A Shift and Share Analysis of Regional Employment · Change in Ireland, 1951-66

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IF regional policy in Ireland is to be developed so as to become more effective, or even if the goal is to evaluate existing strategies the logical first step is to consider the underlying causes of regional disparities in social and economic welfare. Obviously the symptoms of regional distress in Ireland—low incomes, high net emigration, high unemployment and underemployment—could all be alleviated by a faster rate of economic expansion in the regions; but this begs the question as to the cause of inadequate growth in the regions. There are a variety of reasons for this but regional analysts have focused attention in recent years upon two alternative hypotheses. A traditional view is that the regions have inherited an unfavourable economic structure and that there is no reason why other forms of economic activity should not be established in these areas to provide the necessary growth. Alternatively, it has been suggested that the problem areas, because of inherent disadvantages such as their distance from principal markets, do not provide a satisfactory environment for modern export orientated activities. It is also possible that an inadequate growth performance could be a consequence of both factors operating in the same region.

If the cause of the problem is principally structural, then a strategy of attracting capital into such areas by various incentives will not result in sacrifices of efficiency. If, on the other hand, the problem can be shown to be largely due to locational disadvantages the implications for regional and national growth are more serious.[1] This paper addresses itself to this topic by employing a method of analysis, the shift and share technique, which divides the growth of a regional variable, such as employment, into three categories:

1. The premises upon which a regional policy is compatible with maximising national growth in the long term have been outlined elsewhere. See Patrick N. O'Farrell, "Regional Development in Ireland: the Economic Case for a Regional Policy", Administration, Vol. 18, No. 4, 1971, pp. 342-362.

The regional share (or national growth) component (R): this may be regarded as the amount by which total employment in the region would have expanded during the study period if it grew at precisely the same rate as employment in the nation as a whole.

The proportionality shift (P): this may be regarded as the extra amount by which employment in the region has grown or declined as a consequence of the region specialising in nationally fast-growing or slow-growing and declining industries. This shift will be positive in the former case of a region with above-average proportions of employment in industries with rapid growth rates at national level and negative in the latter case of a region specialising in nationally static or declining industries.

The differential shift or regional component (D): this reflects the additional employment growth in the region resulting from employment in each industry in the region growing at a faster or slower rate than its national growth rate. A region in which employment expanded more rapidly than its industrial mix would suggest will feature a positive differential shift while the shift will be negative in the case of a region in which employment grew more slowly than its industrial mix would suggest. Hence, the shift and share technique enables employment change in the thirteen Irish regions defined in Figure 1 to be divided into a proportional component—measuring how much of a region's growth performance is attributable to its economic structure and a differential component measuring the extent to which economic sectors in the area have expanded faster or slower than expected when the influence of industrial structure and national change have been accounted for. The sum of P and D represents a net gain or loss to the region over and above the regional share: $S = P+D$, where $S = $ net total shift. The three components, therefore, $R+P+D$ are exhaustive of the actual regional growth of total employment.

In addition, on the basis of the results obtained, together with other criteria, the present division between the Designated Areas and the remainder of the country is questioned and a new regional structure proposed.

Methodology

The fundamental basis of the analytical methodology is the computation of geographical shifts in the economic activity based upon data describing the spatial distribution of an economic dimension for two different time periods. The various growth categories may be defined:

e_{ij} = employment in the ith industry in the jth region.

E_j = $\sum_i e_{ij}$, total employment in the jth region

E_i = $\sum_j e_{ij}$, total employment in the ith sector

and

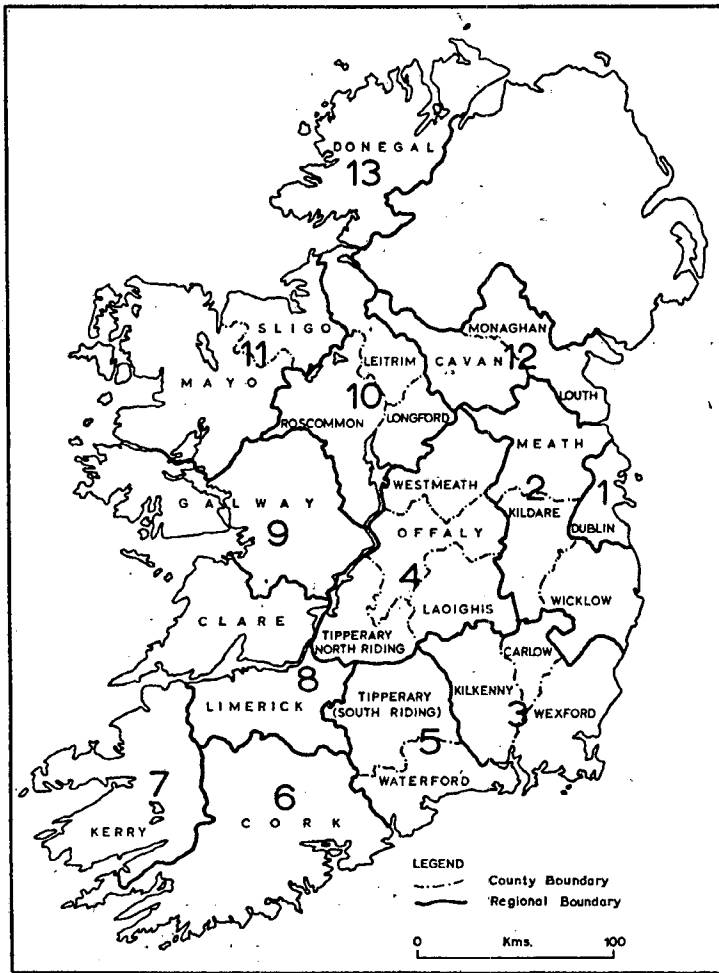G = $\sum_i \sum_j e_{ij}$, the total employment in the nation.

Fig 1: Regional Subdivisions for Shift and Share Analysis.

Then, letting the superscript o denote the initial observation and the superscript 1 the terminal observation:

Total growth in region $j = T_j = E_j^1 - E_j^0$

$$T_j = R + P + D$$

$$\text{Regional Share } (R) = E_j^0\left(\frac{G^1}{G^0}\right) - E_j^0$$

$$\text{Proportionality Shift } (P) = \sum_i e_{ij}^0\left(\frac{E_i^1}{E_i^0} - \frac{G^1}{G^0}\right)$$

$$\text{Differential Shift } (D) = \sum_i\left[e_{ij}^1 - e_{ij}^0\left(\frac{E_i^1}{E_i^0}\right)\right]$$

Stilwell[2] has suggested that another shift be calculated—the reversed proportionality shift. It is an alternative measure of the proportionality shift, but it uses end of the period weights rather than beginning of the period weights. The shift is defined below:

$$\text{Reversed Proportionality shift } (RP) = \sum_i e_{ij}^1\left[\frac{G^0}{G^1} - \frac{E^0}{E^1}\right]$$

According to Stilwell the difference between the P and RP shifts can be interpreted as "the shift in employment resulting from the region having modified its industrial mix during the period in question."[3] He calls this the proportionality modification shift which may be written

$$(PM) = \sum_i\left[e_{ij}^1\left(\frac{G^0}{G^1} - \frac{E^0}{E^1}\right) - e_{ij}^0\left(\frac{E_i^1}{E_i^0} - \frac{G^1}{G^0}\right)\right]$$

Ashby[4] welcomes the detection of regional changes in economic structure but contends that Stilwell's objective can be achieved through comparison of sets of shifts, each set having a consistent set of base weights. To this end Ashby calculated displacement vectors which he maintains facilitate comparison of analytical results under changing bases. Chalmers[5] has demonstrated in a study of northeast Thailand that neither the PM shift nor the displacement vector of the P shift measures what is claimed for it. The differential shift (D_{ij}) associated with the ith industry in the jth region indicates if the region is getting an increasing share of

2. F. J. B. Stilwell, "Regional Growth and Structural Adaptation" *Urban Studies,* V.6, 1969, 162–178.

3. Ibid, p. 168.

4. L. D. Ashby, "Changes in Regional Industrial Structure: a Comment", *Urban Studies,* V.6, 1970, 162–178.

5. J. A. Chalmers, "Measuring Changes in Regional Industrial Structure: a Comment on Stilwell and Ashby", *Urban Studies,* V.8, 1971, 289–292.

the industry. The difference between the rate of growth of the industry at national level and the rate of growth of all industries tells whether the industry in question is a fast or slow grower. Thus, Chalmers shows that if each D_{ij} is weighted by

$$\left(\frac{E_i}{E_i} - \frac{G^1}{G^0}\right)$$

we obtain a measure of the relative mix-modification (MM) for each region.[6]

$$MM = \sum_i D_{ij} \left(\frac{E_i^1}{E_i^0} - \frac{G^1}{G^0}\right)$$

The measure allows the proportionality and differential shifts to be weighted in such a way that it can be determined whether the net effect of these shifts is to generate an improvement in the economic structure of a region relative to that occurring in other regions. Measures such as S, P, and D make no allowance for variations in the size of sectors and regions so that interregional comparisons, in the absence of appropriate adjustments, are highly misleading. Hence, in this paper a new measure, Comparative Net Shift, has been introduced which standardises for size variations by sector and region and may be defined as Net Shift expressed as a percentage of Expected Employment.[7]

From Table 1, $C_s = \dfrac{\text{Col. } 4}{\text{Col. } 3} \times 100$

where C_s = Comparative Net Shift.

Data Sources

The principal source of data for this work are the tables for persons at work in each county, classified by industry in the Censes of Population for 1951, 1961 and 1966.[8] Geographically the returns for County Boroughs and the Borough of Dun Laoghaire have been added back to the relevant counties and amalgamated to provide data for thirteen regions (Figure 1). The nine planning regions were not employed as at the time when this analysis commenced they were not all coterminous with county units and the areas chosen reflect the need to insure the minimum possible level of scale-mixing. To insure strict comparability between

6. Ibid, p. 291.

7. A subsequent paper will discuss the conceptual problems of shift and share analysis, will put forward regional policy recommendations, and propose a new regional structure for grants and other incentives.

8. *Census of Population of Ireland,* Vol. III, 1951; *Census of Population of Ireland,* Vol. IV, 1961; *Census of Population of Ireland,* Vol. III, 1966.

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TABLE 1: *Net Shift and Comparative Shift 1951–61 by Sector*

Sector	Actual 1951	Actual 1961	Expected 1961	Net Shift	Percentage of Total Positive or Negative Net Shift	Comparative Net Shift (Net Shift as percentage of expected Employment)	Actual per cent change 1951–61
	1	2	3	4	5	6	7
All industries	1,219,722	1,052,539	1,052,539	—	—	—	—13·7066
Agriculture, Fishing	496,035	378,732	428,045	—48,313	—63·0948	—11·2869	—23·6481
Mining, Quarrying, Turf	9,927	9,640	8,566	+ 1,074	+ 1·3742	+12·5379	— 2·8911
Manufacturing	174,724	+179,436	150,775	+28,661	+36·6711	+19·0091	+ 2·6968
Building, Construction	85,018	59,587	73,365	—13,778	—17·6286	—18·7801	—29·9125
Electricity ,Gas ,Water	10,122	10,172	8,735	+ 1,437	+ 1·8386	+16·4511	+ 0·4940
Commerce	147,230	143,195	127,050	+16,145	+20·6571	+12·7076	— 2·7406
Insurance, Banking, Finance	12,172	14,239	10,504	+ 3,735	+ 4·7788	+35·5579	+16·9816
Transport	56,742	54,167	48,965	+ 5,202	+ 6·6558	+10·6239	+ 4·5381
Public Administration, Defence	40,531	40,580	34,976	+ 5,604	+ 7·1702	+16·0224	+ 0·1209
Professions	82,610	85,952	71,287	+14,665	+18·7635	+20·5718	+ 4·0455
Personal Service	84,511	63,314	72,927	— 9,613	—12·2996	—13·1817	—25·0819
Entertainment, Sport	10,838	10,986	9,352	+ 1,634	+ 2·0907	+17·4722	+ 1·3656
Others	9,262	2,539	7,992	— 5,453	— 6·9770	—68·2307	—72·5869

these census data it has been necessary to reclassify one industrial group. The category *Repair of Self Propelled Road Vehicles and Cycles (incl. Motor Garages)* is recorded under *Manufacturing Industry* and the sub-group *Manufacture of Transport Equipment* in the 1951 census; in 1961 and 1966 it is classified as *Motor Garages* under *Commerce*. For the purpose of this current study this category has been reallocated under *Commerce* for 1951.

Regional Employment Shift 1951–1961

For the period 1951–1961 total national employment fell by 13·7 per cent from 1,219,722 to 1,052,539—a loss of 167,183 jobs. All areas had fewer persons employed in 1961 than in 1951 (Table 2, Col 7) but the percentage drop varied greatly by region from −4·2 per cent in Dublin (region 1) to −24·3 per cent in Donegal (region 13).[9] Table 1 shows how each of the fourteen sectors upon which the analysis is based fared between 1951–1961. All except Agriculture, Building and Construction, Personal Service and Others recorded positive net shifts in employment (i.e. they performed better than the national average). Of the total negative net shift 63 per cent of it (or 49,313 jobs) is accounted for by decline in excess of the national average in Agriculture (where actual employment fell by 23·6 per cent between 1951–1961). However, both the Building and Construction and Personal Service sectors performed relatively worse than Agriculture as Col. 6 of Table 1 demonstrates: the Comparative Net Shifts of −18·8 per cent in Building and Construction and −13·2 per cent in Personal Service were considerably in excess of the −11·3 per cent in Agriculture. Of the total positive net shift 36·7 per cent of it (28,661) was a result of the expansion of the manufacturing sector (Col. 5 of Table 1). However, Insurance, Banking and Finance together with Professions both performed relatively better than Manufacturing in recording Comparative Net Shifts of +35·6 per cent and +20·6 per cent respectively compared with 19·0 per cent in Manufacturing (Col. 6 of Table 1).

How did these various net shifts express themselves across the 13 regions into which the country has been divided for the purposes of this analysis? Col. 7 of Table 2 demonstrates that an absolute drop in employment was experienced by every region between 1951–1961 but that in intensity of the decline varied considerably. Only three regions—Dublin county (1), Meath, Kildare and Wicklow (2) and Cork (6)—achieved positive net shifts in total employment (i.e. performed better than the national average). The extreme spatial maldistribution of the total national positive net shift is further emphasised by the fact the 90·8 per cent was concentrated in county Dublin (Col. 5 of Table 2) and that relatively Dublin benefited more than elsewhere with a comparative shift of 11·0 per cent compared with 2·3 per cent in Cork (Col 6 of Table 2). The total negative net shift was more widely distributed spatially with the north-western regions Mayo, Sligo (11),

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9. To avoid tedious repetition the regions have been numbered 1–13 in the Tables and on Figure 1, and will be referred to by their appropriate number in the text.

TABLE 2: *Net Shift and Comparative Employment Shift by Regions, 1951–61*

Region	Actual 1951	Actual 1961	Expected 1961	Net Shift	Percentage of total Positive or Negative Net Shift	Comparative Net Shift (Net Shift as percent- age of Expected employment) (Norm)	Actual percentage change 1951–1961
	1	2	3	4	5	6	7
All Regions (Nation)	1,219,722	1,052,539	1,052,539	—	—	—	—13·7066
1. Dublin C.B., Dublin Co.	288,777	276,558	249,195	+27,363	+90·7562	+10·9806	— 4·2313
2. Meath, Kildare, Wicklow	78,788	68,051	67,989	+ 62	+ 0·2056	+ 0·0912	—13·6277
3. Kilkenny, Carlow, Wexford	75,236	63,684	64,924	—1,240	— 4·1128	— 1·9099	—15·3544
4. Tipperary N.R., Laoighis, Offaly, Westmeath	88,696	75,496	76,539	—1,043	— 3·4594	—1·3627	—14·8823
5. Tipperary S.R., Waterford	59,745	50,998	51,556	— 558	— 1·8507	— 1·0823	—14·6406
6. Cork	138,879	122,568	119,843	+2,725	+ 9·0381	+2·2738	—11·7448
7. Kerry	49,689	40,466	42,878	—2,412	— 8·0000	— 5·6253	—18·5615
8. Limerick, Clare	87,820	74,138	75,783	—1,645	— 5·4561	— 2·1707	—15·5796
9. Galway	66,658	57,077	57,521	— 444	— 1·4726	— 0·7719	—14·3734
10. Leitrim, Roscommon, Longford	63,591	48,832	54,875	—6,043	—20·0431	—11·0123	—23·2093
11. Mayo, Sligo	85,389	67,167	73,685	—6,518	—21·6186	— 8·8458	—21·3400
12. Cavan, Monaghan, Louth	82,630	66,736	71,304	—4,568	—15·1509	— 6·4064	— 19·235
13. Donegal	53,824	40,768	46,447	—5,679	—18·8358	—12·2268	— 24·256

Leitrim, Roscommon, Longford (10) and Donegal (13) showing the greatest losses (Col. 4 of Table 2). Col. 6 demonstrates that these regions also exhibited the greatest negative comparative net shifts ranging from −12·2 per cent in region 13 to −11·0 per cent in region 10 and −8·8 per cent in region 11 (see Figure 2).

LEGEND
Over +10%
+5% to +10%
0 to +5%
-0 to -5%
-5% to -10%
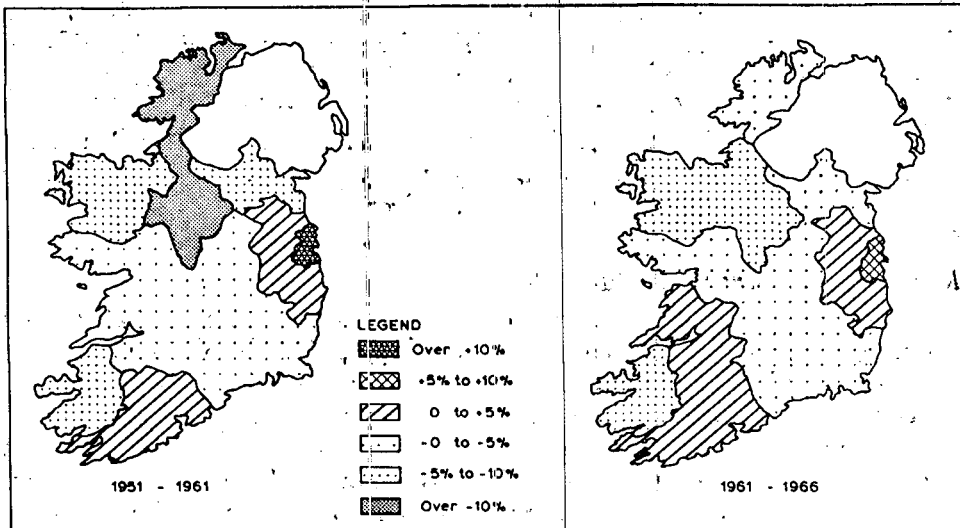Over -10%

1951 - 1961

1961 - 1966

Fig. 2: Comparative Net Shift 1951–1961, and 1961–1966.

Table 3 isolates the causes of varying regional growth rates by quantifying the regional share component (Col. 2) together with the proportional and differential effects. The analysis summarised in Table 3 demonstrates that the regional share component (i.e. national change) was the most important variable contributing to actual employment trends in every region. This element which is −13·7 per cent of 1951 employment in all areas exceeded the sum of the proportional and differential shifts throughout the country. In regions 1, 2 and 6 the positive net total shifts (9·5 per cent, 0·1 per cent and 1·9 per cent of 1951 employment) served to partially offset the large negative regional share; but in all other regions negative net total shifts compounded the negative national change effects. Table 3 shows that the net total shift of 27,363 (Col. 5) in Dublin is composed of a net inward differential shift of 4,942 and a net inward proportional shift of 22,421: the proportional effect is therefore responsible for 81 per cent of the net total shift (Col. 9 of Table 3). One of the most striking features revealed in this table, however, is that of the total national positive net differential shift, 1951–1961, 42 per cent of it occurred in Dublin; while the spatial concentration of 95·6 per cent of the total positive net proportional shift in Dublin is even more marked

(Col. 7). The only other region which benefited positively from the sectoral composition effect (i.e. had an above average share of fast-growth sectors) was Cork and it also registered a positive differential effect. All other areas displayed negative proportional shifts indicating that their economic structures were poorly specialised. Of the eleven regions with negative proportional effects regions 2, 3, 4, 8 and 9[10] manifested positive differential shifts while regions 5, 7, 10, 11, 12 and 13 recorded both negative proportional effects and negative differential shifts (Cols. 3 and 4 of Table 3): the latter are clearly problem areas for economic growth. Hence, the area of significant positive differential shifts has been larger than that of the industry-mix effects. In the cases of regions 5 (Tipperary S.R. and Waterford) and 7 (Kerry) the negative differential shift is negligible; but in regions 10 (Leitrim, Roscommon and Longford), 11 (Mayo and Sligo), 12 (Cavan, Monaghan and Louth) and 13 (Donegal) both the negative proportional effect and negative differential effect are large.

Regional Employment Shift 1961–1966

Between 1961–1966 national employment increased by 1·28 per cent from 1,052,539 to 1,065,987, an absolute increase of 13,448 jobs (Table 4). Only three sectors—Agriculture, Mining, Quarrying and Turf and Personal Service recorded negative net shifts in employment and these sectors were also the only ones to experience an absolute fall in employment between 1961–1966. Of the total net negative shift 97 per cent (or 50,044 jobs) is accounted for by the agricultural sector (compared with 63 per cent between 1951–1961) which indicates that all sectors of the economy except Agriculture, Mining, Quarrying and Turf and Personal Service responded to the stimulus of increased growth in the sixties by taking on extra employees, or at least, by not releasing labour (Col. 5). The greatest negative comparative net shift (−13·0 per cent) also occurred in Agriculture. Of the total positive net shift 32 per cent of it was recorded by the Manufacturing sector and 26·7 per cent by Building and Construction which also displayed the greatest comparative net shift of 22·8 per cent (Col. 6 of Table 4). This represents a dramatic recovery from the 1951–1961 period when Building and Construction had the greatest negative comparative net shift thus demonstrating that in terms of employment this sector responded relatively more than any other to the improved economic climate.

Col. 7 of Table 5 shows that only four regions increased their employment between 1961–1966: Dublin (+8·8 per cent), Meath, Kildare and Wicklow (+4·6 per cent), Limerick-Clare (+2·6 per cent); and Cork (+1·5 per cent). In all other areas there was an absolute decline in employment with region 10 (Leitrim, Roscommon and Longford) and region 11 (Mayo-Sligo) losing 8·3 per cent and 7·0 per cent of their jobs between 1961–1966. Examination of Table 5 shows that the four regions which improved their employment totals displayed a collective employment

10. The large size of the positive differential shift for Co. Galway, 2499, should be noted.

TABLE 3: *Actual, Regional, Proportional and Differential Shifts in Employment, 1951–61*

	Employment Shifts in Period 1951–61								
Region	Actual	Regional share and as percentage of 1951 employment	Net proportional shift and as percentage of 1951 employment	Net differential shift and as percentage of 1951 employment	Net total shift (3+4) and as percentage of 1951 employment	Net differential shift as percentage of total positive and negative shift in all areas	Net proportional shift as percentage of total positive and negative shift in all areas	Net differential shift as percentage of total net shift in each area	Net proportional shift as percentage of total net shift in each area
	1	2	3	4	5	6	7	8	9
Dublin C.B., Dublin Co.	−12,219	−39,642 (−13·7)	+22,421 (7·8)	+4,942 (1·7)	27,363 (9·5)	41·9	95·6	+18·1	+81·0
Meath, Kildare, Wicklow	−10,737	−10,799 (−13·7)	− 868 (−1·1)	+ 930 (1·2)	62 (0·1)	7·9	3·7	51·6	48·4
Kilkenny, Carlow, Wexford	−11,552	−10,312 (−13·7)	− 1,714 (−2·3)	+ 474 (0·6)	1,240 (−1·7)	4·0	7·3	−38·2	−138·2
Tipperary N.R., Laoighis, Offaly, Westmeath	−13,200	−12,157 (−13·7)	− 1,951 (−2·2)	+ 908 (1·0)	1,104 (−1·2)	7·7	8·3	31·8	68·3
Tippreary S.R., Waterford	− 8,747	− 8,189 (−13·7)	− 488 (−0·8)	− 70 (−0·1)	558 (−0·9)	0·6	2·1	12·5	87·4
Cork	−16,311	−19,036 (−13·7)	1,041 (0·7)	1,648 (1·2)	2,725 (1·9)	14·3	4·4	61·8	38·2
Kerry	− 9,223	− 6,811 (−13·7)	− 2,052 (−4·1)	− 360 (−0·7)	2,412 (4·8)	3·1	8·7	14·9	85·1
Limerick-Clare	−13,682	−12,037 (−13·7)	− 1,992 (−2·3)	+ 347 (0·4)	1,645 (−1·9)	2·9	8·5	14·8	85·1
Galway	− 9,581	− 9,137 (−13·7)	− 2,943 (−4·4)	2,499 (3·7)	444 (−0·7)	21·2	12·5	45·9	54·1
Leitrim, Roscommon, Longford	−14,759	− 8,716 (−13·7)	− 3,539 (−5·6)	−2,504 (−3·9)	6,043 (−9·5)	21·3	15·1	41·4	53·6
Mayo-Sligo	−18,222	−11,704 (−13·7)	− 4,242 (−5·0)	−2,276 (−2·7)	6,518 (−7·7)	19·3	18·1	34·9	65·1
Cavan, Monaghan, Louth	−15,624	−12,184 (−13·7)	− 1,128 (−1·4)	−3,440 (−4·2)	4,568 (−5·6)	29·2	4·8	75·3	24·7
Donegal	−13,056	− 7,377 (−13·7)	− 2,550 (−4·7)	−3,129 (−5·8)	5,679 (−10·5)	26·6	10·9	55·1	44·9

TABLE 4: *Net Shift and Comparative Shift 1961–66 by Sector*

	Actual 1961	Actual 1966	Expected 1966	Net Shift	Percentage of total Positive or Negative Net Shift	Comparative Net Shift (Net Shift as percentage of expected Employment)	Actual percentage change 1961–66
	1	2	3	4	5	6	7
All Industries	1,052,539	1,065,987	1,065,987	—	—	—	+ 1·2777
Agriculture, Fishing	378,732	333,527	383,571	—50,044	—97·1200	—13·0469	—11·9359
Mining, Quarrying, Turf	9,640	9,305	9,763	— 458	— 0·8888	— 4·6912	— 3·4751
Manufacturing	179,436	198,377	181,729	+16,648	+32·3080	+ 9·1609	+10·5559
Building, Construction	59,587	74,140	60,348	+13,792	+26·7655	+22·8541	+24·4231
Electricity, Gas, Water	10,172	11,911	10,302	+ 1,609	+ 3·1225	+15·6183	+17·0959
Commerce	143,195	150,138	145,025	+ 5,113	+ 9·9226	+ 3·5256	+ 4·8486
Insurance, Banking, Finance	14,239	16,006	14,421	+ 1,585	+ 3·0759	+10·9909	+12·4096
Transport	54,167	57,246	54,859	+ 2,387	+ 4·6323	+ 4·3512	+ 5·6843
Public Administration, Defence	40,580	43,189	41,098	+ 2,091	+ 4·0579	+ 5·0878	+ 6·4293
Professions	85,952	93,774	87,050	+ 6,724	+13·0490	+ 7·7243	+ 9·1004
Personal Service	63,314	63,097	64,123	— 1,026	— 1·9912	— 1·6000	— 0·3427
Entertainment, Sport	10,986	11,153	11,126	+ 27	+ 0·0524	+ 0·2427	+ 1·5201
Others	2,539	4,124	2,571	+ 1,553	+ 3·0138	+60·4045	+62·4262

increase of 31,039 jobs; the rest of the country *lost* 17,591 jobs over the same period. The same four regions (1, 2, 6 and 8) which recorded absolute increases were also the only ones to achieve positive net inward shifts of employment between 1961–1966. Of these regions it is important to note 1, 2 and 6 also registered net inward shifts in the 1951–1961 period; while Limerick-Clare registered a net outward shift in that period. The change from a net outward to a net inward shift in Limerick-Clare is, as we shall show later, a direct consequence of employment growth in the manufacturing sector. The overwhelming predominance of Dublin as the primary growth area of the country is reflected by the fact that 85·7 per cent (Col. 5 of Table 5) of the total national positive net shift occurred in that area (that is 85·7 per cent of all the employment growth above the national average was located in one county) compared with 90·7 per cent in 1951–1961. This shows that the economic revival of the sixties was itself heavily biased spatially in favour of the capital city and county. Dublin also benefited relatively better than elsewhere with a comparative net shift of 7·4 per cent compared with 3·3 per cent in region 2, 1·3 per cent in Limerick-Clare and 0·2 per cent in Cork.

As in the 1951–1961 period the impact of the negative net shift was more widespread spatially with the same counties of the west and north-west as in 1951–1961 showing the greatest losses. Twenty-three per cent of the total negative net shift occurred in Mayo-Sligo, while Leitrim, Roscommon and Longford recorded the greatest negative comparative net shift of −9·4 per cent (Col. 6 of Table 5).

Table 6 breaks down regional employment change into its three constituent components: the regional share, proportional and differential effects. Columns 2, 3 and 4 of Table 6 shows that in contrast to the 1951–1961 period, the net total shift factor $(P+D)$ contributes more towards actual regional change than the regional share effect in twelve of the thirteen regions.

Table 6 indicates that the net positive total shift of 20,683 in Dublin is made up of a net inward differential shift of 1,344 and a net inward proportional shift of 19,299: the latter is responsible for 93·3 per cent of the total net shift in Dublin. The trend established between 1951–1961 of over 95 per cent of the total national positive proportional shift being concentrated in Dublin is maintained between 1961–1966 (Col. 7 of Table 6). As in 1951–1961 Cork was the only other region of the country to show a positive proportional shift—thereby indicating that all other regions of the Irish economy are poorly specialised. Of the eleven regions with negative proportional shifts regions 2, 3 8 and 9 experienced positive differential effects (with Limerick-Clare showing a marked increase in the size of its differential shift) while regions 4, 5, 7, 10, 11, 12 and 13 recorded both negative differential and negative proportional shifts. Hence, region 4 has been added to the problem areas identified by the 1951–1961 analysis. The differential effect has operated as a decentralisation factor countering the centralising pull on employment of the proportional effect; but the size of the proportional shift has been the principal determinant of the regions' net shift signs and values. The positive differential

	Actual 1961	Actual 1966	Expected 1966	Net Shift	Percentage of total Positive or Negative Net Shift	Comparative Net Shift (Net Shift as percentage of Expected Employment)	Actual percentage change 1961–66
	1	2	3	4	5	6	7
All Regions	1,052,539	1,065,987	1,065,987	—	—	—	+1·2777
1. Dublin, C.B., Dublin Co.	276,558	300,775	280,092	+20,683	+85·7398	+7·3844	+8·7566
2. Meath, Kildare, Wicklow	68,051	71,169	68,920	+ 2,294	+ 9·3231	+3·2632	+4·5819
3. Kilkenny, Carlow, Wexford	63,684	62,979	64,498	− 1,519	− 6·2966	−2·3551	−1·1070
4. Tipperary N.R., Laoighis, Offaly, Westmeath	75,496	73,118	76,461	− 3,343	−13·8576	−4·3722	−3·1498
5. Tipperary S.R., Waterford	50,998	50,853	51,650	− 797	− 3·3038	−1·5431	−0·2843
6. Cork	122,568	124,360	124,134	+ 226	+. 0·9369	+0·1821	+1·4620
7. Kerry	40,466	38,860	40,983	− 2,123	− 8·8004	−5·1802	−3·9688
8. Limerick, Clare	74,138	76,050	75,085	+ 965	+ 4·0003	+1·2852	+2·5790
9. Galway	57,077	55,869	57,806	− 1,937	− 8·0293	−3·3509	− 2·1164
10. Leitrim, Roscommon, Longford	48,832	44,761	49,456	− 4,695	−19·4619	−9·4933	−8·3367
11. Mayo, Sligo	67,167	62,445	68,025	− 5,580	−23·1305	−8·2029	−7·0302
12. Cavan, Monaghan, Louth	66,736	65,252	67,589	− 2,337	− 9·6874	−3·4577	−2·2237
13. Donegal	40,768	39,496	41,289	− 1,793	− 7·4324	−4·3426	−3·1201

shifts in regions 2, 3, 8 and 9 have produced a pattern of growth less concentrated than would have been expected from the initial structure of activities in these regions. A period of expansion in the Irish economy following the stagnation of the 1950s did nothing (except increase significantly the positive differential effect in Limerick-Clare) to alter the extreme spatial maldistribution of employment growth throughout the country. This is clearly shown by a comparison of Figures 2 and 3 which show the spatial distribution of comparative net employment shift for the two periods. Indeed there is some evidence to demonstrate that the employment record of the regions relative to the national average rate of change has displayed a greater variation between 1961–1966 than in the earlier 1951–1961 period. The total volume of net shifting between 1951–1961 was 60,300 (5·7 per cent of total Irish employment) an average rate of 6,030 per annum (Table 2, Col. 4). For the 1961–1966 period the total net shift equalled 48,248 (4·5 per cent of total employment) an average annual rate of 9,650 which is a rate 60 per cent greater than in the 1951–1961 period (Table 5, Col. 4).

It is of considerable policy interest to analyse the source of the differential shift in each area; it is quite possible that an overall negative differential shift in a region may conceal encouraging positive differential growth in some sectors. This detailed region by region analysis is summarised in Appendix 1.

Composition of Net Proportional Shift 1961–1966

Between 1961–1966 national employment increased by 1·28 per cent and ten of thirteen sectors recorded higher employment growth rates (Table 4, Col. 7). The purpose of this analysis is to attempt a sectoral disaggregation of the proportionality effect across the regions of which only two, Dublin and Cork achieved a positive net proportional shift between 1961–1966. Net proportional shift 1961–1966 for individual regions (Table 6, Col. 3) correlates with the proportion employed in above national average rate of change sectors in 1961. In Table 7A the employment of Dublin and Cork is disaggregated into that which is located in above national average rate of change sectors—90·4 per cent of Dublin employment and 64·6 per cent in Cork. Table 7A summarises the proportion of this fast-growth employment which is accounted for by various sectors and the major feature of the table is that the positive proportionality effect is spread over a number of sectors principally Manufacturing, Commerce, Building and Construction, Transport and Professions. There is also a marked similarity in the sectoral distribution of the proportionality effect in both Dublin and Cork.

In 1966 almost 62 per cent of national employment was in sectors which expanded faster than the national average employment growth rate between 1961–1966 and consequently all areas below this figure displayed negative net proportional shifts. Column 3 of Table 7B indicates for 1966 the proportion of each regions' employment in sectors expanding slower than the national average. The three sectors whose performance fell below the national average were Agri-

TABLE 6: *Actual, Regional, Proportional and Differential Shifts in Employment, 1961–66*

Region	Actual	Regional share and as percentage of 1961 employment	Net proportional shift and as percentage of 1961 employment	Net differential shift and as percentage of 1961 employment	Net total shift (3+4) and as percentage of 1961 employment	Net differential shift as percentage of total positive and negative shift in all areas	Net proportional shift as percentage of total positive and negative shift in all areas	Net differential shift as percentage of total net shift in each area	Net proporitonal shift as percentage of total net shift in each area
	1	2	3	4	5	6	7	8	9
Dublin C.B., Dublin Co.	24,217	3,534 (1·3)	19,299 (7·0)	1,384 (0·5)	20,683 (7·5)	18·1	95·2	6·7	93·3
Meath, Kildare, Wicklow	3,118	869 (1·3)	— 571 (—0·8)	2,820 (4·1)	2,249 (3·3)	36·9	2·8	125·4	— 25·5
Killkenny, Carlow, Wexford	— 705	814 (1·3)	— 1,751 (—2·7)	232 (0·4)	— 1,519 (—2·3)	3·0	3·6	— 15·3	115·3
Tipperary N.R., Laoighis, Offaly, Westmeath	— 2,378	965 (1·3)	— 2,007 (—2·7)	—1,336 (—1·8)	— 3,343 (—4·5)	17·5	9·9	39·9	60·1
Tipperary S.R., Waterford	— 145	652 (1·3)	— 305 (—0·6)	— 492 (—1·0)	— 797 (—1·6)	6·5	1·5	61·7	38·3
Cork	— 1,792	1,566 (1·3)	963 (0·8)	— 737 (—0·6)	226 (0·2)	9·6	4·8	—326·1	426·1
Kerry	— 1,606	517 (1·3)	— 1,703 (—4·2)	— 420 (—1·0)	— 2,123 (—5·2)	5·5	8·4	19·8	80·2
Limerick-Clare	1,912	947 (1·3)	— 1,344 (1·8)	2,309 (3·1)	965 (1·3)	30·2	6·6	239·3	—139·3
Galway	— 1,208	729 (1·3)	— 2,830 (—5·0)	893 (1·6)	— 1,937 (—3·4)	11·7	14·9	— 46·1	146·1
Leitrim, Roscommon, Longford	— 4,071	624 (1·3)	— 3,185 (—6·5)	—1,510 (—3·1)	— 4,695 (—9·6)	19·8	15·7	32·2	67·8
Mayo-Sligo	— 4,722	858 (1·3)	— 3,901 (—5·8)	—1,679 (—2·5)	— 5,580 (—8·3)	22·0	19·3	30·1	69·9
Cavan, Monaghan, Louth	— 1,484	853 (1·3)	— 1,095 (—1·6)	—1,242 (—1·9)	— 2,337 (—3·5)	16·3	5·4	53·1	46·9
Donegal	— 1,272	521 (1·3)	— 1,560 (—3·8)	— .227 (—0·6)	— 1,793 (—4·4)	3·0	7·7	12·7	87·3

Employment Shifts in Period 1961–66

Region	Total Employment 1966	Total Employment in Fast Growth Sectors	Percentage Total Employment in Fast Growth Sectors	Percentage of Total Employment in Fast Growth Sectors by Sector									
				Manufacturing	Building Construction	Electricity, Gas, Water	Commerce	Insurance, Banking, Finance	Transport	Public Administration, Defence	Professions	Entertainment, Sport	Others
	1	2	3	4	5	6	7	8	9	10	11	12	13
1. Dublin	300,775	271,945	90·4	32·4	9·0	2·0	20·5	3·3	10·1	7·4	7·6	2·4	0·3
6. Cork	124,360	80,367	64·6	33·0	11·9	1·6	22·4	2·3	8·4	5·2	13·5	0·9	0·6

TABLE 7B: *Composition of Negative Net Proportional Shift 1961–66*

Region	Total Employment, 1966	Total Employment in Slow Growth Sectors	Percentage Total Employment in Slow Growth Sectors	Percentage of Total Employment in Slow Growth Sectors by Sector		
				Agriculture, Fishing	Mining, Quarrying, Turf	Personal Service
	1	2	3	4	5	6
2. Meath, Kildare, Wicklow	71,169	29,849	41·9	77·7	5·5	16·8
3. Kilkenny, Carlow, Wexford	62,969	31,749	50·4	85·7	1·7	12·6
4. Tipperary N.R., Laoighis, Offaly, Westmeath	73,118	37,367	51·1	83·5	7·5	9·0
5. Tipperary S.R., Waterford	50,853	21,103	41·4	83·1	2·1	14·7
7. Kerry	38,860	22,698	58·4	88·6	0·4	10·9
8. Limerick-Clare	76,050	33,886	44·6	87·3	0·7	12·0
9. Galway	55,869	34,311	61·4	90·6	1·5	7·9
10. Leitrim, Roscommon, Longford	44,761	30,734	68·7	93·0	2·8	4·1
11. Mayo-Sligo	62,445	40,022	64·1	93·2	1·0	5·8
12. Cavan, Monaghan, Louth	65,252	29,210	44·8	89·0	1·1	9·8
13. Donegal	39,496	22,171	56·1	88·9	0·7	10·4

culture and Fishing (−11·9 per cent), Mining, Quarrying and Turf (−3·5 per cent) and Personal Service (−0·4 per cent). Columns 4, 5 and 6 of Table 7B show how the negative proportional shift of each region is·distributed between these three sectors. The proportion accounted for by agriculture is predominant in every region ranging from 77·7 per cent in region 2 to 93·3 per cent in Mayo–Sligo. Mining, Quarrying and Turf makes only a minor contribution (Col. 5) but Personal Service exceeds 10 per cent of the total proportion in regions 2, 3, 5, 7, 8 and 13. Hence, this.section of the study has demonstrated that contributions to the positive net proportional shift in Dublin and Cork are distributed.over a number of sectors while Agriculture is the sector responsible for over three-quarters of the negative net proportional shift in all eleven other regions.

TABLE 8: *Proportion of Work Force in Above National Average Rate of Change Sectors, 1961 and 1966*

	1961 Percentage Employed in Above National Average Rate of Change Sectors 1	1961 Percentage Employed in Below National Average Rate of Change Sectors 2	1966 Percentage Employed in Above National Average Rate of Change Sectors 3	1966 Percentage Employed in Below National Average Rate of Change Sectors 4
All Regions	52·0994	47·9006	61·9199	38·0801
Dublin C.B., Dublin Co.	82·6308	17·3692	90·4148	9·5852
Meath, Kildare, Wicklow	47·9155	52·0845	58·0576	41·9424
Kilkenny, Carlow, Wexford	40·7214	59·2786	49·5800	50·4200
Tipperary N.R., Laoighis, Offaly, Westmeath	42·5691	57·4308	48·8949	51·1051
Tipperary S.R., Waterford	49·6490	50·3510	58·5020	41·4980
Cork	54·3388	43·6612	64·6245	35·3755
Kerry	32·6719	67·3281	41·5903	58·4097
Limerick, Clare	41·7748	58·2252	55·4425	44·5575
Galway	29·8281	70·1719	38·5867	61·4133
Leitrim, Roscommon, Longford	24·7194	75·2806	31·3375	68·6625
Mayo, Sligo	28·7894	71·2106	35·9084	64·0916
Cavan, Monaghan, Louth	45·9317	54·0683	55·2351	44·7649
Donegal	34·2597	65·7403	43·8652	56·1348

Table 8 which shows for 1961 and 1966 the proportion of the occupied labour force in each area employed in sectors performing better than the national average of −13·7 per cent (1951–1961) and +1·27 per cent (1961–1966) serves to underline forcibly the regional differentials that have emerged from the shift and share analysis. In 1961, 52·0 per cent of the national labour force was engaged in above average rate of change sectors but only two regions, Dublin and Cork, exceeded this figure. Dublin had 82·6 per cent of its employment in faster than

average growth sectors while Cork had 54·3 per cent. All other regions, with Leitrim, Roscommon and Longford at the bottom with 24·7 per cent, had less than half of their work forces in above national average rate of change sectors. The reallocation of labour from slow to fast growth sectors was most marked between 1961–1966 and the proportion of national employment in fast growth activity in 1966 had risen to 61·9 per cent. Dublin increased its proportion to 90·4 per cent and Cork, the only other region above the national average, improved to 64·6 per cent (Col. 3 of Table 8). All areas increased their share of the work force engaged in rapid growth sectors by about 10 per cent with Leitrim, Roscommon and Longford remaining the most disadvantaged region with only 31·3 per cent of its labour force in above average growth sectors.

TABLE 9: *Relative Mix Modification 1961–1966*

Region	Relative Mix Modification
1. Dublin	−209·8
2. Meath, Kildare, Wicklow	+418·2
3. Carlow, Kilkenny, Wexford	+140·6
4. Tipperary N.R., Laoighis, Offaly, Westmeath	+ 48·0
5. Tipperary S.R., Waterford	− 78·3
6. Cork	−142·7
7. Kerry	−100·0
8. Limerick-Clare	+189·7
9. Galway	−166·7
10. Leitrim, Roscommon, Longford	− 47·8
11. Mayo, Sligo	+ 37·8
12. Cavan, Monaghan	− 68·8
13. Donegal	+ 1·5

Changes in Regional Economic Structure 1961–1966

In Section 1 it was demonstrated that the relative mix modification (*MM*) defined as

$$MM = \sum_i D_{ij} \left(\frac{E_i^1}{E_i^0} - \frac{G^1}{G^0} \right)$$

determines whether the net effect of shifts has been to generate an improvement in the economic structure of a region relative to that occurring in other regions. The relative mix modification has been calculated for every region for the 1961–1966 period and is summarised in Table 9. This analysis shows that the economic structures of regions 1 (Dublin), 5 (Tipperary S.R. and Waterford), 6 (Cork), 7 (Kerry), 9 (Galway), 10 (Leitrim, Roscommon, Longford) and 12 (Cavan, Monaghan and Longford) have disimproved relative to those of other areas between 1961–1966. In the case of Dublin this was largely the result of the large negative differential shift in Manufacturing; while in Galway, Building and

Construction contributed −123·4 towards the relative mix modification values. Regions 2, 3, 4, 8, 11 and 13 registered positive relative mix modification measures and hence improved their economic structure relative to other areas over the period. Some of these figures need to be interpreted with caution as in the case of Regions 4 (Tipperary N.R., Laoighis, Offaly and Westmeath), 11 (Mayo, Sligo), and 13 (Donegal) a positive result would not have occurred but for large positive values in three "Others" sector which is somewhat difficult to interpret.

Sectoral Performance by Regions

In addition to analysing the growth record of each region vertically by sector it is useful to continue the study by examining the horizontal performance of the four major employment sectors, Agriculture, Manufacturing, Commerce and Professions across the regions. This analysis should throw some light upon the relative effectiveness of the Government's regional programmes. Between 1951–1961, Agriculture displayed positive net shifts in regions 1, 2, 3, 4, 5, 6, 8 and 9 and negative shifts in regions 7, 10, 11, 12 and 13 (Table A1, Col. 4).* The national share of the positive net shift was fairly evenly spread among the regions but the intensity of the negative net shift was heavily concentrated in regions 11 (28·6 per cent), 12 (23·2 per cent) and 13 (30·4 per cent) respectively of the total negative net shift. Between 1961–1966 positive shifts in Agriculture were registered by regions 1, 2, 3, 5, 6, 7 and 9 and negative shifts in 4, 8, 10, 11, 12 and 13 (Table A2, Col. 4); hence regions 1, 2, 3, 5, 6 and 9 maintained positive differential shifts in Agriculture in both periods and in regions 10, 11, 12 and 13 this sector performed worse than the national average rate of decline throughout both periods. The analysis has demonstrated that the severity of the regional problem has been compounded, for those areas which were most disadvantageously specialised economically and had the largest agricultural sectors also had the poorest relative employment record in that sector; conversely, areas with the best economic composition performed at above the national average rate in their agricultural sectors. This is consistent with Walsh's finding that the net out-movement from agriculture, as manifest for young males over the 1961–1966 period, is greatest in counties characterised by low agricultural incomes.[11]

Turning to the Manufacturing sector a contrasting trend emerges for between 1951–1961 only regions 1, 2, 5 and 6 exceeded the national Manufacturing growth rate of 2·7 per cent and recorded positive shifts: 81·3 per cent of the national positive manufacturing shift was located in Dublin and its satellite counties (regions 1 and 2). In 1961–1966 positive differential shifts (that is a manufacturing employment growth rate in excess of 10·6 per cent) occurred in regions 2, 3, 5,

*Tables A1 and A2 are included in the Appendix.

11. B. M. Walsh, "Economic and Demographic Adjustment of the Irish Agricultural Labour Force, 1961–1966", *Irish Journal of Agricultural Economics and Rural Sociology*, Vol. 3, No. 2, 1970–1971, pp. 113–124.

6, 7, 8, 9, 10, 12 and 13 and negative shifts only in regions 1, 4 and 11 (Table A2, Col. 6). These data reflect some success in steering manufacturing growth away from Dublin, where, in marked contrast to 1951–1961, 84 per cent (4,619 jobs) of the national *negative* net shift in Manufacturing was registered. However, Dublin, nevertheless, expanded its manufacturing employment from 83,915 to 88,154 and was responsible for 22·4 per cent of the total absolute national increase in that sector. The regional distribution of the manufacturing growth in excess of the national average was highly localised: Limerick-Clare with 55·5 per cent of national positive net shift and Meath-Kildare-Wicklow with 21·8 per cent were responsible for absorbing 77·3 per cent of the above national average growth. As Table A2 shows many of the positive differential shifts in the regions are composed of very small absolute values in terms of total employment: for example, the Leitrim-Roscommon and Longford region recorded a 17·9 per cent absolute increase in manufacturing employment—a total of only 296 more jobs; at the same time the area lost 4,485 jobs in Agriculture. Hence, manufacturing expansion on a scale in excess of the loss of jobs from agriculture occurred only in regions 1 and 2—Dublin and its hinterland; even in Limerick-Clare and Cork the rise in manufacturing employment of (3,931) and (2,615) did not offset the decline in agricultural jobs (4,609) and (4,415) respectively.

If one examines a sector such as Commerce, which is not the object of government regional incentives, a stark contrast emerges in the 1961–1966 period. Only three regions, 1, 2 and 9 experienced positive differential shifts (that is gains of over 4·9 per cent) and two of them (1 and 2—the Dublin area) attracted 96 per cent of the total national positive shift in this sector (Table A2, Col. 9). Of the total absolute national employment growth in this sector, 6,943 jobs, Dublin accounted for 4,173 or 60·1 per cent compared with 22·4 per cent for Manufacturing. Similarly, if employment trends in Professions (Accountancy, Education, Law, Hospitals, Dentists, Religion, Consultants, Veterinary, Planning and Research) are examined only two areas showed positive differential shifts between 1961–1966 (that is over 9·1 per cent growth) and they were Dublin and Limerick-Clare (Table A2, Col. 13). Dublin attracted 95·1 per cent of the total national positive shift and of the total absolute jobs increase of 7,823 the area was responsible for 4,847 (or 62 per cent). The lesson to be gleaned from this is clear: the government's industrial incentive schemes have resulted in a pattern of "concentrated decentralisation" of industrial employment growth—with Limerick-Clare benefitting disproportionately. On the other hand, growth in the other large expanding employment sectors, Commerce and Professions has been grossly overconcentrated in the Dublin area. This analysis demonstrates that unless a more comprehensive and radical regional policy which embraces other high income elasticity of demand sectors such as Services is introduced, as already suggested elsewhere by this author,[12] slow progress will be made in stimulating regional employment growth

12. Patrick N. O'Farrell, "The Regional Problem in Ireland: Some reflections upon Development Strategy", *Economic and Social Review*, Vol. 2, No. 4, 1971, pp. 453–479.

and there can be little prospect of reducing relative spatial disparities in social and economic welfare.

Forecasting Regional Growth

Shift and share analysis may be employed to forecast regional employment growth trends, a process which requires projecting the proportional (or composition) component and the differential (or regional) component. The proportional component in this and other studies displays a high degree of stability over time: the correlation between proportional shift 1951–1961 and 1961–1966 is $r = \cdot91$, so it is reasonable to assume the continuation of past trends. The correlation between the differential shifts 1951–1961 and 1961–1966 is, as expected, a much less satisfactory value of $r = \cdot52$. Brown[13] has argued that the instability of the differential component is a problem in the use of shift and share analysis as a projection model; furthermore, if the component is unstable and changes without systematic pattern, policy decisions made on the basis of historical components will not be relevant to succeeding periods. Brown's thesis has been criticised by Parakevopoulos on the grounds that his statistical tests were based upon small non-random samples. Parakevopoulos analysed differential and proportional effects for 32 industries by states in the USA and a correlation test for signs of the two components for 1940–1950 and 1950–1960 yielded values of 0·96 and 0·90 respectively.[14] He demonstrated that the differential component is stable over time and changes with a consistent pattern.[15]

As the differential effect is essentially a residual which remains after the regional share and composition effect, shift and share analysis tells us little about what conditions its magnitude. Hence, Stilwell[16] argues that it is necessary to attempt to explain the size of the differential effect as revealed in historical data by independent variables likely to be related to that differential: e.g. distance from market centres, quality of infrastructure, level of industrial incentives and so on. Problems of spatial scale mixing will arise in the application of such a methodology and, hence, in this paper the concept of Comparative Net Shift (Net Shift as a proportion of expected employment) has been introduced in order to eliminate scale mixing problems. Regressing Comparative Net Shift 1951–1961 on 1961–1966 yielded the equation

$$S_2 = -0 \cdot 4468 + 0 \cdot 6403 S_1 \qquad r = \cdot 857$$
$$(\cdot 116)$$

13. H. J. Brown, "Shift and Share Projections of Regional Economic Growth: An Empirical Test", *Journal of Regional Science*, Vol. 9, No. 1, 1969, pp. 1–17.

14. Christos C. Parakevopoulos, "The Stability of the Regional Share Component: An Empirical Test", *Journal of Regional Science*, Vol. 11, No. 1, 1971, pp. 107–112.

15. In a subsequent reply Brown pointed out that the tests which he reported were performed on individual industry components not on totals as in Parakevopoulos's work. See H. J. Brown, "The Stability of the Regional Share Component: Reply", *Journal of Regional Science*, Vol. 11, No. 1, 1971, pp. 113–114.

16. F. J. B. Stilwell, 1970, *op. cit.*, pp. 456–457.

where S_2 = Comparative Shift 1961–1966 and S_1 = Comparative Shift 1951–1961. The correlation coefficient is $r = 0.857$; hence 73·4 per cent of the recent comparative shift is explained by the previous one. The areas which lie more than one standard error from the best fit regression line are Meath-Kildare-Wicklow, Limerick-Clare and Donegal where growth performance improved and Tipperary N.R.-Laoighis-Offaly-Westmeath and Galway which were large negative residual areas where relative performance deteriorated. A national employment growth forecast for 5 year periods may be regionally distributed using the above equation which defines how each region will perform relative to national change and hence an estimate of how employment will respond in the regions may be obtained.

Stability of the System

A stability measure may be calculated by classifying the regions of a country in every period under analysis and comparing the classifications attained by the regions in successive periods. The procedure for classification may be illustrated by examining Graph 1.

1. The four axes in the graph divide the two dimensional space into eight octants which are numbered counter-clockwise 1 through 8. Representing the proportional and differential employment shifts in a period for a region as indicated in Graph 1, the point at which the respective ordinates and abscissas cross will fall in any of those octants. The number of the octant may be used as a classification of such a region. For example the Dublin region (net proportional shift 22,481 and net differential shift 4,942 in 1951–1961) falls in octant 2. The classification of regions by this octant orientation is useful as an abbreviation technique to summarise the systematic analysis of the temporal changes in the profiles of the
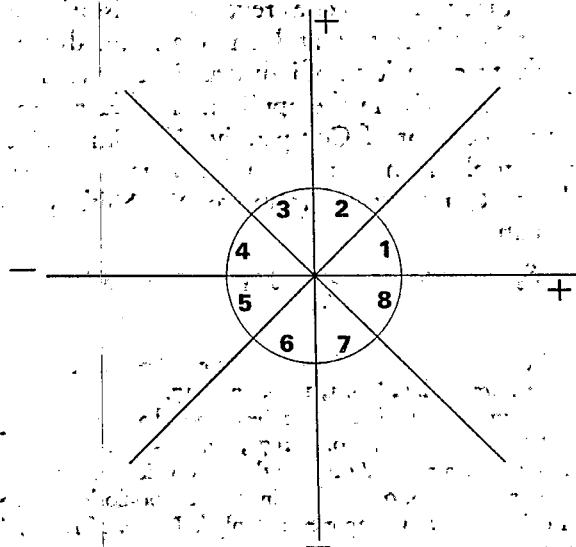
Graph 1.

TABLE 10: *Octant Classification of Regions, Ireland, 1951–61, 1961–66*

Region	Period 1951–61	Period 1961–66
1	2	2
2	8	8
3	7	7
4	7	6
5	6	5
6	1	3
7	6	6
8	7	8
9	6	7
10	6	6
11	6	6
12	5	5
13	5	6

proportional differential employment shifts of the regions.[17] The octant orientation of the different regions in the two periods is summarised in Table 10.

To establish what the changes in the two distributions of octant orientations mean we need to introduce the concept of octant dominance. In octants 1, 4, 5 and 8 differential shifts are larger (more dominant) than proportional effects. Similarly in octants 2, 3, 6 and 7, due to the graph's design, proportional effects dominate the differential effects. We may call 1, 4, 5 and 8 D-dominant and sectors 2, 3, 6 and 7 P-dominant. Table 10 shows that between 1951–1961, seven of the thirteen regions were P-dominant; whereas for the 1966–1971 period eight were P-dominant. Between the two periods, seven regions have not changed their dominant employment shift component. Of the other six, region 4 has changed from larger $-P$ and $+D$ to larger $-P$ and $-D$; region 5 has altered from larger $-P$ and $-D$ to larger $-D$ and $-P$; region 6 has been transformed from larger $+D$ and $+P$ to larger $+P$ and $-D$; region 8 has become larger $+D$ and $-P$ from larger $-P$ and $+D$; region 9 has changed from larger $-P$ and $-D$ to larger $-P$ and $+D$; and region 13 has been transformed from larger $-D$ and $-P$ to larger $-P$ and $-D$. Hence there is no consistent pattern in these areas that have changed and on the whole the structure of the system of regions has altered very little.

Conclusions

The analysis undertaken confirms that the objective of the Government to secure "an equitable sharing of economic progress, both amongst individuals and regions"[18] has not, and if the trends apparent up to 1966 continue, is not

17. J. R. Lasuen, "Venezuela: An Industrial Shift-Share Analysis 1941–1961", *Regional and Urban Economics*, Vol. 1, No. 2, 1971, pp. 153–220.

18. *Third Programme, Economic and Social Development, 1969–1972* (Prl. 431), Dublin, Stationery Office, March, 1969, p. 16.

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likely to be realised. The general pattern to emerge from the 1951–1966 study was that Dublin and surrounding counties (regions 1 and 2) and to a considerably lesser extent Cork and in the 1961–1966 period Limerick-Clare all increased their share of national employment. Between 1951–1966 Dublin gained *48,046 jobs more* than if its employment change had reflected national trends while Meath-Kildare-Wicklow (+2,311) and Cork (+2,941) also registered positive shifts; Limerick-Clare recorded a +965 net shift for the 1961–1966 period. This remarkable Dublin figure implies an excess population expansion of approximately 150,000 people whereas at the other end of the spectrum Mayo-Sligo, for the 1951–1966 period, had 12,098 fewer jobs (or about 36,000 people) than if employment trends had mirrored the national average. Furthermore, Leitrim, Roscommon, Longford had 10,738 fewer people in employment, Donegal (−7,423), Cavan-Monaghan-Louth (−6,905) and Tipperary N.R.-Laoighis-Offaly-Westmeath (−4,386) fewer than if their respective employment performances had equalled the national average. When the economy recovered in the 1961–1966 period the benefits of growth were highly maldistributed spatially: Dublin county, responsible for 90·8 per cent of the positive shift for the nation between 1951–1961, accounted for 85·7 per cent of it in the 1961–1966 period. The impact of the negative net shift was more widespread spatially in both periods. Over 95 per cent of the total national positive proportional shift was concentrated in Dublin during both periods; while Cork was the only other region of the state to record positive proportional shifts, 1951–1961 and 1961–1966—thereby indicating that, in varying degrees, all other areas are poorly specialised economically. Isolation of the regional share, proportional and differential components of growth between 1951–1961 revealed that the negative regional share effect exceeded the total net shift (i.e., $P+D$) in every region and while in regions 1, 2 and 6 positive total net shifts helped to offset negative regional shares in all other areas negative total net shifts exacerbated the negative national change effect. In contrast, the regional share element between 1961–1966 is smaller than the total net shift in all but one region and while in regions 1, 2, 6 and 8 positive total net shifts supplemented positive regional shares, in all other areas negative total net shifts exceeded the respective regional shares resulting in an absolute decline in employment.

In general the proportional effect has been the predominant element in Ireland's spatial growth and this provides support for the hypothesis that Ireland's regional problems are largely but not exclusively structural rather than locational. The positive differential effect has been a centripetal influence countering to some degree the centrifugal impact of the proportional shifts; while the negative differential effect has generally compounded negative proportional shifts. The economic "boom" of the early sixties did not even stabilise existing spatial welfare disparities; indeed there is evidence to the contrary. The employment performance of the regions relative to the national average has displayed a greater variation between 1961–1966 than in the 1951–61 period. Between 1951–1961 the total volume of net shifting averaged 6,030 per annum; but between 1961–1966 this

rate has increased by 60 per cent to an annual rate of 9,650. These findings are substantiated by the data in Table 8 which shows that the proportion of the labour force employed in sectors expanding faster than the national average rose from 82·6 per cent (in 1961) to 90·4 per cent (1966) in Dublin while Leitrim-Roscommon-Longford, at the other end of the continuum had 24·7 per cent (1961) and only 31·3 per cent in 1966. In general there is a considerable stability in the relative structure of the regions. It is reasonable to conclude that the chief reason for the outstanding performance of Dublin is structural and not locational: the area has benefited from a highly favourable economic mix. The depressing performances of regions 4, 7, 10, 11, 12 and 13 were due to a combination of unfavourable structure and a failure on the part of individual industries to grow as fast as in the country as a whole. It is more difficult to assess the significance of negative differential effects. Growth of employment is the result partly of existing firms expanding and partly new industries setting up. A poor growth rate cannot be taken as evidence that the existing industry suffers from locational disadvantage in that particular region and that firms are, therefore, unable to expand. It may well be that firms already in the region are doing well but that there have been few newcomers. Conversely, high rates of growth may be due to a high rate of influx of new firms rather than to any peculiarities in the performance of those already there. Limerick-Clare is an example of this phenomenon. Hence the structural factor goes a long way towards explaining the regional problem in Ireland. It follows that if the regions are to achieve the same growth rate in employment as the nation the "growth sectors" will have to expand much more rapidly in the regions than in the nation as a whole to counteract the effects of adverse structure. With the exception of Manufacturing in Limerick-Clare, there is no evidence that such a trend emerged in the period up to 1966, or, as largely similar policies continued, is likely to have emerged since that time.

The study has shown that contributions to the positive proportional shifts experienced by Dublin and Cork between 1961–1966 were distributed over a number of sectors primarily Manufacturing, Commerce, Transport, Building and Construction and Professions. Conversely, over three-quarters of the negative net proportional shift of the other eleven regions may be accounted for by Agriculture.

The paper has examined the horizontal performance of the four largest employment sectors, Agriculture, Manufacturing, Commerce and Professions across the regions. Those areas with the largest agricultural sectors had the poorest employment record in that sector. In Manufacturing, whereas in 1951–1961, 53·3 per cent of the total national positive shift was recorded in Dublin, between 1961–1966, 84 per cent of the total national negative shift was located in the capital. The spatial distribution of positive net shift in Manufacturing was highly concentrated: Limerick-Clare (55·5 per cent) and Meath-Kildare-Wicklow (21·8 per cent) together accounted for 77·3 per cent of above national average growth. In contrast, 96 per cent of total national positive shift (1961–1966) in Commerce, a sector not subject to government regional incentives, was recorded in regions

1 and 2. Similarly, Professions in Dublin attracted 95·1 per cent of the total national positive shift between 1961–1966. Clearly the regional industrial incentives scheme has succeeded in diverting growth from Dublin but the bulk of it has taken place in Limerick-Clare, Cork, Meath-Kildare-Wicklow and Louth. A complementary paper to this will attempt to draw out the regional policy implications of the empirical analyses in this article; in addition various theoretical problems of shift and share analysis will be discussed and a new regional structure for grants and incentives will be proposed.

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APPENDIX 1

COMPOSITION OF THE DIFFERENTIAL SHIFT BY REGIONS 1951–61 AND 1961–66

Table A1 shows that in Dublin the principal contributions to the positive differential shift of +4,942 in 1951–1961 were Manufacturing (+2,496) Building and Construction (+1,630) and Transport (+2,494). Col. 6, Table A1 demonstrates that 53 per cent of the national positive net shift in manufacturing took place in Dublin while 99 per cent of the net positive shift in Transport was recorded there; in addition all the national positive net shift in Insurance, Banking and Finance occurred in the city and 97 per cent of the shift in Entertainment and Sport. The principal sector of net outward shift was the Professions with 74 per cent of the national negative shift located in Dublin. ·

Between 1961–1966 there were some dramatic changes in the sources of positive and negative differential shifts in Dublin: Manufacturing changed from a high positive net shift to a negative one of −4,619—over 84 per cent of the national negative net shift in that sector (Col. 6 of Table A2). Building and Construction, Transport, Commerce and Professions all recorded high positive shift which gave the region a net differential shift of +1,384. The continuing boom and prosperity of Dublin was based almost exclusively upon its economic structure (93·3 per cent of the net shift between 1961–1966 is accounted for by the proportional effect); the employment of the area is disproportionately distributed among high growth sectors with a small differential effect centred mainly upon services.

Region 2 (Meath-Kildare-Wicklow) has benefited greatly by virtue of its proximity to Dublin and was one of only three regions to record a positive net shift in employment in the stagnant 1951–1961 era. Table A1 shows that the positive net differential shift of 930 in that period consisted principally of a positive net shift of 1,334 in Manufacturing (29 per cent of the national total). The region took full advantage of the national economic recovery in the early sixties and experienced a 2,820 net differential shift between 1961–1966 and, moreover, increased its share of the total national positive net shift from 0·2 per cent in 1951–1961 to 9·3 per cent in 1961–1966. (Col. 5 of Table 5). The sectors which responded most vigorously to the growth stimulus were Manufacturing (+1,200) representing 22 per cent of national positive net shift in that sector, Building and Construction (+1,027) or 48 per cent of national positive shift and Commerce (+681) −28 per cent of national positive shift in that sector (Table A2). The growing affluence of this region in the 1961–1966 period was based entirely upon

the net differential effect which constituted 125·4 per cent of total net shift in the area.

Region 3—Carlow, Kilkenny and Wexford experienced a negative net shift of 1,240 but a positive net differential shift of 474 in the 1951–1961 period. The latter shift was achieved largely as a result of large positive shifts of 1,071 in Agriculture and 462 in Commerce—26 per cent of the national positive shifts (Table A1). Between 1961–1966 a negative net shift of 1,519 occurred but accompanied by a positive net differential shift of 232 resulting principally from small positive shifts in Agriculture, Manufacturing, Building and Construction. The most striking feature of Row 3 of Table A2 is that most sectors in this region expanded or contracted at a rate close to the national average and as the area is not well specialised a proportional shift of −1,751 resulted in a negative net shift in total employment. The region's share of total national negative shift increased from 4·1 per cent in 1951–1961 to 6·3 per cent in 1961–1966 so that its relative position deteriorated marginally.

Region 4, Tipperary N.R., Laoighis, Offaly and Westmeath recorded a negative net shift of 1,043 but a positive net differential shift of 908 between 1951–1961. The latter shift was registered largely as a consequence of a large positive shift of 1,122 in Agriculture (Col. 4, Table A1). By 1961–1966 the relative position of this region had declined with a negative net shift of 3,343 composed of a negative differential shift (−1,336) and a negative proportional shift (−2,007). Large negative shifts in Manufacturing (−802) and Agriculture (−402) were the chief reasons for the poor performance (Table A2). The region's employment record relative to other areas declined during the two periods as the increase in its share of the national negative net shift from 3·4 per cent in 1951–1961 to 13·4 per cent in 1961–1966 testifies.

The Tipperary S.R., Waterford region (5) experienced a small negative net total shift (−558) between 1951–1961 made up of a net differential shift of −70 and a net proportional shift of −488. The area recorded sizeable positive shifts in Agriculture (+306) and Manufacturing (+430) and negative ones in Building and Construction (−510) and Transport (−204) (Row 5 of Table A1). Between 1961–1966 a small negative net total shift of −797 was accompanied by a net differential shift of −492 and a net proportional shift of −305. There were negative shifts in Commerce (−254) and Professions (−277) and a positive one in Agriculture (+276) (Row 5 of Table A2). The relative performance of the region decreased marginally during the periods under analysis: the regional share of total national negative shift rose from 1·9 per cent (1951–1961) to 3·3 per cent in 1961–1966. The 1966 Census was too early to monitor the beneficial effects of the Waterford industrial estate but the region should record a positive differential shift for the 1966–1971 period.

Region 6, Cork County was one of only three areas to show a positive net total shift (+2,725) between 1951–1961 consisting of a net differential shift of +1,684 and a proportional shift of +1,081. Large positive shifts occurred in Building and Construction (+1,476)—41 per cent of the total national positive shift in that sector—Agriculture (+686), Manufacturing (+420) and Professions (+304); with large negative shifts in Commerce (−465) and Personal Service (−768) representing 51 per cent of the total negative shift in the latter (Row 6 of Table A1). The county registered a small net total shift (+226) between 1961–1966 when the differential shift became negative (−737) but the proportional shift remained positive (+963). Agriculture (+455) performed relatively well but Commerce, as in 1951–1961, did poorly (−686)—28 per cent of the total national negative shift in that sector (Row 6 of Table A2). The employment record of other sectors closely reflected their respective national trends. The region's share of

total national positive shift fell from 9·0 per cent in 1951–1961 to 0·9 per cent in 1961–1966.

The Kerry region (7) fared worse than the nation as a whole between 1951–1961 with a net total shift of —2,412 jobs composed of a net differential shift of —360 and a net proportional shift of —2,052. The largest negative shifts in 1951–1961 were in Agriculture (—293) and Manufacturing, (—418) while employment in most other sectors changed at rates similar to national trends (Table A1). For the 1961–1966 period the area continued to lag behind with a net total shift of —2,123 made up, as in 1951–1961, of a very large negative proportional shift of —1,703 and a smaller differential effect of—420. Building and Construction (—373) and Transport (—190) contributed the largest negative shifts while Manufacturing (+249) was the only sizeable positive one (Row 7 of Table A2). The region's proportionate share of the national negative shift rose marginally from 8·0 per cent to 8·8 per cent over the two survey periods. The evidence clearly points to a poorly specialised economic structure as the primary cause of the region's growth problems; high growth sectors are greatly under-represented in the regional economy.

Region 8, the Limerick–Clare area is the only one where a negative net shift in total employment of —1,645 for 1951–1961 was converted to a positive net shift of +965 between 1961–1966; from a 5·4 per cent share of the national negative shift the area captured 4·0 per cent of the national positive shift in 1961–1966. The negative net shift of the earlier period was composed of a small positive differential shift of +347 and a large negative proportional shift of —1,992. The principal negative shifts in 1951–1961 were in Manufacturing (—669), Mining, Quarrying and Turf (—263) and Transport (415). (Row 8 of Table A1). Hence, during this period the employment performance of many sectors in the Limerick-Clare area differed radically from national trends. Between 1961–1966 there was a rapid transformation of the regional economic base with very large positive differential shift of +2,309 partially offset by a negative proportional shift of —1,344. Manufacturing, with a negative shift between 1951–1961 contributed a dramatic positive shift of +3,052—which meant that 56 per cent of the nation's above average manufacturing employment growth occurred in the area. The success of the Shannon Industrial Estate requires no further comment except to point out that, as Row 8 of Table A2 shows, Manufacturing represented a sectoral oasis of expansion and intra-regional direct and indirect multiplier effects are not apparent in Table A2 for no other sector recorded a sizeable positive shift and some, in particular Agriculture (—528), registered large negative shifts. The transformation of Agriculture from a sector of positive shift (1951–1961) to one responsible for 23 per cent of national negative shift in 1961–1966 (Col. 4 of Table A2) may, in part, be due to a transfer of surplus labour from this sector into manufacturing when employment opportunities expanded at Shannon thereby increasing the marginal productivity of labour in agriculture. The 1971 census data is awaited with interest to see the degree of positive employment impact, if any, the dramatic manufacturing expansion has had upon the remainder of the regional economy. One also expects the negative proportionality effect to be greatly reduced when the next census returns are analysed.

Region 9, Galway, experienced a period of large positive differential growth (2,499) and a high negative proportional shift (—2,943)—yielding a net shift of —444 between 1951–1961 followed by a smaller differential shift (+893) and a large negative proportional shift (—2,830)—giving a net shift of —1,937 for 1961–1966. The principal source of positive differential shift in 1951–1961 was Agriculture with a positive differ-

ential shift of 1,902 (27 per cent of the national positive shift in this sector); manufacturing displayed the largest shift of —432 (Col. 6 of Table A1). Sizeable positive shifts in the 1961–1966 period were registered by Agriculture (+616); Personal Service (+236) and Mining, Quarrying and Turf (+220)—24 per cent of the national positive shift in this sector and reflecting, principally, development at Tynagh (Row 9 of Table A2). The Building and Construction sector contributed the largest negative shift—(—533). The region's relative position deteriorated over the two survey periods: its share of negative national net shift rose from 1·4 per cent in 1951–1961 to 8·4 per cent in 1961–1966. The 1971 census should monitor the effects of the recent manufacturing and building expansion in Galway city and as in the case of Limerick-Clare it will be salutory to note its direct and indirect intra-regional effects via the multiplier, if any. The Leitrim, Roscommon and Longford region shares with regions 11, 12 and 13 the characteristic of being the most depressed in the state. The 1951–1961 era marked a period of a negative net total shift (—6,043) made up of large negative differential (—2,504) and proportional (—3,539) shifts. Row 10 of Table A1 shows that the greatest negative shift occurred in Agriculture (—940), Manufacturing (—582) and Commerce (—314). Between 1961–1966 a negative differential shift of —1,510 and a net proportional shift of —3,185 contributed to a negative net total shift of —4,695. Large negative shifts again were registered in Agriculture (—537)—24 per cent of the national negative net shift in this sector—and Commerce (—313) together with Building and Construction (—550)—25 per cent of the national negative net shift (Row 10 of Table A2). The region's relative position remained static over the two survey periods: its share of negative net national shift—20 per cent in 1951–1961—remained very high at 19·4 per cent in 1961–1966. Future prospects on this evidence are not bright, at least in the short term, for not only is the region poorly endowed with growth sectors but the expansion rates of employment in the activities present are almost all below the national average for those sectors.

Region 11, Mayo-Sligo, experienced a large negative differential shift (—2,276) in conjunction with a huge negative proportional shift (—4,242)—total negative net shift —6,518—between 1951–1961 when the area's share of the negative net national shift was 21·6 per cent. This share rose to a depressing 23·1 per cent between 1961–1966 with a negative differential shift of —1,679 added to a negative proportional one of —3,901 to give a total negative net shift of —5,580. The principal source of negative net shift between 1951–1961 was Agriculture (—1,988)—29 per cent of the total negative net shift in that sector (Col. 4 of Table A1). Other sizeable negative shifts were registered in Manufacturing (—288) and Commerce (—172). In 1961–1966 major negative shifts occurred in Agriculture (—567), Building and Construction (—402), Professions (—391) and Commerce (—325); no sizeable positive shifts were recorded in the region (Row 11 of Table A2). These analyses underline the extreme gravity of the employment problem in the whole north-western area and with such large negative proportional shifts in Mayo-Sligo the solution to such ills is fundamentally long-term.

The border counties of Cavan, Monaghan and Louth (region 12) fared badly during the period of heavy emigration in the fifties. The area displayed a large negative differential shift of (—3,440) and a negative proportional shift of —1,128 between 1951–1961 while its share of national negative net shift was 15·1 per cent. This share fell to 9·7 per cent between 1961–1966 largely through a reduction in the differential shift to —1,242 while the negative proportional shift remained virtually constant at —1,095, Agriculture (—1,607), a 23 per cent of the national negative shift, was the largest single contributor to the negative differential shift between 1951–1961 followed by Manufacturing (—796),

Building and Construction (—514), Commerce (—358) and Transport (—636), (Col. 12 of Table A1). Between 1961–1966, as Table A2 shows, the major negative shifts were recorded in Commerce (—356), Transport (—284), Professions (—222) and Agriculture (—215). A positive shift of 334 took place in Manufacturing reflecting the increased pace of industrial development was totally insufficient to counterbalance the poor employment growth performance of other sectors.

The Donegal region performed relatively worse than all other areas between 1951–1961, (comparative net shift—12·2 per cent) with a negative differential shift of —3,129 and a negative proportional shift of —2,550 together representing 18·8 per cent of the total national negative shift. This share fell to 7·4 per cent in 1961–1966 reflecting a greatly improved negative differential shift of —227 but a high proportional one of —1,566. Agriculture, (—2,112), 30·4 per cent of the national negative shift, was the principal source of negative differential shift between 1951–1961: in fact, the northern counties of Donegal, Mayo, Sligo, Cavan, Monaghan and Louth collectively recorded 82·1 per cent of the total national net shift in Agriculture in the 1951–1961 period. To further exacerbate their employment position they also registered 40·9 per cent of the total negative net shift in Manufacturing. Donegal displayed a —833 net shift in Manufacturing, —360 in Building and Construction (Row 13 of Table A1). The improved performance in the 1961–1966 period was caused by a low net outward shift in Agriculture (—15) and growth rates in other sectors close to the national average; the negative proportional shift of —1,566 resulted from a badly specialised regional economy (Table A2).

ACKNOWLEDGEMENTS

Table A1 Total, Proportional and Differential Shift by Regions, 1951-61

Components of Differential Shift and in parentheses Percentage of Total Positive or Negative Net Shift

	Total Shift	Proportional Shift	Differential Shift	Agriculture, Fishing	Mining, Quarrying, Turf	Manufacturing	Building, Construction	Electricity, Gas, Water	Commerce	Insurance, Banking, Finance	Transport	Public Administration	Professions	Personal Service	Entertainments, sport	Others
	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
Dublin C.B., Dublin Co.	+27,363	+22,421	+4,942	+58(1)	−76(−10)	+2,496(53)	+1,630(45)	−636(−80)	−397(−22)	+447(100)	+2,494(99)	−374(−32)	−1,446(−74)	+493(33)	+541(97)	−288(−59)
Meath, Kildare Wicklow	+62	−868	+930	+903(13)	+188(25)	+1,334(29)	−745(−21)	+16(2)	+491(27)	−81(−18)	−72(−3)	−708(−60)	−416(−21)	+89(6)	−146(−26)	+77(16)
Kilkenny, Carlow Wexford	−1,240	−1,714	+474	+1,071(15)	+5(1)	−641(−14)	−376(−10)	−23(3)	+462(26)	−8(−2)	−45(−2)	−10(−1)	+8(1)	+49(3)	−85(−15)	+21(4)
Tipperary N.R., Laoighis, Offaly, Westmeath	−1,043	−1,951	+908	+1,122(16)	+393(53)	−20(−1)	−699(−19)	+269(34)	+325(18)	−46(−10)	−379(−15)	+208(18)	−67(−3)	−210(−14)	−25(−4)	+37(8)
Tipperary S.R., Waterford	−558	−488	−70	+306(4)	+114(15)	+430(9)	−510(−14)	−78(−10)	−65(−4)	−38(−9)	−204(−8)	+79(+7)	+69(+4)	−51(−3)	−88(−16)	−34(−7)
Cork	+2,725	+1,041	+1,684	+686(10)	−12(−2)	+420(9)	+1,476(41)	+138(17)	−465(−26)	−7(−2)	−42(−2)	−24(−2)	+304(16)	−768(−51)	−70(−13)	+48(10)
Kerry	−2,412	−2,052	−360	−293(−4)	−149(−20)	−418(−9)	+65(2)	+74(9)	+137(8)	−20(−4)	−173(−7)	+45(4)	+96(5)	+251(17)	+6(1)	+19(4)
Limerick, Clare	−1,645	−1,992	+347	+892(13)	−263(−35)	−669(−14)	−195(−5)	−55(−7)	+198(11)	−20(−4)	−415(−17)	+513(44)	+530(27)	−273(−18)	−109(−19)	+213(43)
Galway	−444	−2,943	+2,499	+1,902(27)	−1(0)	−432(−9)	+209(6)	−31(−4)	+156(9)	−28(−6)	+13(1)	+84(7)	+206(11)	+397(27)	+3(1)	+21(4)
Leitrim, Roscommon, Longford	−6,043	−3,539	−2,504	−940(−14)	−193(−26)	−582(−12)	−217(−6)	+113(+14)	−314(−18)	−44(−10)	−252(−10)	−25(−2)	−23(−1)	−66(−4)	+8(1)	+31(6)
Mayo, Sligo	−6,518	−4,242	−2,276	−1,988(−29)	+35(5)	−288(−6)	+235(7)	+29(4)	−192(−11)	−38(−9)	−68(−3)	−34(−3)	+108(6)	−36(−2)	−29(−5)	−10(−2)
Cavan, Monaghan, Louth	−4,568	−1,128	−3,440	−1,607(−23)	−53(−7)	−796(−17)	−514(−14)	+122(14)	−358(−20)	−71(−16)	−636(−25)	+243(−21)	+305(16)	−92(−6)	−2(0)	+25(5)
Donegal	−5,679	−2,550	−3,129	−2,112(−30)	+12(2)	−833(−18)	−360(−10)	+27(3)	+22(1)	−45(−10)	−222(−9)	+4(0)	+327(17)	+218(15)	−7(−1)	−160(−33)

Table A2: *Total, Proportional and Differential Shift by Regions, 1961–1966*

Components of Differential Shift and in parenthesis Percentage of Total Positive or Negative Net Shift

	Total Shift 1	Proportional Shift 2	Differential Shift 3	Agriculture, Fishing 4	Mining, Quarrying, Turf 5	Manufacturing 6	Building Construction 7	Electricity, Gas, Water 8	Commerce 9	Insurance, Banking, Finance 10	Transport 11	Public Administration 12	Professions 13	Personal Service 14	Entertainments, Sport 15	Others 16
Dublin C.B., Dublin Co.	+20,683	+19,299	+1,384	+256(11)	+410(44)	−4,619(−84)	+880(41)	−96(−22)	+1,678(69)	+23(14)	+859(97)	+120(36)	+2,147(95)	+149(21)	−114(−38)	−309(−47)
Meath, Kildare, Wicklow	+2,249	−571	+2,820	+347(15)	−472(−51)	+1,200(22)	+1,027(48)	+119(27)	+681(28)	+36(22)	−4(0)	+28(8)	−285(−13)	−137(−19)	+143(48)	137(20)
Kilkenny, Carlow, Wexford	−1,519	−1,751	+232	+301(13)	−170(−18)	+139(3)	+255(12)	+97(22)	−171(−7)	+1(1)	−51(−6)	+11(3)	−217(−10)	−74(−10)	+40(13)	71(11)
Tipperary N.R., Laoighis, Offaly, Westmeath	−3,343	−2,007	−1,336	−420(−18)	−129(−14)	−802(−15)	−15(−1)	+48(11)	−26(−1)	−19(−11)	+26(3)	+97(25)	−211(−9)	+17(2)	−31(−10)	+129(20)
Tipperary S.R., Waterford	−797	−305	−492	+276(12)	+14(2)	+33(1)	−69(−3)	−9(−2)	−254(−10)	−39(−23)	−7(−1)	−24(−7)	−277(−12)	−110(−16)	−39(−13)	+13(2)
Cork	+226	+963	−737	+455(20)	−86(−9)	+72(1)	−62(−3)	−130(−30)	−686(−28)	+26(16)	−48(−5)	−83(−24)	−168(−7)	+30(4)	−29(−10)	−28(−4)
Kerry	−2,123	−1,703	−420	+32(1)	−65(−7)	+249(5)	−373(−17)	−3(−1)	−111(−5)	+3(2)	−190(−21)	−21(−6)	−97(−4)	+170(24)	+5(2)	−19(−3)
Limerick, Clare	+965	−1,344	+2,309	−528(−23)	+172(19)	+3,052(56)	−36(−2)	−53(−12)	−111(−5)	+62(37)	+2(0)	−34(−10)	+109(5)	−98(−14)	+17(6)	−245(−37)
Galway	−1,937	−2,830	+893	+616(27)	+220(24)	+156(3)	−533(−25)	+49(11)	+79(3)	+16(10)	0(0)	++1(0)	−103(−5)	+236(34)	+76(25)	+80(12)
Leitrim, Roscommon, Longford	−4,695	−3,185	−1,510	−537(−24)	+35(4)	+122(2)	−550(−25)	+98(22)	−313(−13)	−15(−9)	−21(−2)	−19(−6)	−160(−7)	−136(−19)	−28(−9)	+14(2)
Mayo, Sligo	−5,580	−3,901	−1,679	−567(−25)	−1(0)	−76(−1)	−402(−19)	+25(6)	−325(−13)	−39(−23)	−188(−21)	+81(24)	−391(−17)	+61(9)	−38(−13)	+181(27)
Cavan, Monaghan, Louth	−2,337	−1,095	−1,242	−215(−9)	+74(8)	+334(6)	−75(−3)	−119(−27)	−356(−15)	−50(−30)	−284(−32)	−138(−41)	−222(−10)	−150(−21)	+17(6)	−58(−9)
Donegal	−1,793	−1,566	−227	−15(−1)	−2(0)	+140(3)	−46(−2)	−27(−6)	−87(−4)	−5(−3)	−95(−11)	−20(−6)	−125(−6)	+41(6)	−20(−7)	+34(5)