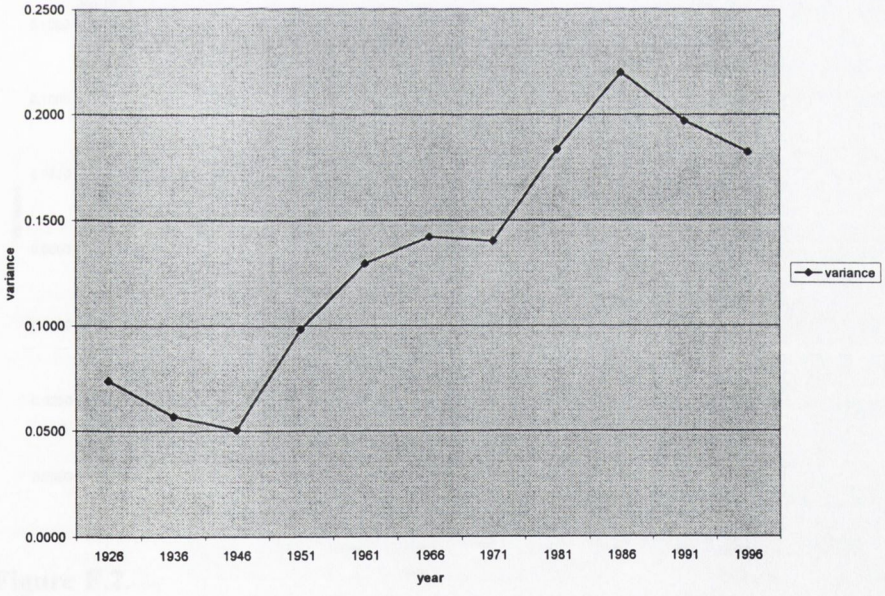


**Figure F.2.3d Variance of service employment; North East region**

# F.2.4 Midlands Region

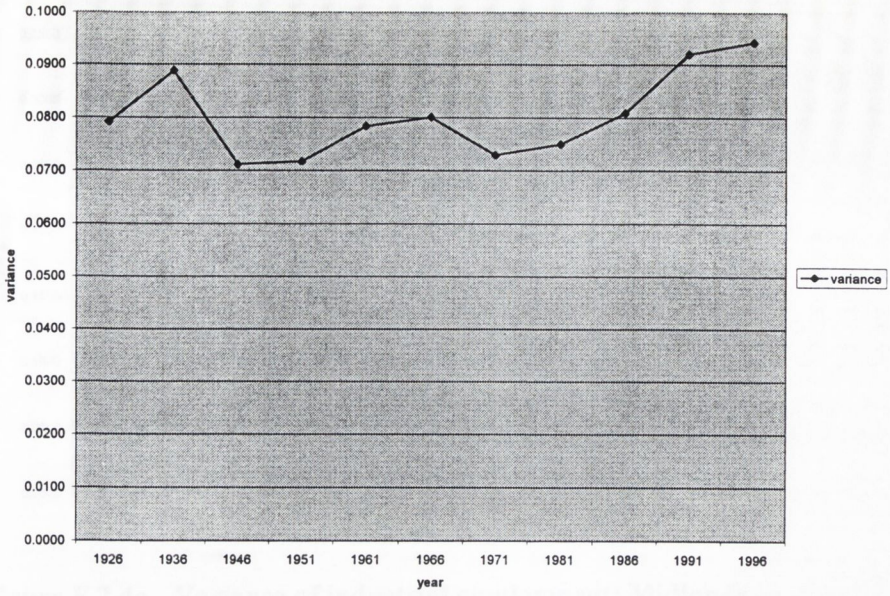


**Figure F.2.4a Variance of total employment; Midlands region**

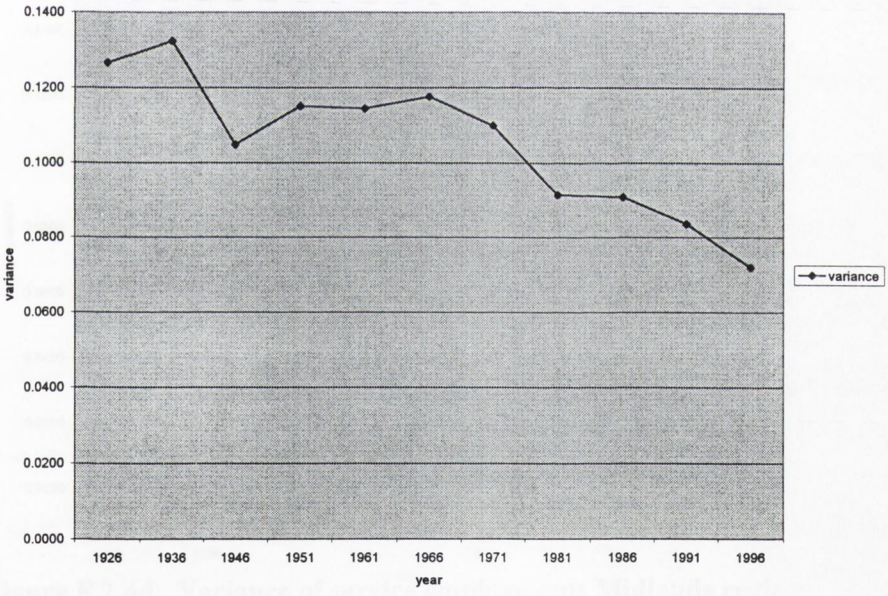


**Figure F.2.4b Variance of agricultural employment; Midlands region**

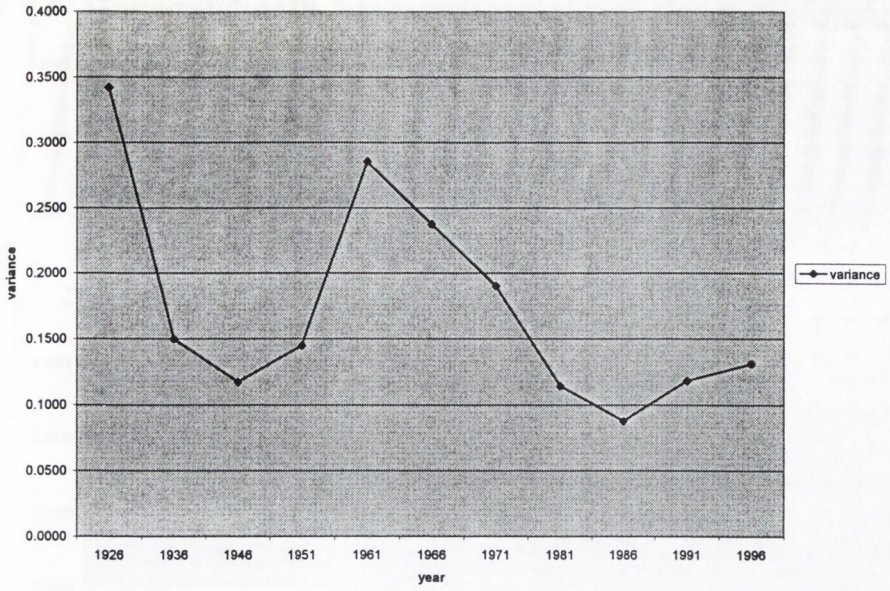


**Figure F.2.4c Variance of industrial employment; Midlands region**

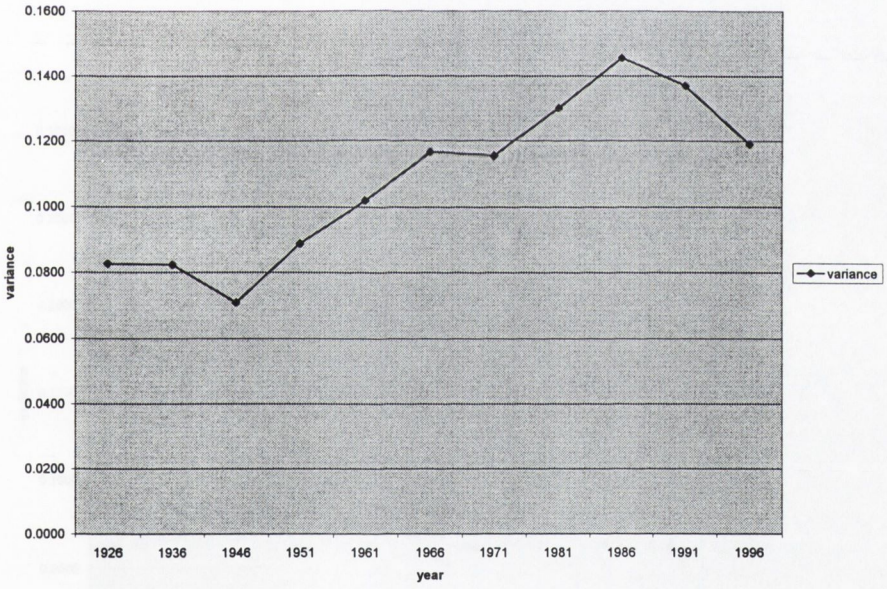


**Figure F.2.4d Variance of service employment; Midlands region**

## F.2.5 Donegal/North West Region

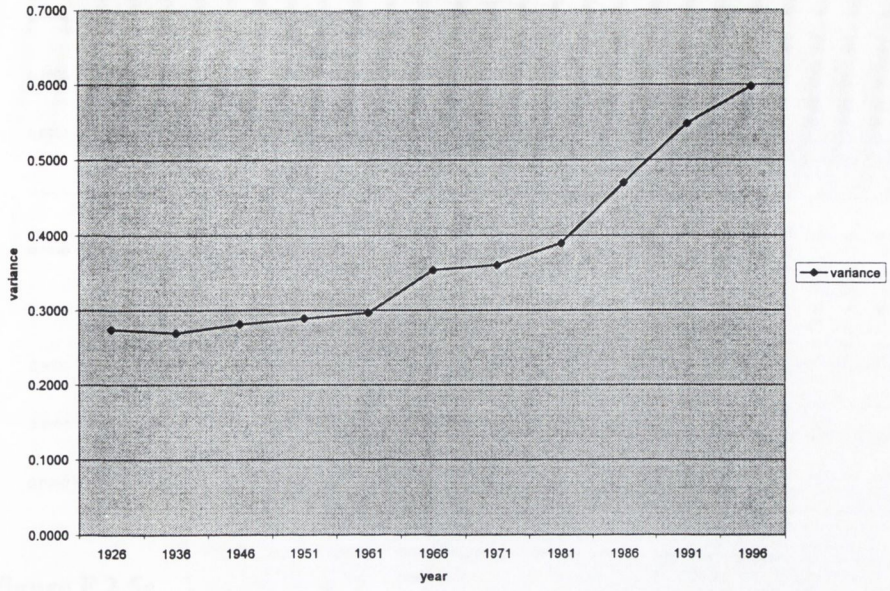


**Figure F.2.5a Variance of total employment; Donegal/North West region**

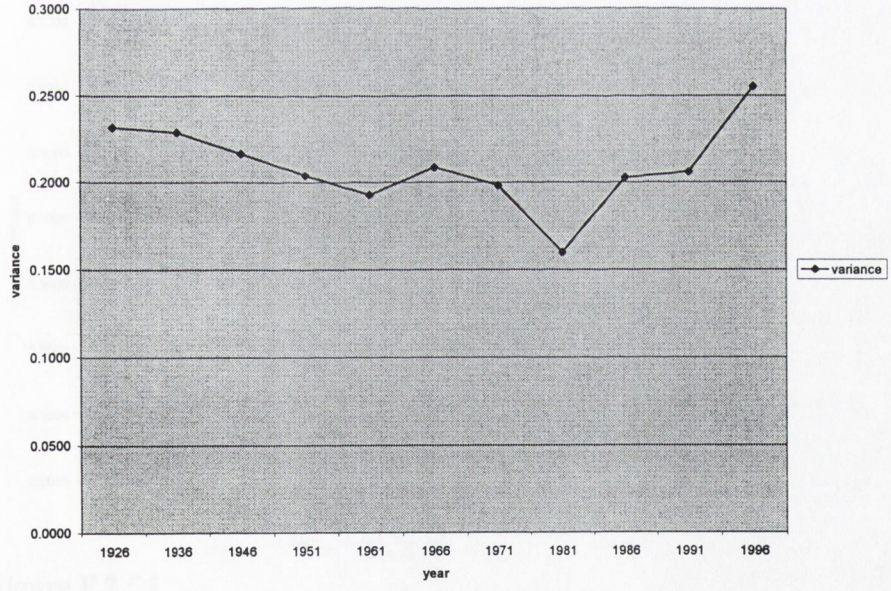


**Figure F.2.5b Variance of agricultural employment Donegal/North West region**

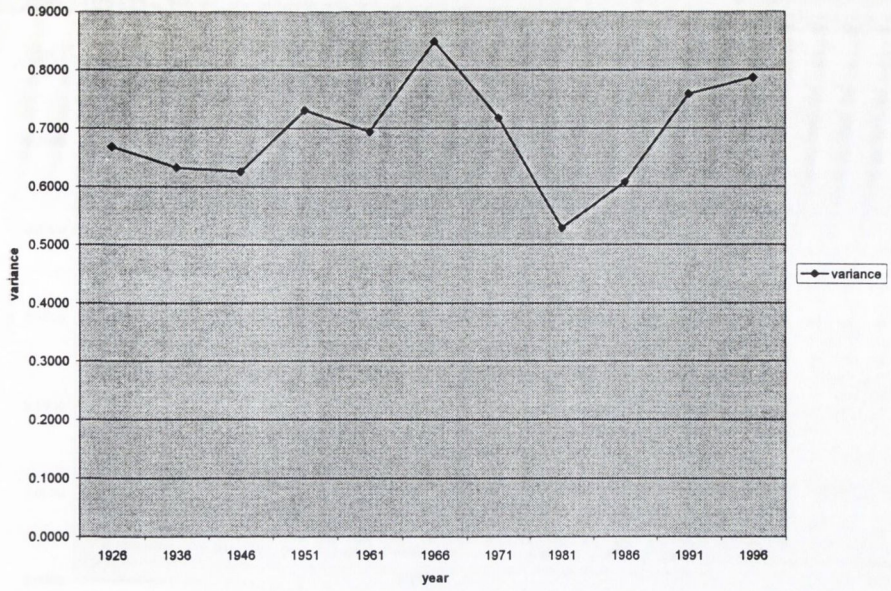


**Figure F.2.5c Variance of industrial employment; Donegal/North West region**

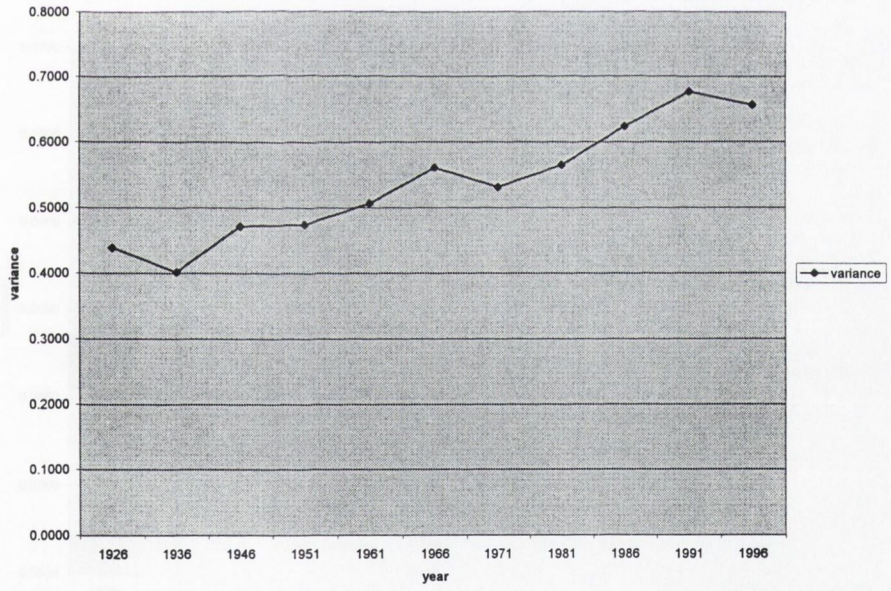


**Figure F.2.5d Variance of service employment; Donegal/North West region**

## F.2.6 Mid-West Region

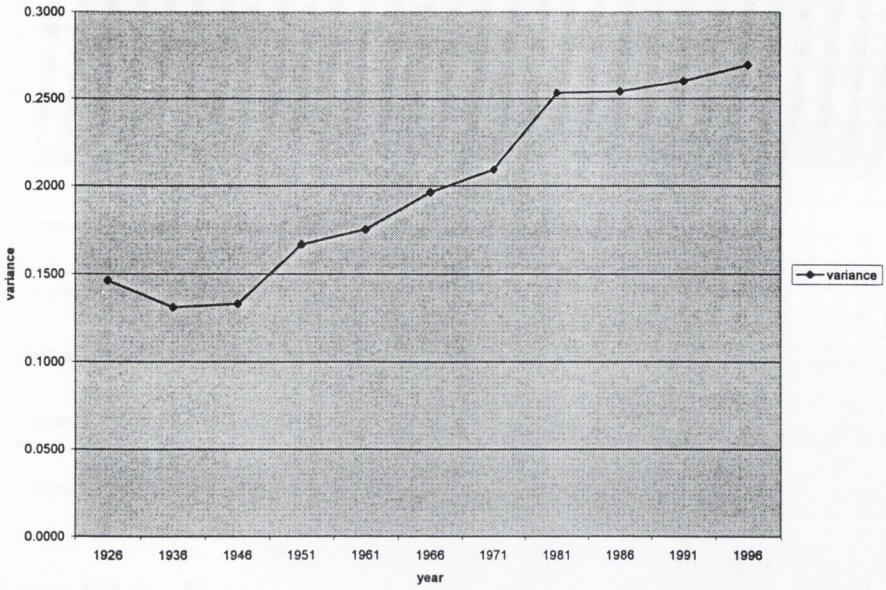


**Figure F.2.6a Variance of total employment; Mid-West region**

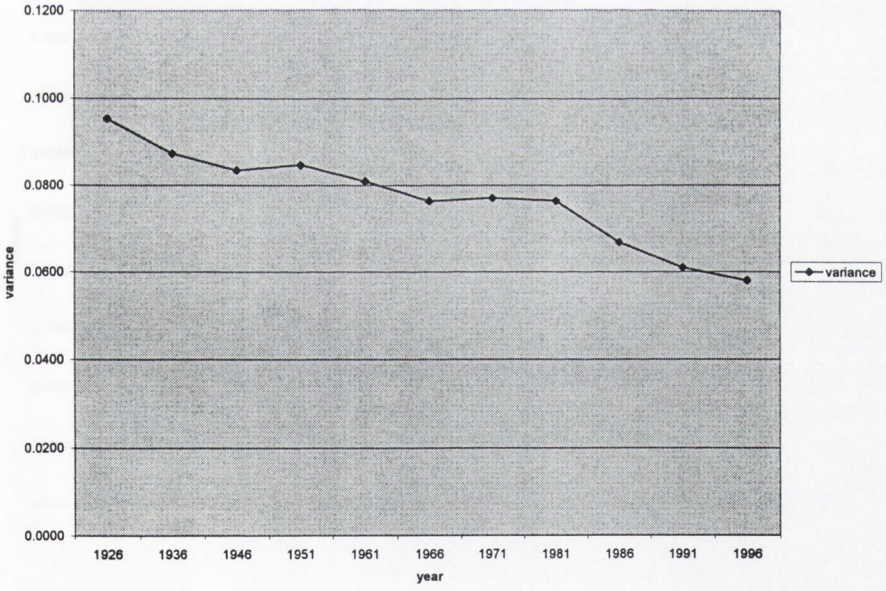


**Figure F.2.6b Variance of agricultural employment; Mid-West region**

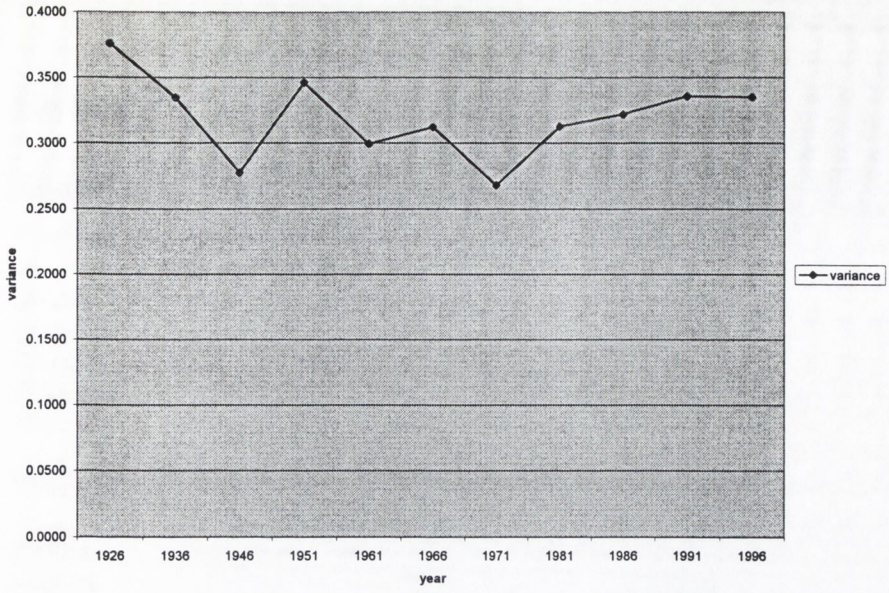


**Figure F.2.6c Variance of industrial employment; Mid-West region**

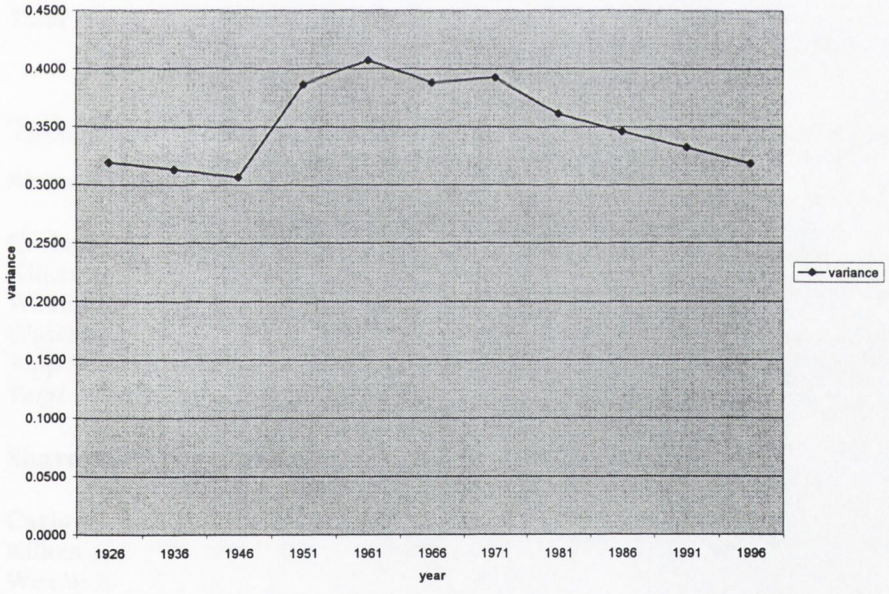


**Figure F.2.6d Variance of service employment; Mid-West region**

## Section F.3

### Table F.3.1a Sectoral employment; East region

**Share of agricultural employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dublin | 4.2 | 3.8 | 4.6 | 2.7 | 2.1 | 1.8 | 1.5 | 1.0 | 0.9 | 1.2 | 0.7 |
| Kildare | 44.6 | 43.3 | 49.8 | 34.6 | 29.7 | 25.2 | 21.7 | 12.7 | 11.8 | 10.5 | 7.1 |
| Meath | 60.8 | 57.2 | 61.2 | 53.8 | 49.1 | 41.7 | 34.6 | 22.2 | 19.2 | 17.3 | 12.7 |
| Wicklow | 48.5 | 41.9 | 41.5 | 35.5 | 31.2 | 27.7 | 22.3 | 13.5 | 12.8 | 11.9 | 8.5 |
| *Total* | 17.1 | 14.4 | 16.5 | 11.0 | 9.2 | 7.6 | 6.2 | 4.1 | 3.9 | 3.9 | 2.7 |

**Share of industrial employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dublin | 28.5 | 32.7 | 33.2 | 38.9 | 39.3 | 39.8 | 38.8 | 31.5 | 26.7 | 24.7 | 21.9 |
| Kildare | 9.4 | 12.0 | 13.3 | 26.9 | 32.3 | 35.7 | 37.0 | 36.8 | 30.2 | 28.7 | 29.3 |
| Meath | 10.5 | 14.7 | 13.2 | 20.0 | 21.5 | 27.1 | 32.4 | 36.2 | 32.9 | 29.3 | 31.5 |
| Wicklow | 12.0 | 15.6 | 18.3 | 24.0 | 27.1 | 29.5 | 35.2 | 37.0 | 31.3 | 28.0 | 26.6 |
| *Total* | 23.6 | 28.2 | 28.5 | 35.6 | 36.8 | 38.1 | 38.1 | 32.6 | 27.7 | 25.6 | 23.6 |

**Share of service employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dublin | 67.3 | 63.5 | 62.2 | 58.4 | 58.6 | 58.3 | 59.7 | 67.5 | 72.4 | 74.1 | 77.5 |
| Kildare | 46.0 | 44.7 | 36.9 | 38.6 | 38.0 | 39.0 | 41.3 | 50.5 | 58.0 | 60.8 | 63.6 |
| Meath | 28.8 | 28.2 | 25.6 | 26.2 | 29.5 | 31.1 | 32.9 | 41.5 | 48.0 | 53.4 | 55.7 |
| Wicklow | 39.5 | 42.5 | 40.2 | 40.5 | 41.8 | 42.8 | 42.4 | 49.5 | 56.0 | 60.1 | 64.9 |
| *Total* | 59.3 | 57.4 | 55.0 | 53.4 | 54.0 | 54.3 | 55.7 | 63.4 | 68.4 | 70.6 | 73.7 |

### Table F.3.1b Sectoral employment; South East region

**Share of agricultural employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Carlow | 54.0 | 53.1 | 54.5 | 47.9 | 42.8 | 38.6 | 33.7 | 21.3 | 20.7 | 18.9 | 15.0 |
| Kilkenny | 59.9 | 58.1 | 57.9 | 52.6 | 48.1 | 43.8 | 38.0 | 25.8 | 24.0 | 22.5 | 17.5 |
| Wexford | 58.9 | 56.5 | 56.2 | 51.7 | 48.7 | 43.5 | 37.1 | 27.0 | 24.8 | 22.9 | 17.7 |
| Waterford | 43.5 | 41.1 | 41.8 | 35.0 | 30.7 | 26.7 | 22.1 | 16.2 | 15.2 | 14.0 | 11.1 |
| Tipp S | 54.7 | 54.7 | 54.9 | 49.6 | 45.8 | 42.2 | 38.0 | 27.5 | 27.1 | 25.8 | 19.5 |
| *Total* | 54.5 | 52.9 | 53.1 | 47.4 | 43.2 | 38.9 | 33.4 | 23.6 | 22.3 | 20.8 | 16.1 |

**Share of industrial employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Carlow | 14.1 | 15.7 | 15.0 | 20.4 | 22.9 | 24.6 | 28.2 | 38.2 | 34.8 | 33.6 | 32.6 |
| Kilkenny | 11.6 | 14.3 | 15.4 | 20.1 | 21.5 | 23.8 | 27.3 | 34.3 | 29.8 | 27.6 | 27.2 |
| Wexford | 11.5 | 13.1 | 13.8 | 17.6 | 15.6 | 19.7 | 23.7 | 29.5 | 27.0 | 27.1 | 28.3 |
| Waterford | 14.8 | 17.3 | 19.6 | 25.7 | 27.8 | 31.7 | 36.4 | 39.9 | 37.0 | 37.1 | 35.4 |
| Tipp S | 12.7 | 14.7 | 14.4 | 20.1 | 20.7 | 22.9 | 24.3 | 31.9 | 28.4 | 26.2 | 30.7 |
| *Total* | 12.7 | 14.8 | 15.6 | 20.7 | 21.4 | 24.5 | 28.1 | 34.4 | 31.1 | 30.1 | 30.7 |

**Share of service employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Carlow | 31.9 | 31.2 | 30.5 | 31.7 | 34.3 | 36.8 | 38.0 | 40.4 | 44.5 | 47.5 | 52.4 |
| Kilkenny | 28.5 | 27.6 | 26.6 | 27.3 | 30.5 | 32.4 | 34.7 | 39.9 | 46.1 | 49.9 | 55.3 |
| Wexford | 29.7 | 30.4 | 30.0 | 30.7 | 35.8 | 36.8 | 39.2 | 43.5 | 48.2 | 49.9 | 54.0 |
| Waterford | 41.8 | 41.6 | 38.6 | 39.4 | 41.6 | 41.5 | 41.6 | 43.9 | 47.8 | 49.0 | 53.5 |
| Tipp S | 32.5 | 30.6 | 30.7 | 30.3 | 33.5 | 34.9 | 37.7 | 40.6 | 44.6 | 48.0 | 49.9 |
| *Total* | 32.8 | 32.3 | 31.3 | 31.9 | 35.4 | 36.6 | 38.5 | 42.0 | 46.6 | 49.1 | 53.2 |

**Table F.3.1c Sectoral employment; North East region**

**Share of agricultural employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cavan | 76.1 | 74.0 | 71.7 | 66.8 | 63.4 | 58.8 | 51.8 | 38.1 | 35.3 | 32.2 | 25.6 |
| Louth | 38.7 | 33.8 | 31.8 | 23.8 | 19.5 | 17.0 | 12.6 | 8.6 | 8.2 | 7.7 | 6.1 |
| Monaghan | 71.3 | 67.6 | 65.4 | 59.3 | 55.8 | 50.7 | 42.6 | 30.9 | 27.0 | 26.3 | 22.3 |
| *Total* | 64.4 | 59.9 | 57.5 | 49.8 | 44.5 | 39.6 | 32.8 | 23.1 | 21.0 | 19.7 | 15.7 |

**Share of industrial employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cavan | 5.4 | 6.8 | 9.3 | 12.6 | 12.1 | 15.1 | 19.8 | 27.8 | 28.1 | 26.0 | 28.4 |
| Louth | 19.2 | 29.9 | 34.2 | 39.3 | 40.9 | 44.1 | 48.0 | 43.8 | 37.6 | 34.8 | 37.1 |
| Monaghan | 7.2 | 9.8 | 12.2 | 16.2 | 15.4 | 19.9 | 25.8 | 29.8 | 31.7 | 29.9 | 30.7 |
| *Total* | 9.7 | 14.6 | 17.8 | 22.9 | 24.0 | 28.2 | 33.3 | 35.5 | 33.3 | 31.0 | 33.0 |

**Share of service employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cavan | 18.5 | 19.3 | 19.0 | 20.6 | 24.5 | 26.1 | 28.4 | 34.1 | 36.5 | 41.9 | 46.0 |
| Louth | 42.0 | 36.4 | 34.1 | 36.8 | 39.7 | 38.9 | 39.4 | 47.5 | 54.1 | 57.5 | 56.9 |
| Monaghan | 21.6 | 22.6 | 22.4 | 24.6 | 28.8 | 29.4 | 31.6 | 39.2 | 41.4 | 43.9 | 47.0 |
| *Total* | 25.8 | 25.4 | 24.7 | 27.3 | 31.5 | 32.2 | 33.9 | 41.4 | 45.7 | 49.4 | 51.3 |

**Table F.3.1d Sectoral employment; Midlands region**

**Share of agricultural employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Laoghais | 64.7 | 62.3 | 61.8 | 54.0 | 50.4 | 46.5 | 41.9 | 28.7 | 27.0 | 25.2 | 19.5 |
| Longofrd | 74.1 | 72.2 | 68.2 | 62.4 | 57.9 | 53.7 | 48.8 | 32.8 | 29.9 | 27.6 | 21.5 |
| Offaly | 56.4 | 59.9 | 62.3 | 49.2 | 39.6 | 36.0 | 34.3 | 23.8 | 23.0 | 20.8 | 16.3 |
| Westmeath | 58.2 | 56.9 | 56.2 | 47.2 | 42.1 | 36.6 | 32.5 | 20.5 | 18.5 | 16.8 | 12.8 |
| Roscommon | 80.6 | 77.7 | 75.6 | 70.9 | 68.1 | 63.8 | 59.4 | 40.3 | 36.3 | 32.2 | 24.4 |
| *Total* | 67.9 | 66.9 | 65.6 | 57.4 | 51.7 | 47.3 | 43.2 | 28.8 | 26.5 | 23.9 | 18.3 |

**Share of industrial employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Laoghais | 10.2 | 12.6 | 14.5 | 21.7 | 22.5 | 23.7 | 24.8 | 32.4 | 27.8 | 24.1 | 26.4 |
| Longofrd | 6.3 | 7.5 | 9.4 | 15.2 | 16.2 | 19.1 | 19.8 | 30.6 | 31.4 | 28.0 | 28.9 |
| Offaly | 21.5 | 14.5 | 15.3 | 26.3 | 36.9 | 38.2 | 35.8 | 42.3 | 38.4 | 35.6 | 37.4 |
| Westmeath | 9.8 | 12.1 | 11.0 | 19.7 | 19.9 | 22.5 | 21.9 | 27.9 | 26.9 | 26.6 | 29.4 |
| Roscommon | 4.5 | 6.6 | 7.2 | 10.5 | 11.0 | 13.3 | 14.3 | 23.9 | 23.5 | 21.9 | 25.9 |
| *Total* | 10.1 | 10.3 | 11.2 | 18.3 | 21.5 | 23.6 | 23.4 | 31.4 | 29.4 | 27.2 | 29.8 |

**Share of service employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Laoghais | 25.1 | 25.1 | 23.7 | 24.3 | 27.0 | 29.8 | 33.4 | 38.9 | 45.2 | 50.7 | 54.1 |
| Longofrd | 19.6 | 20.3 | 22.4 | 22.4 | 25.9 | 27.2 | 31.3 | 36.6 | 38.7 | 44.4 | 49.5 |
| Offaly | 22.1 | 25.6 | 22.4 | 24.4 | 23.6 | 25.8 | 29.9 | 33.9 | 38.6 | 43.6 | 46.3 |
| Westmeath | 31.9 | 30.9 | 32.8 | 33.1 | 38.1 | 40.8 | 45.5 | 51.6 | 54.7 | 56.6 | 57.8 |
| Roscommon | 15.0 | 15.7 | 17.2 | 18.6 | 20.9 | 22.9 | 26.3 | 35.9 | 40.1 | 46.0 | 49.7 |
| *Total* | 22.0 | 22.8 | 23.2 | 24.3 | 26.8 | 29.2 | 33.3 | 39.9 | 44.2 | 48.9 | 51.8 |

**Table F.3.1e Sectoral employment; Donegal/North West region**

**Share of agricultural employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Donegal | 72.5 | 70.4 | 66.3 | 59.6 | 54.6 | 49.5 | 42.4 | 25.8 | 21.6 | 17.7 | 13.6 |
| Leitrim | 81.7 | 79.8 | 77.7 | 74.5 | 70.5 | 67.6 | 59.4 | 40.6 | 34.7 | 31.7 | 23.4 |
| Sligo | 72.0 | 69.4 | 68.2 | 60.3 | 55.0 | 51.9 | 44.5 | 27.7 | 23.8 | 19.8 | 14.5 |
| *Total* | 74.2 | 72.1 | 69.1 | 62.7 | 57.7 | 53.2 | 45.8 | 28.7 | 24.1 | 20.2 | 15.1 |

**Share of industrial employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Donegal | 8.2 | 10.2 | 12.2 | 17.0 | 17.1 | 20.5 | 24.2 | 30.5 | 32.0 | 32.0 | 34.6 |
| Leitrim | 4.4 | 5.7 | 7.2 | 8.7 | 9.5 | 10.5 | 14.7 | 24.8 | 26.6 | 24.7 | 27.5 |
| Sligo | 6.7 | 8.2 | 9.0 | 13.9 | 15.6 | 16.5 | 19.8 | 26.4 | 24.5 | 24.0 | 26.4 |
| *Total* | 7.1 | 8.8 | 10.4 | 14.6 | 15.3 | 17.7 | 21.4 | 28.3 | 29.0 | 28.7 | 31.3 |

**Share of service employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Donegal | 19.3 | 19.3 | 21.5 | 23.4 | 28.3 | 30.1 | 33.5 | 43.7 | 46.4 | 50.2 | 51.7 |
| Leitrim | 13.9 | 14.5 | 15.1 | 16.7 | 20.0 | 21.9 | 25.9 | 34.6 | 38.7 | 43.6 | 49.1 |
| Sligo | 21.3 | 22.4 | 22.8 | 25.8 | 29.3 | 31.6 | 35.6 | 45.9 | 51.7 | 56.2 | 59.1 |
| *Total* | 18.7 | 19.1 | 20.5 | 22.7 | 27.0 | 29.1 | 32.8 | 43.0 | 46.9 | 51.1 | 53.6 |

## Table F.3.1f Sectoral employment; Mid-West region

**Share of agricultural employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Limerick | 47.8 | 47.6 | 47.4 | 40.2 | 37.0 | 30.7 | 26.4 | 17.0 | 16.0 | 14.8 | 11.2 |
| Tipp N | 62.4 | 60.3 | 60.0 | 55.1 | 51.5 | 45.5 | 39.7 | 28.2 | 27.5 | 25.5 | 19.7 |
| Clare | 69.2 | 71.0 | 68.4 | 64.7 | 60.6 | 52.3 | 45.0 | 29.7 | 25.8 | 21.8 | 16.1 |
| *Total* | 58.1 | 57.9 | 57.0 | 50.8 | 47.1 | 40.0 | 34.5 | 22.8 | 21.1 | 18.9 | 14.3 |

**Share of industrial employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Limerick | 16.1 | 17.2 | 18.2 | 23.2 | 21.7 | 27.8 | 29.4 | 35.0 | 32.1 | 30.0 | 32.0 |
| Tipp N | 10.1 | 13.7 | 14.0 | 18.8 | 19.8 | 23.3 | 26.8 | 31.6 | 28.2 | 26.1 | 28.4 |
| Clare | 11.5 | 8.6 | 11.6 | 13.3 | 13.6 | 20.6 | 24.6 | 31.1 | 31.4 | 28.9 | 30.9 |
| *Total* | 13.3 | 13.7 | 15.1 | 19.3 | 18.9 | 24.8 | 27.5 | 33.3 | 31.1 | 28.9 | 31.0 |

**Share of service employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Limerick | 36.1 | 35.2 | 34.4 | 36.6 | 41.3 | 41.5 | 44.3 | 48.0 | 51.9 | 55.2 | 56.7 |
| Tipp N | 27.5 | 26.0 | 25.9 | 26.0 | 28.7 | 31.3 | 33.5 | 40.2 | 44.3 | 48.4 | 51.9 |
| Clare | 19.3 | 20.4 | 20.0 | 21.9 | 25.7 | 27.1 | 30.4 | 39.1 | 42.9 | 49.3 | 53.0 |
| *Total* | 28.7 | 28.4 | 27.9 | 29.9 | 34.0 | 35.2 | 38.1 | 43.9 | 47.7 | 52.2 | 54.7 |

## Table F.3.1g Sectoral employment; West region

**Share of agricultural employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Galway | 75.8 | 71.3 | 69.3 | 64.3 | 60.2 | 54.9 | 48.2 | 29.6 | 26.4 | 21.5 | 15.4 |
| Mayo | 80.9 | 77.4 | 76.6 | 72.7 | 67.2 | 62.1 | 56.3 | 37.3 | 33.0 | 30.8 | 21.8 |
| *Total* | 78.3 | 74.3 | 72.8 | 68.3 | 63.3 | 58.0 | 51.6 | 32.6 | 28.9 | 24.9 | 17.6 |

**Share of industrial employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Galway | 6.1 | 8.6 | 8.6 | 12.6 | 12.4 | 15.0 | 17.8 | 25.4 | 24.8 | 24.7 | 25.4 |
| Mayo | 4.1 | 6.2 | 6.7 | 8.8 | 10.2 | 13.0 | 15.1 | 25.6 | 24.6 | 24.0 | 27.0 |
| *Total* | 5.1 | 7.4 | 7.7 | 10.8 | 11.4 | 14.1 | 16.7 | 25.5 | 24.7 | 24.4 | 26.0 |

**Share of service employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Galway | 18.2 | 20.2 | 22.0 | 23.2 | 27.4 | 30.2 | 34.0 | 44.9 | 48.8 | 53.8 | 59.2 |
| Mayo | 15.0 | 16.4 | 16.6 | 18.5 | 22.6 | 24.9 | 28.6 | 37.1 | 42.4 | 45.2 | 51.2 |
| *Total* | 16.6 | 18.3 | 19.5 | 21.0 | 25.2 | 27.8 | 31.7 | 41.9 | 46.4 | 50.7 | 56.4 |

**Table F.3.1h Sectoral employment; South West region**

**Share of agricultural employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cork | 46.7 | 44.3 | 44.2 | 37.8 | 33.1 | 29.0 | 24.5 | 17.1 | 16.8 | 15.4 | 11.8 |
| Kerry | 68.1 | 66.2 | 64.5 | 60.9 | 56.0 | 51.5 | 44.6 | 30.5 | 28.2 | 24.8 | 18.8 |
| *Total* | 52.9 | 50.5 | 50.0 | 43.9 | 38.8 | 34.4 | 29.2 | 20.1 | 19.3 | 17.5 | 13.4 |

**Share of industrial employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cork | 15.1 | 18.3 | 19.7 | 25.2 | 27.9 | 31.1 | 33.1 | 34.0 | 29.8 | 29.4 | 28.8 |
| Kerry | 8.0 | 9.6 | 11.0 | 14.1 | 14.3 | 16.5 | 20.7 | 29.0 | 26.1 | 25.6 | 23.5 |
| *Total* | 13.0 | 15.9 | 17.2 | 22.3 | 24.5 | 27.6 | 30.2 | 32.9 | 29.0 | 28.6 | 27.6 |

**Share of service employment**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cork | 38.2 | 37.4 | 36.1 | 37.0 | 39.0 | 39.9 | 42.3 | 48.9 | 53.5 | 55.2 | 59.4 |
| Kerry | 24.0 | 24.2 | 24.5 | 25.0 | 29.7 | 32.1 | 34.8 | 40.4 | 45.7 | 49.6 | 57.8 |
| *Total* | 34.1 | 33.6 | 32.8 | 33.8 | 36.7 | 38.0 | 40.6 | 47.0 | 51.7 | 54.0 | 59.0 |

## Section F.4

**Table F.4a The productivity-enhanced employment rate; East region**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dublin | 36.6 | 38.0 | 34.8 | 40.6 | 37.8 | 37.3 | 36.4 | 35.5 | 32.9 | 34.5 | 38.5 |
| Kildare | 22.5 | 23.4 | 21.2 | 26.5 | 26.6 | 28.9 | 27.7 | 29.1 | 27.5 | 29.7 | 35.3 |
| Meath | 16.1 | 18.4 | 16.6 | 19.3 | 19.1 | 21.9 | 23.5 | 25.0 | 24.1 | 26.4 | 32.3 |
| Wicklow | 20.0 | 22.8 | 22.4 | 25.0 | 25.5 | 26.7 | 26.9 | 27.3 | 25.6 | 27.5 | 32.5 |
| Region total | 32.1 | 34.1 | 31.4 | 36.8 | 34.9 | 35.1 | 34.3 | 33.7 | 31.2 | 33.0 | 37.2 |

**Table F.4b The productivity enhanced employment rate; South East region**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Carlow | 19.0 | 18.8 | 17.8 | 20.3 | 20.2 | 21.4 | 21.5 | 24.7 | 23.1 | 24.7 | 27.8 |
| Kilkenny | 17.0 | 17.8 | 17.6 | 19.7 | 19.5 | 21.0 | 21.6 | 24.4 | 23.7 | 25.2 | 29.4 |
| Wexford | 17.3 | 17.6 | 17.0 | 18.7 | 18.3 | 19.9 | 20.6 | 21.8 | 21.2 | 23.4 | 27.9 |
| Waterford | 22.6 | 23.1 | 21.3 | 25.6 | 25.6 | 27.0 | 27.6 | 27.1 | 25.7 | 27.3 | 31.0 |
| Tipperary S | 18.8 | 18.8 | 18.0 | 19.9 | 19.5 | 20.6 | 21.0 | 22.4 | 21.3 | 22.9 | 27.7 |
| Region total | 18.9 | 19.2 | 18.4 | 20.8 | 20.6 | 22.1 | 22.6 | 24.0 | 23.0 | 24.7 | 28.9 |

**Table F.4c The productivity-enhanced employment rate; North East region**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cavan | 10.7 | 11.7 | 12.8 | 14.9 | 14.6 | 16.1 | 18.1 | 21.1 | 20.3 | 22.2 | 26.1 |
| Louth | 23.6 | 27.4 | 26.1 | 31.5 | 30.7 | 31.7 | 31.6 | 29.2 | 26.5 | 27.6 | 32.1 |
| Monaghan | 12.4 | 14.5 | 15.4 | 18.1 | 17.6 | 19.4 | 22.0 | 22.6 | 22.2 | 23.7 | 27.5 |
| Region total | 15.1 | 17.6 | 18.1 | 21.8 | 21.8 | 23.4 | 25.0 | 25.2 | 23.7 | 25.1 | 29.3 |

**Table F.4d The productivity-enhanced employment rate; Midlands region**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Laoghis | 14.4 | 15.9 | 16.4 | 19.3 | 19.3 | 20.0 | 19.8 | 22.7 | 21.4 | 23.1 | 27.6 |
| Longford | 11.1 | 11.6 | 14.0 | 15.6 | 16.0 | 17.5 | 18.0 | 21.8 | 21.0 | 22.0 | 26.4 |
| Offaly | 20.5 | 17.4 | 17.1 | 21.8 | 25.2 | 25.3 | 22.6 | 24.2 | 22.1 | 24.1 | 28.3 |
| Westmeath | 17.2 | 17.5 | 18.2 | 21.3 | 21.3 | 22.7 | 22.5 | 25.6 | 24.9 | 26.8 | 30.8 |
| Roscommon | 8.6 | 10.4 | 11.2 | 12.9 | 13.0 | 14.6 | 14.9 | 20.4 | 20.6 | 22.9 | 27.0 |
| Region total | 13.9 | 14.3 | 15.2 | 18.1 | 19.0 | 20.2 | 19.7 | 23.1 | 22.2 | 24.0 | 28.3 |

**Table F.4e The productivity-enhanced employment rate; Donegal/North West region**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Donegal | 12.2 | 13.2 | 14.1 | 16.5 | 16.4 | 18.5 | 19.0 | 19.3 | 19.8 | 22.6 | 26.6 |
| Leitrim | 8.1 | 9.5 | 10.3 | 11.7 | 12.3 | 13.0 | 15.5 | 20.1 | 20.1 | 21.6 | 26.1 |
| Sligo | 12.1 | 13.2 | 13.5 | 16.7 | 17.2 | 18.0 | 19.8 | 24.2 | 23.9 | 26.3 | 31.0 |
| Region total | 11.3 | 12.5 | 13.3 | 15.7 | 15.9 | 17.5 | 18.7 | 20.7 | 20.9 | 23.4 | 27.7 |

**Table F.4f The productivity-enhanced employment rate; Mid-West region**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Clare | 13.4 | 12.2 | 13.5 | 14.7 | 15.0 | 18.2 | 19.6 | 23.1 | 24.0 | 26.4 | 30.9 |
| Limerick | 20.7 | 20.0 | 19.1 | 22.8 | 22.0 | 24.5 | 24.7 | 26.8 | 25.4 | 27.0 | 31.5 |
| Tipperary N | 16.4 | 17.4 | 17.2 | 18.8 | 18.3 | 20.4 | 21.2 | 23.4 | 22.1 | 23.9 | 28.8 |
| Region total | 17.5 | 17.0 | 17.0 | 19.6 | 19.2 | 21.9 | 22.6 | 25.1 | 24.4 | 26.3 | 30.8 |

**Table F.4g The productivity-enhanced employment rate; West region**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Galway | 10.6 | 12.7 | 13.1 | 14.9 | 15.3 | 17.2 | 18.2 | 22.5 | 22.8 | 25.6 | 30.3 |
| Mayo | 8.2 | 10.0 | 9.9 | 11.5 | 12.6 | 14.5 | 15.3 | 19.4 | 19.4 | 21.0 | 25.7 |
| Region total | 9.4 | 11.4 | 11.6 | 13.3 | 14.1 | 16.0 | 17.0 | 21.3 | 21.5 | 23.9 | 28.6 |

**Table F.4h The productivity-enhanced employment rate; South West region**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cork | 21.0 | 22.5 | 21.7 | 25.3 | 25.0 | 26.2 | 26.4 | 27.1 | 25.1 | 27.4 | 31.1 |
| Kerry | 12.6 | 13.7 | 14.1 | 15.3 | 15.4 | 16.8 | 18.5 | 21.3 | 20.5 | 23.4 | 27.7 |
| Region total | 18.6 | 20.0 | 19.5 | 22.6 | 22.5 | 23.8 | 24.5 | 25.8 | 24.1 | 26.5 | 30.3 |

## Section F.5

**Table F.5a Natural log of the productivity-enhanced employment rate; 1926 to 1996.**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dublin | 3.6 | 3.6 | 3.5 | 3.7 | 3.6 | 3.6 | 3.6 | 3.6 | 3.5 | 3.5 | 3.6 |
| Kildare | 3.1 | 3.2 | 3.1 | 3.3 | 3.3 | 3.4 | 3.3 | 3.4 | 3.3 | 3.4 | 3.6 |
| Meath | 2.8 | 2.9 | 2.8 | 3.0 | 2.9 | 3.1 | 3.2 | 3.2 | 3.2 | 3.3 | 3.5 |
| Wicklow | 3.0 | 3.1 | 3.1 | 3.2 | 3.2 | 3.3 | 3.3 | 3.3 | 3.2 | 3.3 | 3.5 |
| Carlow | 2.9 | 2.9 | 2.9 | 3.0 | 3.0 | 3.1 | 3.1 | 3.2 | 3.1 | 3.2 | 3.3 |
| Kilkenny | 2.8 | 2.9 | 2.9 | 3.0 | 3.0 | 3.0 | 3.1 | 3.2 | 3.2 | 3.2 | 3.4 |
| Wexford | 2.9 | 2.9 | 2.8 | 2.9 | 2.9 | 3.0 | 3.0 | 3.1 | 3.1 | 3.2 | 3.3 |
| Waterford | 3.1 | 3.1 | 3.1 | 3.2 | 3.2 | 3.3 | 3.3 | 3.3 | 3.2 | 3.3 | 3.4 |
| Tipperary South | 2.9 | 2.9 | 2.9 | 3.0 | 3.0 | 3.0 | 3.0 | 3.1 | 3.1 | 3.1 | 3.3 |
| Cavan | 2.4 | 2.5 | 2.5 | 2.7 | 2.7 | 2.8 | 2.9 | 3.1 | 3.0 | 3.1 | 3.3 |
| Louth | 3.2 | 3.3 | 3.3 | 3.4 | 3.4 | 3.5 | 3.5 | 3.4 | 3.3 | 3.3 | 3.5 |
| Monaghan | 2.5 | 2.7 | 2.7 | 2.9 | 2.9 | 3.0 | 3.1 | 3.1 | 3.1 | 3.2 | 3.3 |
| Donegal | 2.5 | 2.6 | 2.6 | 2.8 | 2.8 | 2.9 | 2.9 | 3.0 | 3.0 | 3.1 | 3.3 |
| Leitrim | 2.1 | 2.2 | 2.3 | 2.5 | 2.5 | 2.6 | 2.7 | 3.0 | 3.0 | 3.1 | 3.3 |
| Sligo | 2.5 | 2.6 | 2.6 | 2.8 | 2.8 | 2.9 | 3.0 | 3.2 | 3.2 | 3.3 | 3.4 |
| Laoghis | 2.7 | 2.8 | 2.8 | 3.0 | 3.0 | 3.0 | 3.0 | 3.1 | 3.1 | 3.1 | 3.3 |
| Longford | 2.4 | 2.5 | 2.6 | 2.7 | 2.8 | 2.9 | 2.9 | 3.1 | 3.0 | 3.1 | 3.3 |
| Offaly | 3.0 | 2.9 | 2.8 | 3.1 | 3.2 | 3.2 | 3.1 | 3.2 | 3.1 | 3.2 | 3.3 |
| Westmeath | 2.8 | 2.9 | 2.9 | 3.1 | 3.1 | 3.1 | 3.1 | 3.2 | 3.2 | 3.3 | 3.4 |
| Roscommon | 2.2 | 2.3 | 2.4 | 2.6 | 2.6 | 2.7 | 2.7 | 3.0 | 3.0 | 3.1 | 3.3 |
| Limerick | 3.0 | 3.0 | 2.9 | 3.1 | 3.1 | 3.2 | 3.2 | 3.3 | 3.2 | 3.3 | 3.5 |
| Tipperary North | 2.8 | 2.9 | 2.8 | 2.9 | 2.9 | 3.0 | 3.1 | 3.2 | 3.1 | 3.2 | 3.4 |
| Clare | 2.6 | 2.5 | 2.6 | 2.7 | 2.7 | 2.9 | 3.0 | 3.1 | 3.2 | 3.3 | 3.4 |

**Table F.5b Natural log of employment; 1926 to 1996.**

| | 1926 | 1936 | 1946 | 1951 | 1961 | 1966 | 1971 | 1981 | 1986 | 1991 | 1996 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Dublin | 12.2 | 12.4 | 12.4 | 12.6 | 12.5 | 12.6 | 12.7 | 12.8 | 12.7 | 12.8 | 12.9 |
| Kildare | 10.1 | 10.1 | 10.2 | 10.2 | 10.1 | 10.2 | 10.1 | 10.5 | 10.5 | 10.6 | 10.8 |
| Meath | 10.2 | 10.2 | 10.3 | 10.2 | 10.1 | 10.1 | 10.2 | 10.3 | 10.3 | 10.4 | 10.6 |
| Wicklow | 10.0 | 10.0 | 10.1 | 10.1 | 10.0 | 10.0 | 10.0 | 10.2 | 10.2 | 10.3 | 10.5 |
| Carlow | 9.6 | 9.5 | 9.5 | 9.5 | 9.4 | 9.4 | 9.3 | 9.4 | 9.4 | 9.4 | 9.5 |
| Kilkenny | 10.3 | 10.3 | 10.2 | 10.2 | 10.0 | 10.0 | 10.0 | 10.1 | 10.0 | 10.1 | 10.2 |
| Wexford | 10.6 | 10.6 | 10.5 | 10.5 | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 10.3 | 10.5 |
| Waterford | 10.4 | 10.3 | 10.2 | 10.3 | 10.2 | 10.2 | 10.2 | 10.3 | 10.2 | 10.3 | 10.4 |
| Tipperary South | 10.4 | 10.4 | 10.3 | 10.3 | 10.1 | 10.1 | 10.1 | 10.1 | 10.0 | 10.0 | 10.2 |
| Laoghis | 10.0 | 10.0 | 10.0 | 9.9 | 9.8 | 9.7 | 9.6 | 9.7 | 9.7 | 9.7 | 9.8 |
| Longford | 9.8 | 9.7 | 9.7 | 9.6 | 9.4 | 9.3 | 9.2 | 9.2 | 9.2 | 9.1 | 9.2 |
| Offaly | 10.1 | 10.0 | 10.1 | 10.0 | 10.0 | 9.9 | 9.8 | 9.8 | 9.8 | 9.8 | 9.9 |
| Westmeath | 10.1 | 10.0 | 10.0 | 10.0 | 9.9 | 9.8 | 9.8 | 9.9 | 9.9 | 9.9 | 10.0 |
| Roscommon | 10.5 | 10.5 | 10.4 | 10.3 | 10.1 | 10.0 | 9.9 | 9.8 | 9.8 | 9.8 | 9.8 |
| Cavan | 10.5 | 10.5 | 10.4 | 10.3 | 10.0 | 10.0 | 9.9 | 9.8 | 9.7 | 9.8 | 9.8 |
| Louth | 10.1 | 10.2 | 10.1 | 10.3 | 10.2 | 10.2 | 10.2 | 10.3 | 10.2 | 10.2 | 10.4 |
| Monaghan | 10.2 | 10.2 | 10.1 | 10.1 | 9.8 | 9.8 | 9.8 | 9.7 | 9.7 | 9.7 | 9.8 |
| Donegal | 11.1 | 11.1 | 11.0 | 10.9 | 10.6 | 10.6 | 10.5 | 10.4 | 10.4 | 10.5 | 10.6 |
| Leitrim | 10.1 | 10.1 | 9.9 | 9.9 | 9.5 | 9.4 | 9.3 | 9.1 | 9.0 | 9.0 | 9.0 |
| Sligo | 10.3 | 10.3 | 10.2 | 10.1 | 9.9 | 9.9 | 9.8 | 9.8 | 9.8 | 9.8 | 9.9 |
| Clare | 3.0 | 3.0 | 2.9 | 3.1 | 3.1 | 3.2 | 3.2 | 3.3 | 3.2 | 3.3 | 3.5 |
| Limerick | 2.8 | 2.9 | 2.8 | 2.9 | 2.9 | 3.0 | 3.1 | 3.2 | 3.1 | 3.2 | 3.4 |
| Tipperary North | 2.6 | 2.5 | 2.6 | 2.7 | 2.7 | 2.9 | 3.0 | 3.1 | 3.2 | 3.3 | 3.4 |

## Section F.6

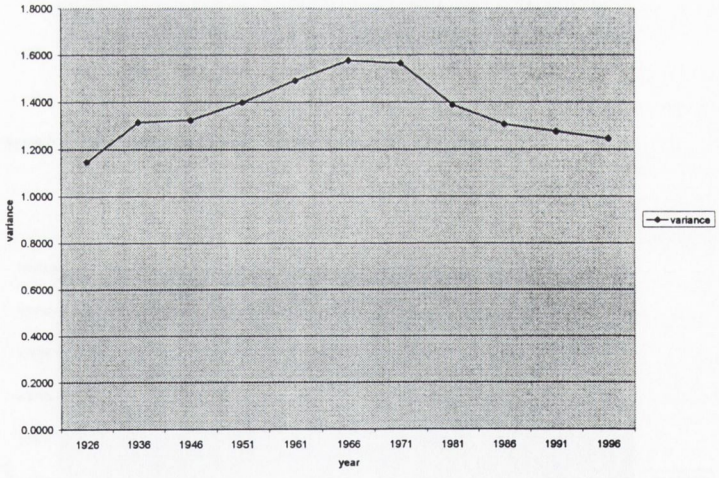


**Figure F.6a Variance of population; East region.**

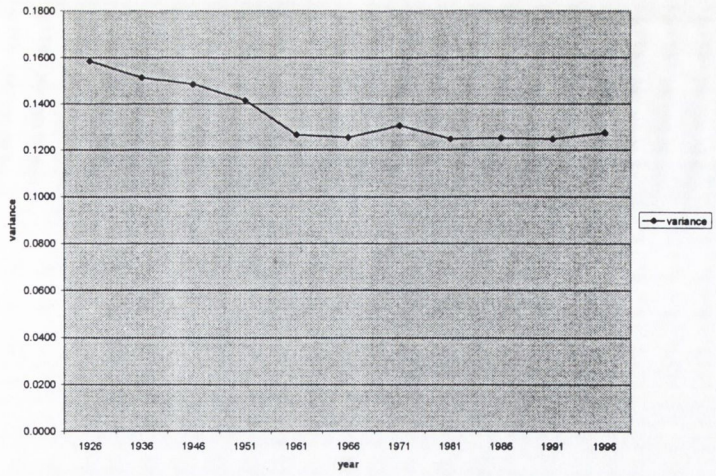


**Figure F.6b Variance of population; South East region.**

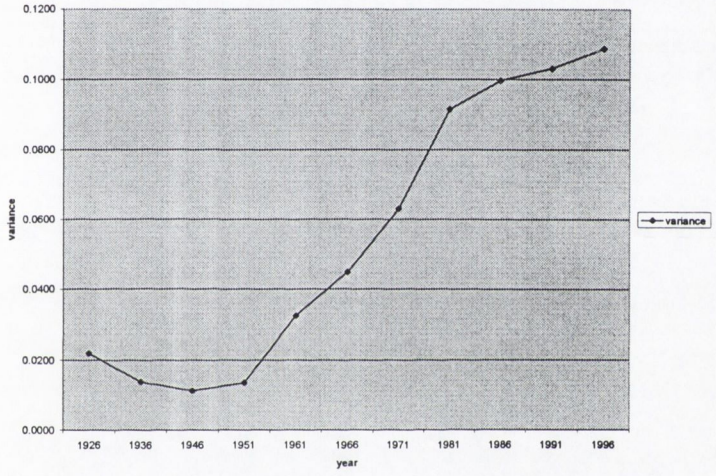


**Figure F.6c Variance of population; North East region.**

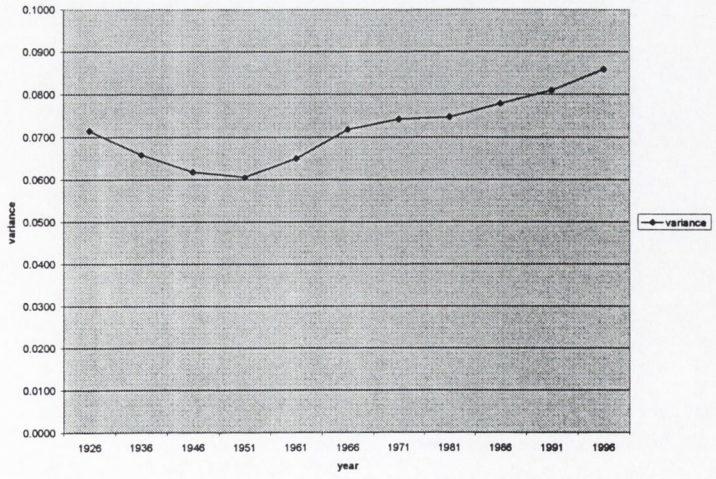


**Figure F.6d Variance of population; Midlands region.**

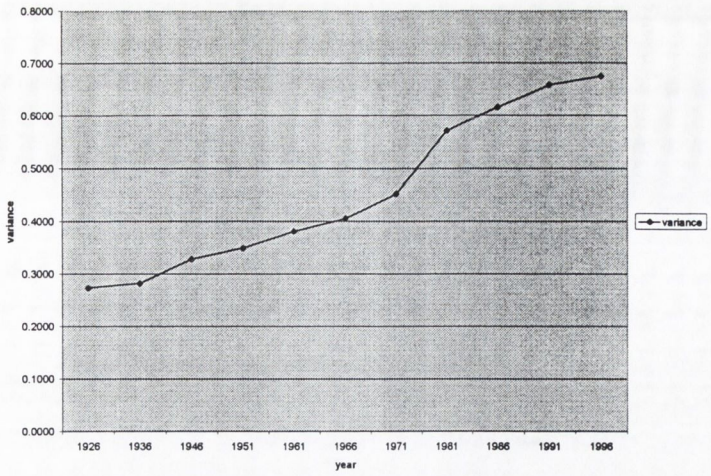


**Figure F.6e Variance of population; Donegal/North West region.**

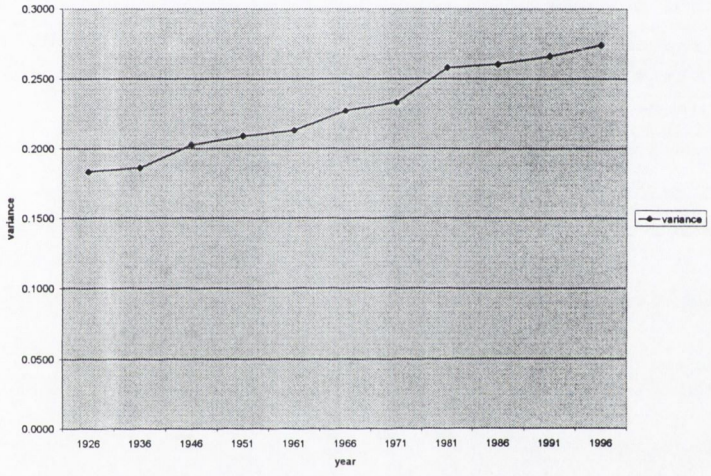


**Figure F.6f Variance of population; Mid-West region.**

# Appendix G

## SECTION G.1

**Table G.1a List of counties in each regional authority**

| Regional Authority | Constituent Counties | Type of area |
|---|---|---|
| Border | Cavan | Administrative county |
| | Donegal | Administrative county |
| | Louth | Administrative county |
| | Monaghan | Administrative county |
| | Sligo | Administrative county |
| Dublin | Dublin | County Borough |
| | Dun Laoghaire-Rathdown | Administrative county |
| | Fingal | Administrative county |
| | South Dublin | Administrative county |
| Mid-East | Kildare | Administrative county |
| | Meath | Administrative county |
| | Wicklow | Administrative county |
| Midlands | Laoghis | Administrative county |
| | Longford | Administrative county |
| | Offaly | Administrative county |
| | Westmeath | Administrative county |
| Mid-West | Clare | Administrative county |
| | Limerick | County Borough |
| | Limerick | Administrative county |
| | Tipperary North Riding | Administrative county |
| South East | Carlow | Administrative county |
| | Kilkenny | Administrative county |
| | Tipperary South Riding | Administrative county |
| | Waterford | County Borough |
| | Waterford | Administrative county |
| | Wexford | Administrative county |
| South West | Cork | County Borough |
| | Cork | Administrative county |
| | Kerry | Administrative county |
| West | Galway | County Borough |
| | Galway | Administrative county |
| | Mayo | Administrative county |
| | Roscommon | Administrative county |

## SECTION G.2

Challenges that face the two regions as given in the National Development Plan, 2000 to 2006.

**Southern and Eastern Region**

- Consolidate and build on the Region's recent economic performance, especially regarding employment and reductions in long term unemployment, thereby maintaining the Region's key role in national economic competitiveness;
- Address urban congestion and general bottlenecks to growth, particularly as regards economic and social infrastructure and human resources;
- Further develop counter-balances to Dublin, relieving pressure on the capital and its hinterland, and distributing growth more widely throughout the Region;
- Support the further development of agriculture, agri-business and the seafood sector;
- Promote social inclusion in deprived urban and rural areas; and
- Maintain a viable rural economy.

**Border, Midlands and Western Region**

- Increase the potential of the Region to act as a counterbalance to the Southern and Eastern Region, especially Dublin, and pursue more balanced growth within the region;
- Increase the presence in the Region of the key drivers of sustainable economic growth, notably in the productive sector;
- Improve the quality of the Region's economic and social infrastructure and human resources;
- Build on the Region's natural resource base especially in the areas of agriculture, tourism, the seafood sector and rural enterprise; and
- Promote rural and urban social inclusion.