

Industrial Structure and Labour Market Adjustments in Canada During the 1981-84 Recession*

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Introduction

The regional impact of business cycles is quite variable. Some regions typically lead national trends, while others lag (Bassett and Haggett 1971; Hepple 1975; King and Clark 1978; Lever 1980; Marchand 1982, 1986). The severity of a recession and the intensity of a boom also vary regionally (Cho and McDougall 1978; Elias 1979; Gordon 1985a; Green 1986; Jeffrey and Webb 1972; Martin 1982a, 1982b, 1984; Norcliffe 1987; Raynald 1987; Taylor and Bradley 1983; Thirlwall 1966). There are two conventional explanations of why regions behave so differently. The first puts emphasis on their industry-mix and employment specializations, whereas the second relates performance to the competitiveness of regional producers in any given industry. The central proposition in this paper is that in a country such as Canada, which is characterized by marked regional economic specialization, regional industrial structure will have an important influence on labour market adjustments during recession. This is not to dismiss regional competitiveness as a factor, but rather to focus on the role of industrial structure. Although this proposition may at first glance seem self-evident, in practice it is more controversial. A series of studies (mainly of the U.K.) have concluded that industry structure has a very small effect on regional cyclical performance; thus the findings of this study run counter to most other empirical studies. For this reason,

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at certain points the findings of U.K. studies are cited, and possible explanations of the observed difference are discussed.

There is no disputing that some industries are much more affected by business cycles than are others; indeed, employment in a few activities (such as social services) actually fluctuates in a counter-cyclical manner. Since industries are located according to different locational rules, their relative importance varies from region to region. The logical *a priori* conclusion to these premises is that employment structure will have an important influence on the cyclical sensitivity of a regional economy. However credible this structural argument may appear, empirical research has failed to produce much supportive evidence. Indeed the conclusion drawn by Cheshire (1973, 7) in his study of regional unemployment differences in Great Britain is that:

All [results] suggest . . . that the industrial structure of a region was virtually irrelevant in determining its unemployment rate, for both men and women, and at times of high and of low unemployment.

Commenting on data drawn from Cheshire's study Armstrong and Taylor (1978, 92-3) suggest that:

The results indicate that . . . regional differences in unemployment would have been very small if each regional industry had experienced the same unemployment rate as its national counterpart. The influence of a region's industry mix is small.

In another study of unemployment in North West England from 1969 to 1980, Taylor and Bradley (1983) likewise found the mix of industry not to affect unemployment much, even though there were quite large differences in employment structure among the journey-to-work regions they used in their analysis.

In Canada, Marchand's (1982; 1986) research points to a somewhat similar conclusion. In her studies of the transmission of unemployment through the Canadian central place system between 1957 and 1979 using spectral analysis, she has found that a major (Juglar) cycle of 8-12 years strongly dominated the economies of most cities both in Central and in Western Canada. Measuring the relationship between the unemployment series for Canada as a whole and for specific urban centres using the coherence estimate of cross-spectral analysis, Marchand found the correspondence to increase in cities that had larger populations and a higher percentage employed in manufacturing. She concludes (1986, 253) that:

Cross-spectral results further emphasize the role played by size and industrial diversification in promoting a regularity in the occurrence of downturns and upturns, which is typical of the nation and therefore highly coherent with it. These results demonstrate conclusively

that an explanation of short-term performance for urban economies cannot be reduced to a sectoral interpretation.

These results might lead one to become skeptical of the structural explanation. It is of interest, therefore, that Armstrong and Taylor (1985, 151) conclude a review of this very issue with the following comment:

It is difficult to accept the counter hypothesis that the industry-mix has absolutely no part to play in explaining spatial disparities in unemployment. The 1979-81 slump, for example, had a far more dramatic effect on unemployment levels in the West Midlands than in many other regions of the U.K. . . . Since the West Midlands is known to depend heavily upon manufacturing industries, the particularly severe decline in unemployment in this region suggests that the industry-mix played a significant part.

Indeed, the work of Townsend (1983) points to industry-mix being an important variable in explaining unemployment in the U.K. during the 1979-81 recession. This was a period when a large number of jobs were shed by U.K. manufacturing; regions specializing in manufacturing recorded the largest proportional increases in unemployment.

The central hypothesis in this study is that regional industrial structure had a significant influence on regional labour market adjustments in Canada during the 1981-84 slump. Previously, studies of Canadian labour market adjustments have concentrated on unemployment. However, as Gordon (1985a; 1985b) stresses, the *supply* of labour (measured as the total labour force) is also susceptible to cyclical change, hence both adjustments will be considered here. This hypothesis will be examined in five steps. The first section provides a context for the analysis that follows by summarizing the regional impact on the 1981-84 recession. The next section examines the cyclicity of regional unemployment. The impact of the recession on the total labour force and on employment is then described, leading to an examination, in the fourth section, of the role of industrial structure. The concluding section summarizes the results and offers some thoughts as to why the recent Canadian experience appears to have differed from that of the U.K. in the 1960s and 1970s.

The 1981-84 Recession in Canada

Like most western nations, between 1981 and 1984 Canada experienced its most severe recession since the Great Depression of the 1930s. The immediate consequences included manifestations of de-industrialization such as plant closures and mass redundancies (Gertler 1985; Norcliffe *et al.* 1986). The longer-term consequences of the

recession for Canadian labour markets were two-fold. First, the workforce stopped growing; indeed between September 1981 and February 1982 Canada's total labour force shrank by 150,000 persons (see Figure 1). And second, the number within the workforce that was unemployed rose from 836,000 in mid-1981 to 1.5 million by the end of 1982.¹ Most of this increase in unemployment was cyclical, but Miller (1987) and the [Macdonald] Royal Commission (1985) have noted an increase in structural unemployment in the preceding decade. The synopsis presented below will focus mainly on the consequences for unemployment, because this was the larger of the two cyclical effects. The impact on the size of regional labour forces will be sketched in more briefly.

In August 1981, the unemployment rate exceeded 15 percent only in a few parts of northern Quebec and Newfoundland (see Figure 2). There were, in addition, a few pockets with unemployment in the 10 to 15 percent range in the interior of British Columbia, Quebec, and the Atlantic Provinces, but from Alberta east to the Quebec border unemployment was quite low (generally between 3 and 7 percent). By December 1982, which marked the peak of national unemployment, a very different picture emerges. Unemployment had reached extremely high levels in much of British Columbia, the Atlantic Provinces and the Shield areas of Quebec and Ontario (Figure 3). But even in the industrial heartland of Southern Ontario (in the Windsor and Hamilton-Niagara regions) levels in excess of 15 percent were recorded. Only the Prairie Provinces withstood the tide, with just a few regions recording over 10 percent unemployment. The performance index used by Norcliffe (1987) shows how well the Prairie economy performed at this stage. Two years later, in December 1984 (the end of Statistics Canada's time series based on this system of regions), there had been a modest national recovery (see Figure 1). But as Figure 4 shows, the recovery did not affect all regions. In eastern Canada east and north of Quebec City, the unemployment situation had actually deteriorated. Unemployment levels in the Prairie Provinces had dropped

¹The data used in this paper are drawn from two sources. The unemployment and labour force data published in Statistics Canada's *The Labour Force* are estimates based on a rolling sample, which is periodically corrected following a complete census (such as the June 1981 national census). Statistics Canada stress that there will be some errors in their estimates of month-to-month changes, particularly in certain regions (see note 4). The author has made seasonal adjustments to the published unemployment series by approximating as closely as possible the method used by Statistics Canada. The data used in de-seasonalizing the unemployment series, and in the subsequent sections dealing with employment, were special tabulations prepared for the author by Statistics Canada. These tabulations include some subsequent revisions to employment and unemployment figures and therefore may differ from the original published data.

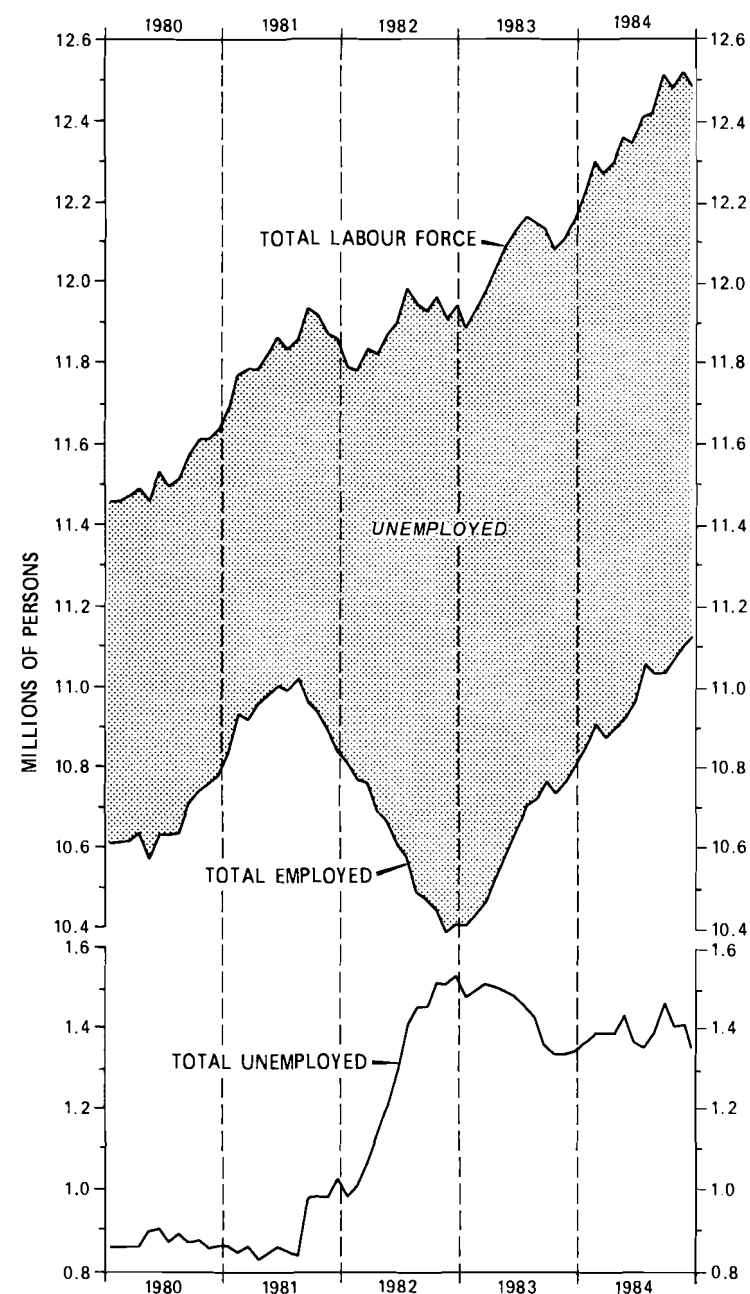


Figure 1

CANADIAN LABOUR FORCE, EMPLOYMENT AND UNEMPLOYMENT 1980-84

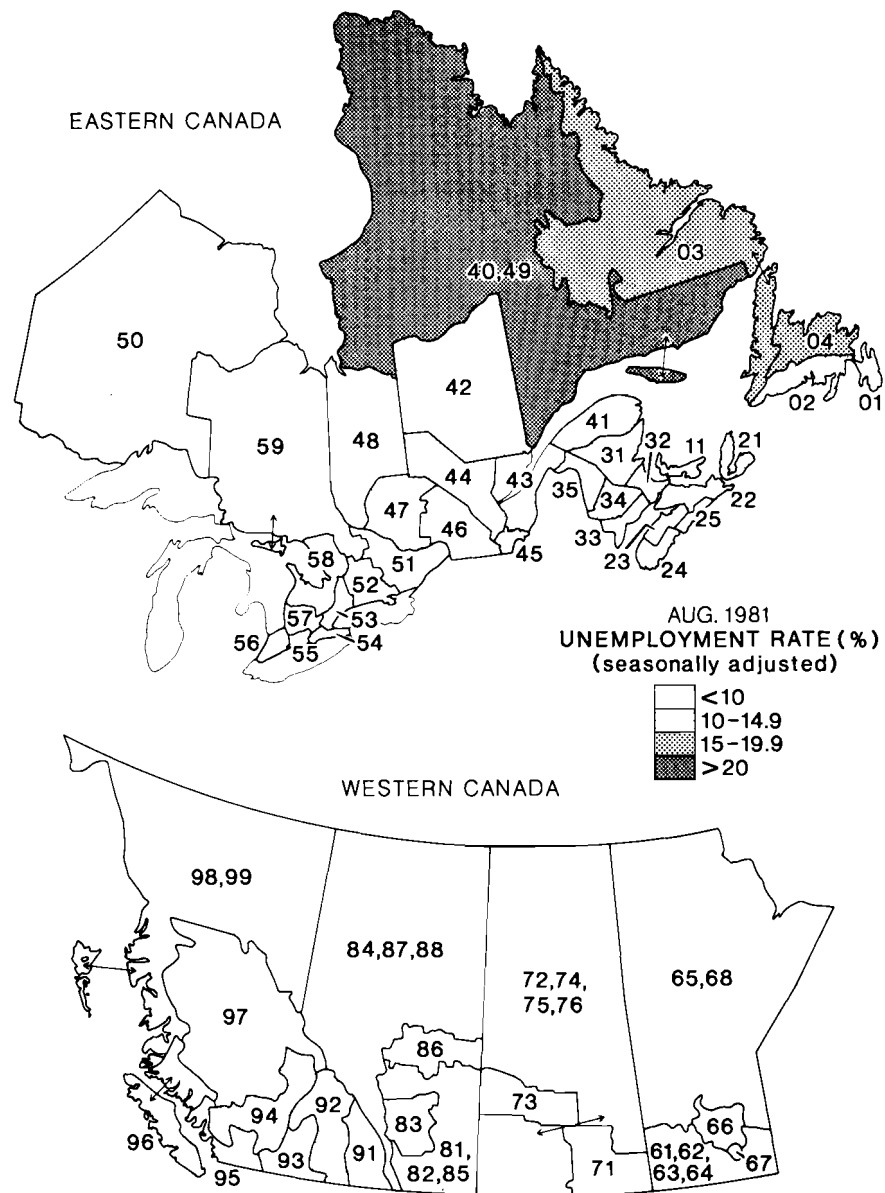


Figure 2

REGIONAL UNEMPLOYMENT RATES (SEASONALLY ADJUSTED) AUGUST 1981

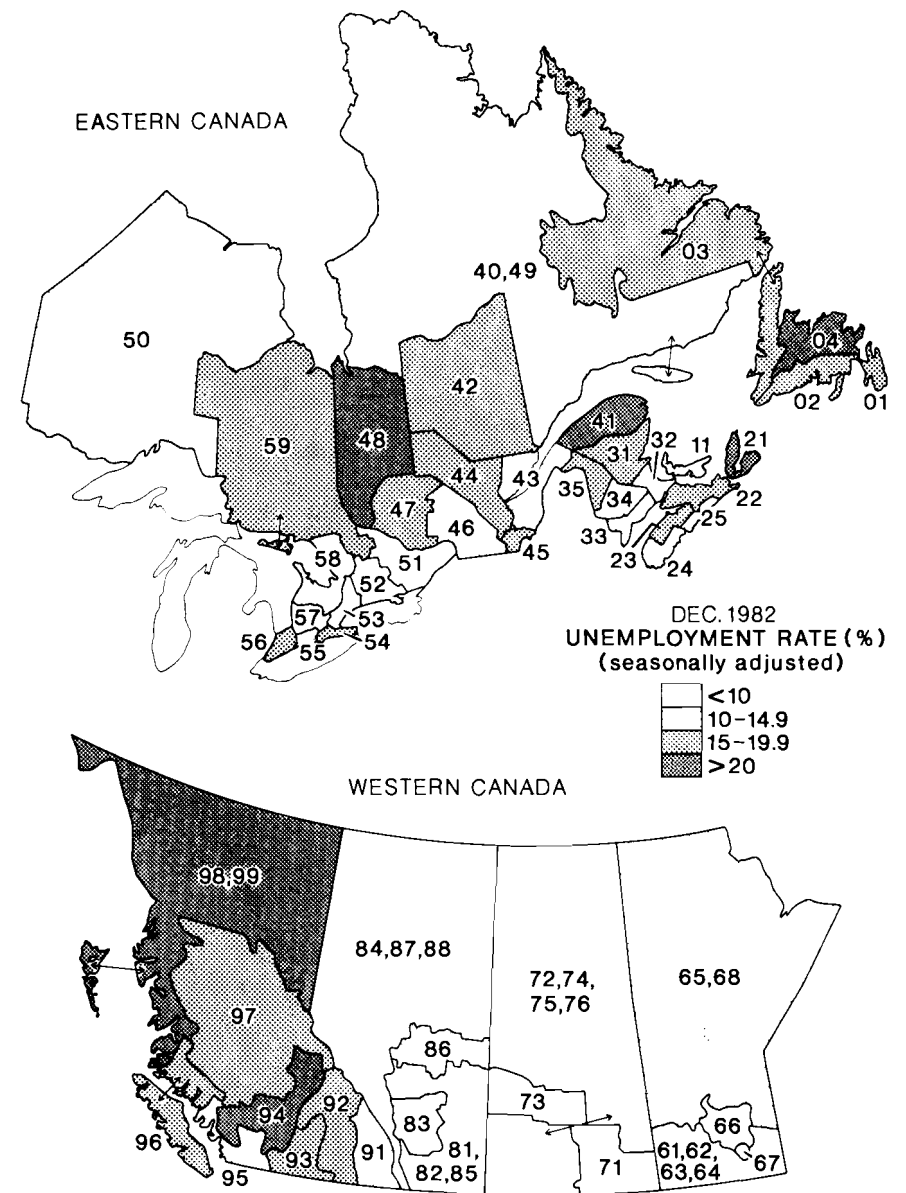


Figure 3

REGIONAL UNEMPLOYMENT RATES (SEASONALLY ADJUSTED)
DECEMBER 1982

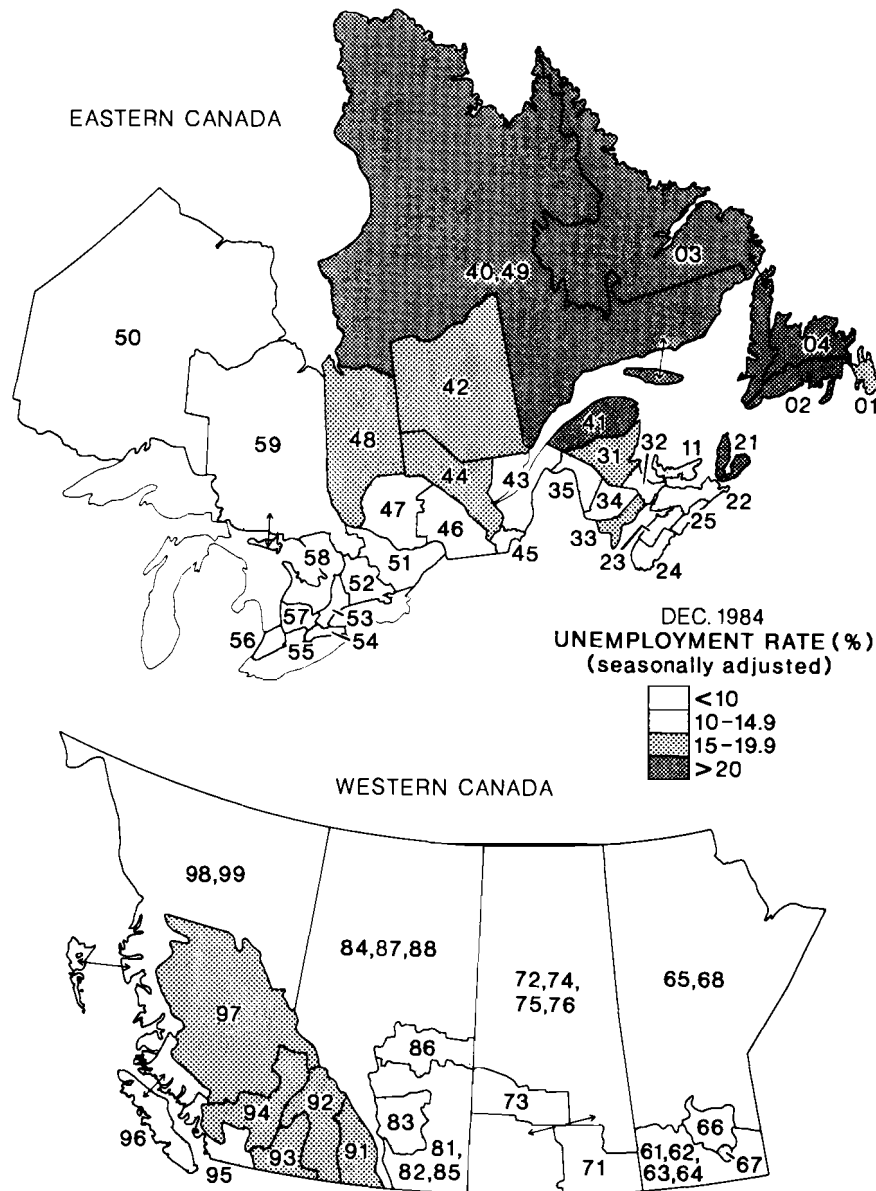


Figure 4
REGIONAL UNEMPLOYMENT RATES (SEASONALLY ADJUSTED)
DECEMBER 1984

very little, while British Columbia improved only marginally. The situation improved most dramatically in Ontario and Southern Quebec.

In some instances national fluctuations are greatly amplified in regional economies, which in consequence are subject to extremely large cyclical perturbations. Hewings (1977), Swan (1972), the Economic Council (1977) and Thirsk (1973) have found unemployment in the Atlantic Provinces, Quebec and British Columbia to be cyclically sensitive in the post-war period. More recently, Raynauld (1987) has classified the Ontario economy with B.C. as quite volatile between 1966 and 1984, whereas the Atlantic Provinces, Quebec and the Prairies were less volatile. It is clear, however, that the variations *within* some provinces are sufficiently large as to cast doubt on the generality of statements that relate to the province as a whole. Thus, during the downswing unemployment in the Kamloops region of British Columbia grew at nearly three times the national rate, whereas in nearby Vancouver it grew at about one and a half times the national rate. Other regions showed the opposite tendency, with a damped response to national employment fluctuations. A case in point is the Ottawa region, where unemployment rose at only half the national rate of increase during the downswing due to the stability of federal government employment. The overall pattern was one of high cyclical sensitivity in the resource periphery (especially certain regions in Newfoundland, Alberta, and British Columbia) and in some industrial regions in Southern Ontario. Employment patterns in the remainder of Central Canada, and parts of Manitoba, Saskatchewan and the Maritimes were more stable.

Regional labour markets display one further characteristic: there are phase differences. Regions may lead the nation into recession, they may have synchronous cycles, or they may follow the national pattern. And there are variable responses at different stages of the business cycle. The recession affected most regions in Canada at about the same time in the summer of 1981. A few regions in the Atlantic Provinces, Ontario and the West were affected as early as the spring of 1981, but overall, there was considerable uniformity. However, if declining unemployment rates are used to measure the recovery, then regional recoveries were much more variable (Norcliffe 1987). The West was very slow to break out of recession, as was Newfoundland. Central Canada recovered well and for the most part led the expansionary phase, although there were a few pockets in the periphery that led Central Canada for particular and local reasons.

Broadly speaking, there was a correspondence between a region's unemployment trends and its labour force fluctuations. For example, the regions of Newfoundland, Saskatchewan and Alberta were not

greatly affected by the recession up to December 1982 because their local oil, gas and fishing industries were still relatively buoyant; unemployment levels in these regions rose quite slowly, while their labour forces continued to grow. This was contrary to the trends evident in most other regions, which were caught up in the recession quite rapidly, where unemployment generally rose quickly, and where labour forces shrank. This correspondence is most evident in the hard-hit regions of British Columbia where unemployment levels soared in 1982; among the eight regions, only Vancouver managed to record a small labour force increase, and four experienced a shrinkage by more than 10 percent of their labour force.

Regional labour force and unemployment trends during the recovery phase also corresponded quite closely. Newfoundland, which experienced worsening unemployment throughout 1983 and 1984, saw a continued decline in its total labour force. Recovery was most marked in Central Canada, with the workforce of all Labour Force Economic Regions growing to exceed their 1981 size as unemployment dropped back to near pre-recession levels. Elsewhere in Canada shifts in the labour force size and in unemployment were variable, but regions scoring a drop in their level of unemployment almost invariably saw their labour force begin to grow again. An extreme case is northern British Columbia: a dramatic drop in unemployment from 1983 to 1984 was accompanied by a 24 percent jump in the size of the workforce as major developments were initiated in the port of Prince Rupert and at the Quintette coal deposit.

Analysis of Labour Force Changes

Previous studies of cyclical change in regional labour markets have for the most part used unemployment as a synoptic measure of change. In practice, the full range of cyclical labour market adjustments is greater (Armstrong and Taylor 1981). Three elements will be considered here. First, there are changes in the size of the total labour force. Second, the proportion of the total labour force that is unemployed may change. And third, the corresponding proportion that is employed may fluctuate. This order of treatment may seem perverse, since unemployment is often conceptualized as the balance of labour supply (the total labour force) and labour demand (the employed part of the workforce); however, the approach adopted in this study makes this the most logical order.²

²There are labour force changes outside the measured labour market, particularly changes in irregular and informal activity, which are not captured by conventional statistical series. These are not treated here.

The Supply Side: Labour Force Changes

Substantial adjustments to the total size of the labour force of Canada and its regions took place during the recession. Between the fourth quarters of 1981 and 1982 the labour force grew at less than one-fifth of the average annual increase of nearly 300,000 achieved in the preceding seven years; there was an increase in early retirements, there were many more discouraged workers (particularly women), and a larger proportion of young adults remained longer in educational and training programs (Social Planning Council of Metropolitan Toronto). Indeed the workforce declined absolutely by some 150,000 persons between August and December 1981. By 1982-83 Canada's labour force growth rate had returned to about 60 percent of the long-term average, rising again to exceed the long-term average in 1983-84.

As Table 1 shows, at the sub-provincial level there was some correspondence between unemployment and labour force changes (and, by extension, with interregional migration patterns). Thus, the regions found to perform comparatively well in terms of unemployment during the 1981-82 downswing—the Prairies, Newfoundland, and certain regions in Southern Ontario with fairly diversified economies—in the main scored modest labour force increases. Conversely, in British Columbia and in other regions of Central Canada and the Maritimes that experienced a rapid increase in unemployment, labour forces frequently experienced an absolute decline. In the two years following, the labour force grew in the great majority of regions, but not at the same rate. The record of regions in the Prairies, British Columbia and Newfoundland is quite mixed, whereas in Central Canada and the Maritimes fairly healthy growth rates were recorded, particularly by metropolitan regions.

Table 2, based on the work of Termote (1987), records some of the dramatic reversals of migration that occurred as a result of these changing regional economic fortunes. Alberta maintained a high rate of net immigration during the first year of the recession, but by 1982 the flow had reversed, and in the following two years there was very considerable net outmigration. British Columbia followed a similar trend, but the inflow dropped much earlier in the recession. Ontario and the Maritime Provinces evince the reverse pattern; although they experienced net out-migration up to 1982, the strong economic recovery in the following year (particularly in Ontario) initiated a flow back into these regions at a substantial rate. The migration effect can have an abrupt impact in local labour markets, particularly in resource towns in the periphery populated by logging, mining and oil and gas exploration camps where new developments or closures take place (Bradbury and St.-Martin 1983).

Table 1
SOURCES OF CHANGE IN REGIONAL EMPLOYMENT

Region	1981-1982					1982-1983					1983-1984				
	ΔU	ΔLF	ΔE	ΔE _s	ΔE _c	ΔU	ΔLF	ΔE	ΔE _s	ΔE _c	ΔU	ΔLF	ΔE	ΔE _s	ΔE _c
1.	+3.2	+0.6	-2.6	-2.1	-0.5	-1.0	+0.5	+1.5	+2.2	-0.7	+2.5	+6.9	+4.4	+1.6	+2.8
2.	+0.6	+0.2	-0.4	-0.6	+0.2	+0.4	+0.8	+0.4	+0.3	+0.1	+2.7	+1.3	-1.4	+0.2	-1.6
3.	+2.7	+5.3	+2.6	-1.6	+4.2	+1.2	-3.0	-4.2	+1.0	-5.2	-1.5	-0.1	+1.4	+0.7	+0.7
4.	+2.4	+1.8	-0.6	-0.9	+0.3	+0.9	+0.6	-0.3	+0.6	-0.9	+0.9	+0.6	-0.3	+0.4	-0.7
11.	+0.8	+0.7	-0.1	-1.1	+1.0	-1.6	+1.4	+3.0	+1.3	+1.7	+0.8	+0.7	-0.1	+0.4	-0.5
21.	+1.3	-2.1	-3.4	-2.2	-1.2	-0.6	+0.3	+0.9	+1.0	-0.1	+0.9	+5.8	+4.9	+2.1	+2.8
22.	+2.2	+0.4	-1.8	-2.5	+0.7	-1.1	+2.0	+3.1	+2.0	+1.1	-0.3	+1.7	+2.0	+1.7	+0.3
23.	+2.2	-0.1	-2.3	-1.8	-0.5	-0.3	+1.4	+1.7	+1.0	+0.7	0.0	+4.1	+4.1	+1.1	+3.0
24.	+2.3	+0.8	-1.5	-1.7	+0.2	-0.3	+1.4	+1.7	+1.3	+0.4	-1.1	-0.5	+0.6	+0.5	+0.1
25.	+4.8	+5.5	+0.7	-2.4	+3.1	-2.2	+4.8	+7.0	+3.9	+3.1	+4.5	+4.2	-0.3	+3.1	-3.4
31.	+1.3	-2.6	-3.9	-2.7	-1.2	-0.9	-2.4	-1.5	+1.5	-3.0	+2.5	+6.2	+3.7	+1.1	+2.6
32.	+2.4	+2.1	-0.3	-1.4	+1.1	-1.1	+0.6	+1.7	+1.6	+0.1	0.0	+0.8	+0.8	+1.3	-0.5
33.	+2.9	-1.9	-4.8	-2.7	-2.1	-0.2	+3.6	+3.8	+2.2	+1.6	+1.5	+0.7	-0.8	+1.4	-2.2
34.	+0.5	-1.3	-1.8	-0.9	-0.9	0.0	-0.2	-0.2	+1.1	-1.3	-0.7	-1.3	-0.6	+0.8	-1.4
35.	-0.4	-0.7	-0.3	-1.0	+0.7	+0.2	+2.1	+1.9	+1.0	+0.9	+0.5	+1.5	+1.0	+0.5	+0.5
40.	-2.0	+0.6	+2.6	-1.6	+4.2	+5.9	+10.0	+4.1	+1.5	+2.6	+0.1	-3.3	-3.4	+0.9	-4.3
41.	+3.6	+0.5	-3.1	-2.4	-0.7	+0.5	+12.5	+12.0	+2.1	+9.9	+1.8	-0.3	-2.1	+1.8	-3.9
42.	+4.4	+0.8	-3.6	-3.6	0.0	-0.9	+1.7	+2.6	+2.8	-0.2	-1.8	+4.6	+6.4	+2.3	+4.1
43.	+2.6	-3.2	-5.8	-11.7	+5.9	-0.6	+17.7	+18.3	+14.2	+4.1	-4.5	+14.2	+18.7	+10.2	+8.5
44.	+5.5	+1.8	-3.7	-8.3	+4.6	-1.5	-4.7	-3.2	+5.3	-8.5	-2.7	+3.0	+5.7	+3.0	+2.7
45.	+5.7	+6.4	+0.7	-4.4	+5.1	-4.0	-2.7	+1.3	+3.9	-2.6	-4.2	+1.0	+5.2	+1.9	+3.3
46.	+55.4	-17.3	-72.7	-70.4	-2.3	-7.8	+34.0	+41.8	+54.2	-12.4	-5.9	+33.8	+39.7	+36.3	+3.4
47.	+8.1	-4.7	-12.8	-3.0	-9.8	-6.4	+4.2	+10.6	+2.9	+7.7	+2.9	-0.8	-3.7	+2.2	-5.9
48.	-1.2	-2.1	-0.9	-2.9	+2.0	-3.8	+1.9	+5.7	+1.9	+3.8	+3.7	-0.8	-4.5	+1.9	-6.4
50.	+8.9	+13.5	+4.6	-3.8	+8.4	-8.5	-1.2	+7.3	+3.4	+3.9	+4.3	-5.4	-9.7	+1.9	-11.6
51.	+14.2	-17.7	-31.9	-11.7	-20.2	-8.3	+19.3	+27.6	+14.3	+13.3	+10.2	+11.2	+1.0	+8.1	-7.1
52.	+11.2	+10.4	-0.8	-7.9	+7.1	-11.2	+3.3	+14.5	+7.0	+7.5	+2.3	+6.6	+4.3	+4.1	+0.2
53.	+85.5	+19.5	-66.0	-90.4	+24.4	-39.9	+37.3	+77.2	+65.9	+11.3	-7.3	+76.4	+83.7	+67.9	+15.8
54.	+34.2	+3.7	-30.5	-24.9	-5.6	-18.0	-13.4	+4.6	+12.4	-7.8	-4.3	+19.5	+23.8	+11.7	+12.1
55.	+14.8	+6.7	-8.1	-10.0	+1.9	-16.4	+0.6	+17.0	+8.8	+8.2	+6.0	+11.3	+5.3	+5.7	-0.4
56.	+9.8	-1.9	-11.7	-12.2	+0.5	-5.2	+10.5	+15.7	+8.4	+7.3	-7.7	+4.5	+12.2	+6.3	+5.9
57.	+13.7	+12.5	-1.2	-14.3	+13.1	-6.5	-7.3	-0.8	+9.7	-10.5	-2.9	+7.0	+9.9	+5.9	+4.0
58.	+7.0	-7.9	-14.9	-8.6	-6.3	-6.6	-0.2	+6.4	+6.6	-0.2	+1.1	+6.5	+5.4	+3.8	+1.6
59.	+21.2	-13.6	-34.7	-17.4	-17.3	-13.9	+15.5	+29.4	+6.4	+23.0	+6.4	-1.7	-8.1	+6.3	-14.4
61.	+2.2	+1.8	-0.4	-3.5	+3.1	-0.5	+4.3	+4.8	+3.9	+0.9	-0.6	-1.6	-1.0	+0.9	-1.9
65.	+2.5	+0.3	-2.2	-1.1	-1.1	-1.9	-1.3	+0.6	+0.7	-0.1	0.0	+2.1	+2.1	+1.1	+1.0
66.	+0.5	-0.4	-0.9	-1.2	+0.3	-0.4	+0.4	+0.8	+0.9	-0.1	0.0	+1.4	+1.4	+0.5	+0.9
67.	+15.7	+9.0	-6.7	-9.3	+2.6	-6.1	+4.5	+10.6	+8.5	+2.1	+0.2	+2.4	+2.2	+6.7	-4.5
71.	+1.6	+5.4	+3.8	-4.1	+7.9	+0.9	-0.5	-1.4	+3.8	-5.2	+1.1	+5.6	+4.5	+2.2	+2.3
72.	+2.5	+0.4	-2.1	-5.8	+3.7	+0.8	+7.9	+7.1	+5.8	+1.3	+3.1	+2.1	-1.0	+0.7	-1.7
73.	+4.7	+5.8	+1.1	-4.2	+5.3	-0.4	+3.6	+4.0	+3.4	+0.6	+2.5	+6.9	+4.4	+2.3	+2.1
81.	+8.2	+7.7	-0.5	-6.2	+5.7	-0.5	-3.0	-2.5	+4.8	-7.3	+2.3	-2.7	-5.0	+3.4	-8.4
83.	+26.5	+9.7	-16.8	-17.1	+0.3	+2.3	+14.0	+11.7	+9.4	+2.3	-0.2	+4.8	+5.0	+14.1	-9.1
84.	+7.3	+4.7	-2.6	-4.5	+2.8	-0.4	+1.1	+1.5	+2.3	-1.2	-3.0	-3.7	-0.7	+3.6	-4.3
86.	+24.6	+2.3	-22.3	-18.2	-4.1	+5.4	-3.6	-9.0	+10.4	-19.4	+4.6	+5.3	+0.7	+10.2	-9.5
91.	+1.6	+0.7	-0.9	-2.3	+1.4	+0.3	+3.3	+3.0	+0.7	+2.3	+0.7	+1.5	+0.8	+1.2	-0.4
92.	+0.6	-3.6	-4.0	-2.0	-2.0	+1.6	+2.8	+1.2	+1.3	-0.1	-0.6	-0.5	+0.1	+0.8	-0.7
93.	+6.5	-7.1	-13.6	-3.8	-9.8	+0.2	+6.8	+6.6	+3.4	+3.2	+3.6	+11.3	+7.7	+2.1	+5.6
94.	+5.2	+0.9	-4.3	-4.0	-0.3	-1.1	+0.7	+1.8	+1.2	+0.6	-0.1	+0.7	-0.6	+0.6	-1.2
95.	+46.9	+10.1	-36.8	-29.4	-7.4	+1.8	-15.4	-17.2	+22.5	-39.7	+9.3	+24.5	+15.2	+15.8	-0.6
96.	+15.3	-2.7	-18.0	-7.8	-10.2	-8.1	+1.7	+9.8	+6.8	+3.0	+4.5	+4.9	+0.4	+3.7	-3.3
97.	+9.2	-0.3	-9.5	-4.7	-4.8	-0.5	+2.9	+3.4	+2.7	+0.7	+0.2	+3.4	+3.2	+1.9	+1.3
98.	+1.6	-0.9	-2.5	-1.6	-0.9	+1.4	+2.4	+1.0	+1.2	-0.2	-4.7	-1.2	+3.5	+0.5	+3.0

LF: Change in total labour force; E: Change in total number employed; U: Change in unemployment; E_s: Change in unemployment due to industrial structure (see text); E_c: Change in unemployment due to competitive effect (see text).

Values are in thousands.

Table 2
NET INTERPROVINCIAL MIGRATION RATES
1980-1985

	Nfld.	P.E.I.	N.S.	N.B.	Que.	Ont.	Man.	Sask.	Alta.	B.C.
1980-81	- 6.3	-10.3	-3.4	-7.2	-3.6	-3.9	-9.2	-4.0	20.7	14.2
1981-82	-10.0	- 7.0	-2.3	-4.1	-4.0	-0.7	-2.6	-0.3	16.3	3.2
1982-83	3.2	4.4	4.5	5.1	-3.8	2.7	2.5	3.7	- 5.0	- 0.5
1983-84	- 3.5	6.4	4.4	2.5	-2.7	4.1	0.3	2.1	-13.6	2.3
1984-85	- 6.1	5.0	2.8	0.0	-1.4	4.2	1.2	-0.3	-11.7	- 0.8

Source: Termote, 1987. Rates are per 1000.

Cyclicity and Unemployment

Although absolute changes in total labour force size were often substantial, particularly during the recovery when overall growth resumed, the biggest labour market adjustments during the first year of the recession were changes in cyclical unemployment (see Figure 1 and Table 1). The cyclical sensitivity of regional unemployment can be modeled using a Brechling (1987) model. This model, which describes the relationship between unemployment rates in a region and a nation, can be expressed in either an additive or multiplicative form. The simplest version, which is used here, is an additive model which states that:

$$U_r = \beta_{r,0} + \beta_{r,1} U_n + \epsilon_r \quad (1)$$

where

U_r is the unemployment rate in region r ;

$\beta_{r,0}$, $\beta_{r,1}$, are regional regression coefficients that are estimated using OLS procedures;

U_n is the national unemployment rate; and

ϵ_r is the usual error term.

The parameters of this model were estimated using seasonally-adjusted unemployment data for the 48 months from January 1981 to December 1984, for each of Canada's 53 Labour Force Regions.³ The results,

³Time parameters can be included in Brechling models. The present time series does not, however, span a full business cycle; hence, their inclusion is inappropriate.

which are given in Table 3, were generally in accord with our expectations of what was happening in various regions.⁴

The model has a simple interpretation. The constant, β_0 indicates the amount by which a region's unemployment rate would stand above or below a national rate of zero, and β_1 is a measure of cyclical sensitivity. The constant was negative in most regions in Western Canada, positive in all regions in Quebec and the Atlantic Provinces, while in regions in Ontario it was distributed around zero. The distribution of the measure of cyclical sensitivity (β_1) shows substantial local variability (see Figure 5). The economies of British Columbia, Alberta (excepting Lethbridge), the Shield regions of Ontario and Quebec, the Gaspé and Newfoundland, plus the Niagara region in Southern Ontario were highly cyclical. Below average cyclical sensitivity was evident in the "agricultural" Prairies, the Maritime Provinces, and most regions between Windsor and Quebec City.⁵

The Combined Impact: Employment Change

The preceding discussion has identified the two major labour force adjustments that occur during a business cycle. First, a person may retire permanently, withdraw temporarily, enter or re-enter the labour force, or migrate, thereby causing fluctuations in labour force size. And second, there are changes in levels of unemployment. In general, the greater part of these changes are cyclical, being the result of fluctuations in the aggregate demand for goods and services. However, smaller changes in structural unemployment also occur. Thus, for any region, total labour force adjustments are given by:

$$LF_{r,t+1} - LF_{r,t} = (E_{r,t+1} - E_{r,t}) + (U_{r,t+1} - U_{r,t})$$

or

$$\Delta LF_{r,t} = \Delta E_{r,t} + \Delta U_{r,t} \quad (2)$$

⁴Some of the parameters should be interpreted with caution for three reasons. Statistics Canada stress that the reliability of their published unemployment data varies and that data for regions 40 and 99 should be used "with caution and qualification". Secondly, the Durbin-Watson statistic indicated the presence of serial correlation among the residuals of regions 2, 23, 31, 34, 35, 48, 52, 58, 61, 67, 83, 86 and 97, which suggests that the estimates for these regions may be inefficient. An attempt to overcome this problem using first differences in the form $\Delta U_{r,t} = b_{r,0} + b_{r,1} \Delta U_{n,t}$ was abandoned because (contrary to expectations) the problem of serial correlation was scarcely reduced. And thirdly, for regions 35 and 40 the t statistic was not significant.

⁵Raynauld (1987) has argued that contrary to popular impressions, and earlier results presented by the Economic Council of Canada (1977), the Ontario economy is volatile. The results presented here would qualify Raynauld's findings to suggest that some regions within Ontario have volatile economies.

Table 3

**RESULTS OF A BRECHLING MODEL FITTED TO CANADIAN REGIONAL
UNEMPLOYMENT DATA JANUARY 1981 TO DECEMBER 1984**

Region	$\beta_{r,0}$	$\beta_{r,1}$	R ² (%)
1. St. John's	3.507	1.147	63
2. South Coast	0.617	1.658	24
3. Labrador	5.823	1.386†	60
4. North Shore	9.797	0.976	42
11. P.E.I.	9.077	0.315†	14
21. Cape Breton	9.776	0.850	53
22. North Mainland	4.933	0.780†	53
23. Annapolis	1.909	0.978	60
24. South Shore	3.076	0.631†	28
25. Halifax	4.165	0.600†	63
31. North Coast	5.848	0.991	54
32. Moncton	8.564	0.602†	44
33. Saint John	2.850	0.856	62
34. Fredericton	6.558	0.583†	29
35. Madawaska	11.703	0.231†	4**
40. Ungava	13.729	0.209†	1**
41. Gaspé	9.011	1.123	39
42. Lac St. Jean	4.185	1.086	47
43. Québec	8.093	0.344†	23
44. Trois Rivières	2.662	1.154	78
45. Eastern Townships	5.439	0.778†	27
46. Montréal	2.509	0.901	87
47. Gatineau	6.562	0.588†	24
48. Rouyn	2.194	1.652†	44
50. Thunder Bay	0.345	0.877	39
51. Ottawa	2.528	0.545†	67
52. Peterborough	4.411	0.599†	40
53. Toronto	-2.431	0.952	91
54. Niagara	-1.533	1.242†	73
55. London	2.022	0.734†	42
56. Windsor	3.815	0.705†	37
57. Kitchener	2.378	0.520†	53
58. Georgian Bay	4.268	0.475†	33
59. Sudbury	-5.745	1.802†	78
61. Brandon	1.269	0.461†	48
65. North Manitoba	-1.112	0.823	51
66. Interlake	5.304	0.201†	11*
67. Winnipeg	-0.491	0.904	86
71. Regina	-0.310	0.607†	64
72. Rural Saskatchewan	-0.132	0.595†	56
73. Saskatoon	-0.003	0.751†	68
81. Lethbridge	-2.916	0.913	79
83. Calgary	-8.634	1.636†	81
84. North Alberta	-5.318	1.234†	83
86. Edmonton	-8.065	1.630†	71
91. Cranbrook	-4.603	1.490†	48

Region	$\beta_{r,0}$	$\beta_{r,1}$	R ² (%)
92. Kootenay	1.145	1.356	52
93. Kelowna	-5.259	1.712†	82
94. Fraser Valley	-3.205	1.822†	70
95. Vancouver	-7.589	1.738†	84
96. Victoria	-1.617	1.436†	78
97. Prince George	-6.855	2.056†	72
98. Prince Rupert	-4.979	1.513†	49

† significantly different from 1.0 (at .05 level in a 2 tailed test).

* significant at .05 level; ** not significant; all other R² significant at < .01.

where $E_{r,t}$ is the employed workforce in region r at time t . Since the combination of labour force and unemployment changes will measure the total regional effect of the recession, the terms of (2) are re-arranged as:

$$\Delta E_{r,t} = \Delta LF_{r,t} - \Delta U_{r,t} \quad (3)$$

which formally states that changes in the size of a region's employed workforce can be employed as a synoptic measure of labour market adjustment. Values of $\Delta E_{r,t}$ for the fifty-three regions for the three time periods 1981-82, 1982-83 and 1983-84 are given in Table 1.

The Role of Industrial Structure

Equation (3) defines the total labour force adjustment quite simply as employment change. Not only does this definition capture changes both in unemployment and in labour force size, it also permits the application of indirect methods designed to assess the contribution of industrial structure to employment growth. Since published Canadian data do not directly classify unemployed persons by previous industry of employment (in contrast, for instance, to U.K. data), this compatibility with indirect methods is a distinct advantage. The relevant indirect method of assessing the contribution of industrial structure to employment change is shift-share analysis. Applying the method to the present problem, we first calculate a set of weights, w_i , measuring the regional proportion of national employment in each industry. Thus in any industry, i :

$$w_{r,i} = E_{r,i} / E_{n,i} \quad (4)$$

The total change in a regional labour force is then expressed as:

$$\Delta E_r = \sum_i w_{r,i} \Delta E_{n,i} + \sum_i E_{n,i}^{(t+1)} \Delta w_{r,i} \quad (5)$$

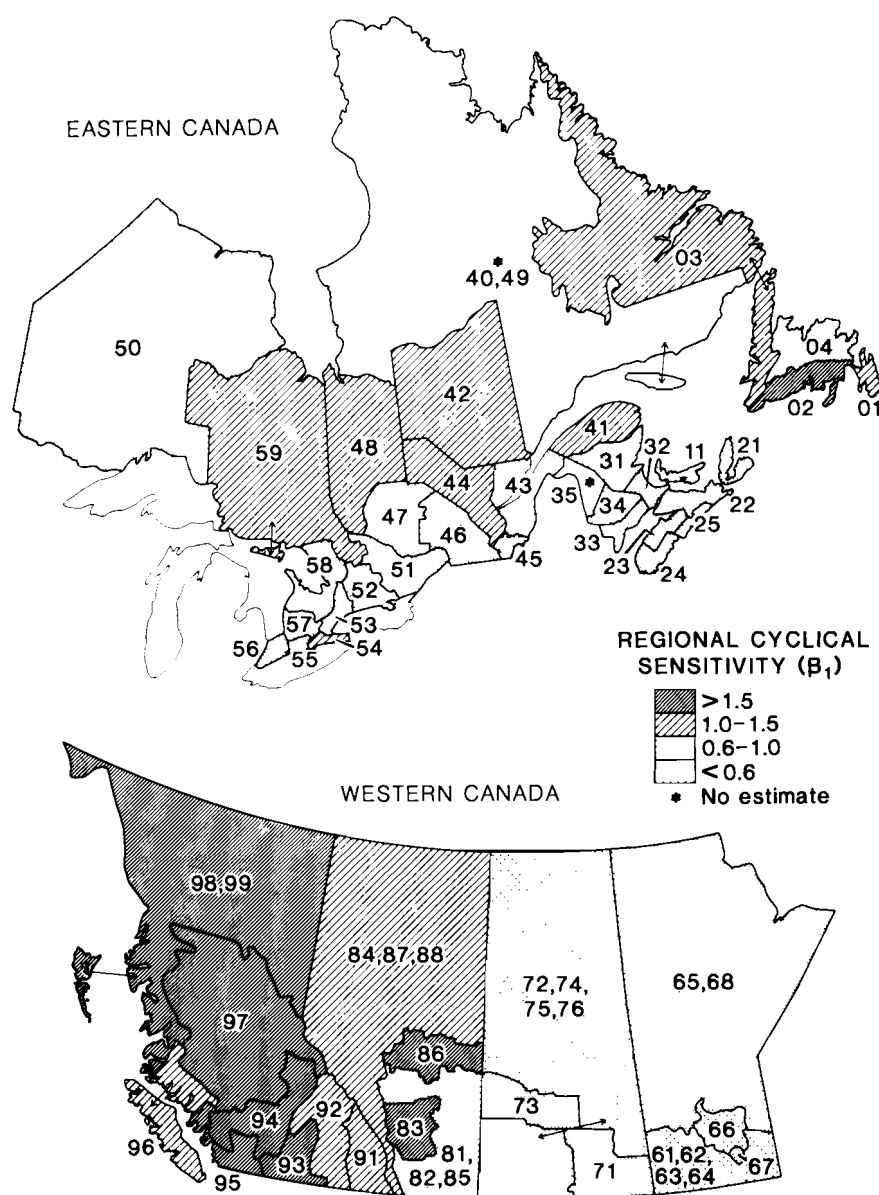


Figure 5
CYCLICAL SENSITIVITY, AS MEASURED BY β_1 (SEE TEXT)

The first term in (5) is the change in regional employment that would occur if the employment change in each industry is applied to the respective regional industrial weight. It is usually referred to as the structural or mix effect (Armstrong and Taylor 1985; Fothergill and Gudgin 1982) and is identified as ΔE_s in Table 1.⁶ The second term, the regional weights effect, measures the employment change that is attributable to changes in each region's proportion of an industry's national employment during any period.⁷ Since it is assumed that an increase/decrease in some way reflects the competitive status of a region, this effect is often referred to as the competitive effect and is identified as ΔE_c in Table 1.⁸

The relationship between employment change and the structural component was expressed statistically as a bivariate regression model with both variables measured as logarithms of the percentage rate of employment change, for each of the three years, 1981-82, 1982-83 and 1983-84 as:

$$\ln(100 + (\Delta E \cdot 100/E)) = b_0 + b_1 \ln(100 + (\Delta E_s \cdot 100/E)) + e \quad (6)$$

where e is the error term.⁹ The results of this model, which was estimated using OLS, are given in Table 4. The slope coefficient was positive in each of the three years, with the structural component accounting for a significant proportion of the variance. It is worth stressing that this result almost certainly underestimates the importance of industrial structure.¹⁰ Overall, these results demonstrate the importance of regional industrial structure, and corroborate a recent statement by Raynald (1987, 88):

⁶The "classical" shift-share model (Stilwell 1969) also identifies a national share, which is here incorporated as part of the first term in equation (5). In an economy as open as that of Canada, there is no strong *a priori* reason why the national growth rate should apply to each region. Regional performance is highly influenced by factors outside Canada, particularly the level of demand for the goods and services produced in a region.

⁷I am grateful to my colleague, Dr. John Marshall, for a proof of this particular form of the relationship.

⁸There has long been a debate over the technique and meaning of shift-share analysis. Of particular relevance are Boddy's (1987) comments. He notes that a negative competitive share may not reflect on a locational disadvantage, but may simply result from a region having an older vintage of plant and machinery. During restructuring, such old capital stock is typically written off.

⁹This functional form is used to avoid the problem of inflated correlations associated with the use of absolute magnitudes. Since growth may be negative, it was necessary to express values about 100 percent in order to calculate logarithms.

¹⁰This same analysis, when based on 12 employment categories, explained only about 10 percent of the variance. By disaggregating heterogeneous categories such as mining and manufacturing, a substantial increase in levels of explanation was

specific industry composition (like the oil industry of the Prairies and the wood sector of B.C.) and associated factors (world price of oil, etc.) should be taken into account to get a clearer picture of the forces underlying the facts [of Canadian regional unemployment].

Although these results point to the general influence of industrial mix, there is some evidence that the importance of this variable weakened as recovery took hold. If one compares the magnitude of the structural and the competitive effects (E_s and E_c) in Table 1, the structural effect dominated in 38 of 53 regions in 1981-82, 34 in 1982-83, but only 23 in 1983-84. Over the same three years, the competitive effect evidently grew in importance, being the larger effect first in 12 regions, then in 19, and finally in 28 regions. Thus by 1983-84, the competitive effect was larger than the structural effect in a majority of the regions. Such a finding is consistent with theories of regional investment that view industrial decline (plant closures, redundancies, etc.) as being a fairly uniform decay process within each industry, but expansion a regionally selective process. The former would make industry mix more important during a downswing, whereas the latter would give emphasis to regional competitiveness during expansionary phases.

Table 4
REGRESSION OF PERCENTAGE EMPLOYMENT CHANGE AGAINST
THE STRUCTURAL EFFECT

Year	b_0	b_1	R^2	SE
1981-82	- 2.320 (1.25)	1.508 (3.70)	22.6%	.038
1982-83	-11.126 (2.97)	3.399 (4.21)	27.4%	.034
1983-84	- 6.025 (1.675)	2.30 (2.96)	15.7%	.040

Values in brackets are t statistics. For b_0 the test in $H_0 : B_0 = 0$.

Discussion

The main finding of this paper is that, during Canada's most recent recession, fluctuations in regional employment and the timing of

achieved. Were data available for further disaggregation, levels of explanation would doubtless increase more.

regional responses to the global recession were governed, in many instances, by the mix of industries that dominate a region's economy. This is not a strong conclusion, because it is based on limited data that are themselves subject to sampling error. Moreover, in many regions the Brechling model used to describe regional cyclical sensitivity has a lower explanatory power than one would like. Unfortunately, Statistics Canada collect very limited data for Labour Force Economic Regions, which makes further analysis difficult. Despite these limitations, the analysis consistently points to industrial structure as having an important influence on labour market adjustments, particularly during the downswing phase of the recession.

Having reached such a conclusion, there remains the task of reconciling these results with those referred to in the introduction, which found industrial structure to be an unimportant variable, particularly in studies based on U.K. data. It is possible that the differences are simply the consequence of using different methodologies. There are, however, also differences of substance. Three characteristics of the Canadian economy are likely to enhance the importance of regional industrial structure.

First, Canada does not have a highly interconnected national economy so much as a series of regional economies that are less well connected than, for instance, are the regions of the U.K. Part of this is attributable to the great size of Canada and the physical distances that separate most regions. But this is only part of the picture. Canadian regions are also widely separated in economic space. Many regions concentrate on producing and exporting a narrow range of staple products in which they have a comparative advantage (Coffey 1987). Economic specialization is a characteristic of the U.K.'s few peripheral regions (Chisholm and Oeppen 1973), but it is even more evident in Canada's vast hinterland, which occupies a large proportion of the nation's territory. Regional specializations include wheat in the southern Prairies; forest products in British Columbia and the "Green North"; fish on the Atlantic and Pacific Coasts; minerals on the Shield and in other favoured localities; oil and gas in Alberta and Saskatchewan; and potash in Saskatchewan. Secondary manufacturing is confined largely to the Windsor-Quebec City axis (Yeates 1979), and the most important sector within manufacturing (vehicles and parts) is highly concentrated in a few towns within the axis. Even the service sector shows a degree of regional specialization: federal and provincial administrations are localized in their respective seats of government; business services are concentrated in Montreal, Toronto, Calgary and Vancouver; and other high-level producer, consumer, and community services such as universities and major hospitals are found mainly in the larger metropolitan regions.

The second peculiarity of the Canadian economy is that, despite its openness, it is strongly connected with only one other economy, the United States, which accounts for approximately 75 percent of Canadian trade (Norcliffe and Featherstone 1988). The only other large country with a comparable penchant for exporting resource staples and importing end products is Australia, which has a greater diversity of trading partners (Conlon 1985). Although there is some domestic demand for Canadian staples, and some value is added in such activities as sawing wood, making paper, and smelting metals, the majority of Canadian staple output ends up in U.S. markets in either a raw or semi-processed form (Watkins 1977). National accounts statistics (United Nations 1985) show that, in 1982, merchandise exports accounted for 23.6 percent of Canadian GDP, compared to 20.3 percent in the U.K. (and a mere 6.8 percent for the United States). The difference

Table 5
PERCENTAGE CHANGE IN CANADIAN EMPLOYMENT BY MAJOR SECTOR
1981-82, 1982-83, 1983-84 (4th quarter)

Sector	1981-82	1982-83	1983-84
Agriculture	-1.2	+3.8	-5.4
Mining: metals and non-metals	-34.5	-3.2	+8.0
Mining: fuels and services	-12.0	+5.6	+19.6
Forestry	-6.2	+18.9	-3.9
Fishing and hunting	+0.3	-4.4	-7.2
Manufacturing: durables			
- wood industries	-23.9	+24.4	-2.1
- primary metals	-15.4	-1.6	+9.0
- machinery	-8.0	+1.2	-23.5
- transport equipment	-16.0	+14.6	+24.2
- electrical	-7.9	-3.8	+36.1
- other durables	-14.0	+2.2	-4.4
Manufacturing: non-durables			
- food and beverages	-2.5	+0.3	-5.4
- rubber and plastics	-26.6	+18.9	+15.6
- textiles	+8.1	+11.4	-22.7
- clothing and knitting	-17.4	+15.0	-3.9
- other non-durables	-8.2	+6.2	+3.0
Construction	-13.2	-1.1	+3.8
Transport and utilities	-3.7	-3.1	-0.9
Trade	-5.0	+3.4	+4.6
Finance, insurance, real estate	-4.9	+7.2	+3.0
Services	+1.7	+4.5	+2.5
Public Administration	+2.9	+0.1	+1.0
All industries	-4.3	+3.4	+2.4

Source: Statistics Canada, special tabulations.

between these two percentages is not large, but Britain's trade is spread across a large number of trading partners, whereas Canada's trade is highly influenced by demand signals from one source—the United States. The diversity of sources of demand signals in the U.K. may well weaken structural effects.

The third characteristic which makes industrial structure more important to regional employment in Canada than in the U.K. is the degree to which Canada's staple industries are cyclically sensitive (see Table 5). In comparison, these resource industries play a much smaller role in the U.K. economy. Admittedly the manufacture of durable and non-durable goods and construction were also much affected by Canada's slump in 1981, but in Canada's peripheral regions it was the resource sector that was most sensitive.

These three characteristics help to explain why, in Canada, industrial structure has an important influence on the way regional unemployment responds to major business cycles. They are also relevant to the conclusion reached by Marchand (1986), for although it is clear that the 1981-84 recession was part of a Juglar cycle that was experienced globally, the response in Canada varied a lot from region to region. The evidence presented here points to industrial structure being an important factor accounting for that variability.

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