

THE DEVELOPMENT OF REGIONAL UNEMPLOYMENT DIFFERENTIALS IN FINLAND IN THE 1990S

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This paper addresses the issue of regional response to national economic cycles. Two basic alternatives for a region to react to national development are presented. The empirical analysis deals with the unemployment situation in Finland which has undergone rapid changes in the 1990s. The main questions are: Has a significantly different regional pattern of unemployment begun to arise in Finland? Has the dynamics of regional unemployment differentials changed? In analysing regional unemployment differentials, methods based on sequential and recursive estimations are used. The results suggest that unemployment has been more equally shared among regions than in previous recessions. The dynamics seems to have met with changes. (JEL J64, R11)

1. Introduction*

The spatial perspective of the labour market is often neglected in labour market analysis, though it is seen as important for many reasons (cf. Fischer and Nijkamp, 1987, p. 2). Labour markets are spatially segmented and geographical space exerts a frictional effect on labour market adjustment processes. The spatial distribution of job loss induced by economic restructuring and adjustment processes contrasts with that of new job creation. Unemployment and labour force participation rates suggest that regional disparities in the utilization of labour resources have been relatively large even within highly developed and integrated countries (Ter-

vo, 1992, 1993). Both equilibrium and disequilibrium factors may account for the geographical distribution of unemployment (Marston, 1985; Pehkonen and Tervo, 1998).

Most importantly from the standpoint of unemployment analysis, spatial variations in the dynamics of unemployment generally seem to be strong. A study relating to the OECD countries indicated that, although the national unemployment rate is a dominating factor in the changes in the unemployment rate for each individual region, about 30 percent of the regional movements cannot be explained at the national level (OECD, 1989).

Following Thirlwall (1966) and Brechling (1967), a considerable number of studies have examined the dynamics of regional unemployment disparities (cf. Fischer and Nijkamp, 1987, pp. 16–17 and Forrest and Najbitt, 1988; Caroleo, 1990; Chapman, 1991; Byers, 1991; Carballo and Levia, 1992; as examples of recent

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studies). When comparing periods over which the overall unemployment rate has increased, ratio- and level-based measures will give different impressions about the direction of change in regional unemployment differentials. Past analyses in different countries and over different time periods have shown both smaller proportionate as well as larger absolute fluctuations in the high unemployment regions (Gordon, 1985). As far as Finland is concerned, Okko (1981b) showed that regional differences in the ratios of the unemployment rate were at a minimum during the recession in the 1970s when the aggregate rate of unemployment was at its maximum. At the same time absolute differences in regional unemployment rates were very high.

In the 1990s many countries faced a phase of slow or even declining economic growth. At this respect Finland was one of the best – or worst – examples. After the exceptionally rapid growth of the 1980s when GDP grew by an average of 4% annually, the standard of living rose rapidly and unemployment was very low, the Finnish economy developed a sudden downward trend.¹ The crisis into which Finland drifted led to a dramatic rise in unemployment climbing within a few years from about 3% to over 20%, one of the highest rates in Europe. Economic recovery since 1994 has only slowly reduced unemployment.

With this rapid rise in unemployment, following a downward trend in the latter half of the 1980s, it is of interest to examine whether regional patterns of unemployment rates have changed. Regional differences in unemployment have traditionally been wide and relatively fixed in Finland (Pehkonen and Tervo 1997). In contrast to previous recessions, areas once relatively immune from job losses appeared to be suffering particularly badly. It seems, however, that the worst unemployment areas have remained the same. The nature of recent changes in the patterns of regional unemployment in Finland merits, however, a thorough analysis.

This paper addresses the issue of regional response to national economic cycles. The main questions considered in the paper are: Has a significantly different regional pattern of unemployment begun to arise in Finland? Has the dynamics of regional unemployment differentials changed?

These questions will be analysed from different starting points in this paper. First, a framework for the analysis is introduced. Second, recent developments in the regional labour markets are outlined. Third, the dynamics of regional differentials are analysed. In these analyses, methods based on sequential and recursive estimations are used. The last section summarizes the findings.

2. Absolute and proportional fluctuations

One way of looking changes in the regional pattern of unemployment is to compare movements in regional rates with those in the national rate. We may differentiate between two 'basic' alternatives in the response of regional unemployment differentials to the fluctuations in overall unemployment. In the first of these, absolute differences in regional unemployment rates do not change, while in the second proportional differences remain unchanged.

In the first basic alternative, the number of unemployed in a region during a recession increases in relation to the labour force of that region. Roughly, each region loses jobs in proportion to the number of its existing jobs. In this case, absolute differences in regional unemployment rates do not alter even if proportional differences narrow with the consequence that the share of the unemployed in the low unemployment regions grows. Recession treats all regions equally, irrespective of their previous unemployment. This alternative is implicitly based on the notion that prevailing patterns of regional unemployment differentials depend on varying, region-specific and permanent (non-cyclical) unemployment. New unemployment resulting from recession will change these fixed patterns temporarily as it divides up between regions in accordance with the labour force of

¹ For the analysis of the reasons of the Finnish economic crisis in the 1990s, see e.g. the special issue of *Finnish Economic Papers* (Vol 9, No 1, 1996).

each region, not in accordance with fixed non-cyclical unemployment.

In the second basic alternative, recession treats regions in relation to their present unemployment situation. The distribution of old unemployment also dictates the distribution of new unemployment so that the level of prevailing unemployment in a regional economy straightforwardly reveals its receptivity to resist recession. This means that proportional differences in regional unemployment rates, as well as regional shares of unemployment, will remain the same and absolute differences will grow. This also means that weak regions suffer more from recession than more favoured regions because they lose proportionately more jobs.

Experiences from different countries have shown that the development usually follows a pattern between these two basic cases. The normal relationship between regional and national unemployment is between linear and multiplicative so that ratios of unemployment between regions fall and the differences between them rise during recessions (OECD, 1989; Gordon, 1985; Okko, 1981a). Clearly, there are also many other alternatives for the development of regional patterns of unemployment rates during a recession. For example, absolute differences may decrease or proportional differences may increase, or the relative positions of individual regions may also change completely (cf. Pehkonen and Tervo, 1998). Such cases, however, rarely occur, especially if the analysis is directed at large regional units which is the case in our analysis.

3. Outlining recent regional development in the labour market

In the following analyses, Finland is crudely divided into four sub-regions. Uusimaa, which includes the greater Helsinki area, is the most developed area in Finland. Southern Finland (SF) consists of the fairly developed southern parts of the country, excluding Uusimaa. Central Finland (CF) comprises the central part of Finland and Northern Finland (NF) consists of

the sparsely populated northern and eastern parts of the country.

Figure 1 shows the patterns of development in the four 'regional labour markets' in 1976–97I. The upper curves indicate changes in labour supply (size of the labour force), the lower curves changes in labour demand (number of employed) and the areas between these curves open unemployment (number of unemployed). The data is based on Labour Force Surveys, compiled by Statistics Finland.

As Figure 1 shows, the number of jobs increased in all regions around 1980. In 1976–85, job growth was about 15% in all areas except Southern Finland, where it was 8%. Growth continued in Uusimaa in the latter half of the 1980s while in other regions the number of jobs either remained stable or started to decline. Because of migration, the labour supply continued to rise sharply in Uusimaa.

The deep economic crisis in the beginning of the 1990s cut sharply the number of jobs in all regions. The proportional loss of jobs was slightly smaller in Uusimaa compared with the other country, being 15% in Uusimaa and 18% in the country as a whole in 1990–94. On the whole, the number of jobs in Uusimaa fell to the level of the late 1970s while in the other regions it fell to the level of the late 1950s.

As marginal workers withdrew from the market ('the discouraged worker-effect'), or stayed outside the market, the labour supply also decreased. This decrease, however, was much smaller compared with the decrease in the number of jobs, leading to rapid growth in open unemployment. The number of jobs was lowest in 1994 after which it has slowly grown. It is however noteworthy that the growth of jobs has only taken place in the southern parts of the country, especially in Uusimaa where it was 9% in 1994–97I. As labour supply has also increased, the subsequent decrease in unemployment has remained slow.

The number of unemployed rose dramatically in all regions in the 1990s. However, there are obvious regional differences. Compared with the situation in 1990, the number of unemployed increased over tenfold in the 'best' region, Uusimaa, while in Northern Finland it does not increased 'even' fourfold. Compared

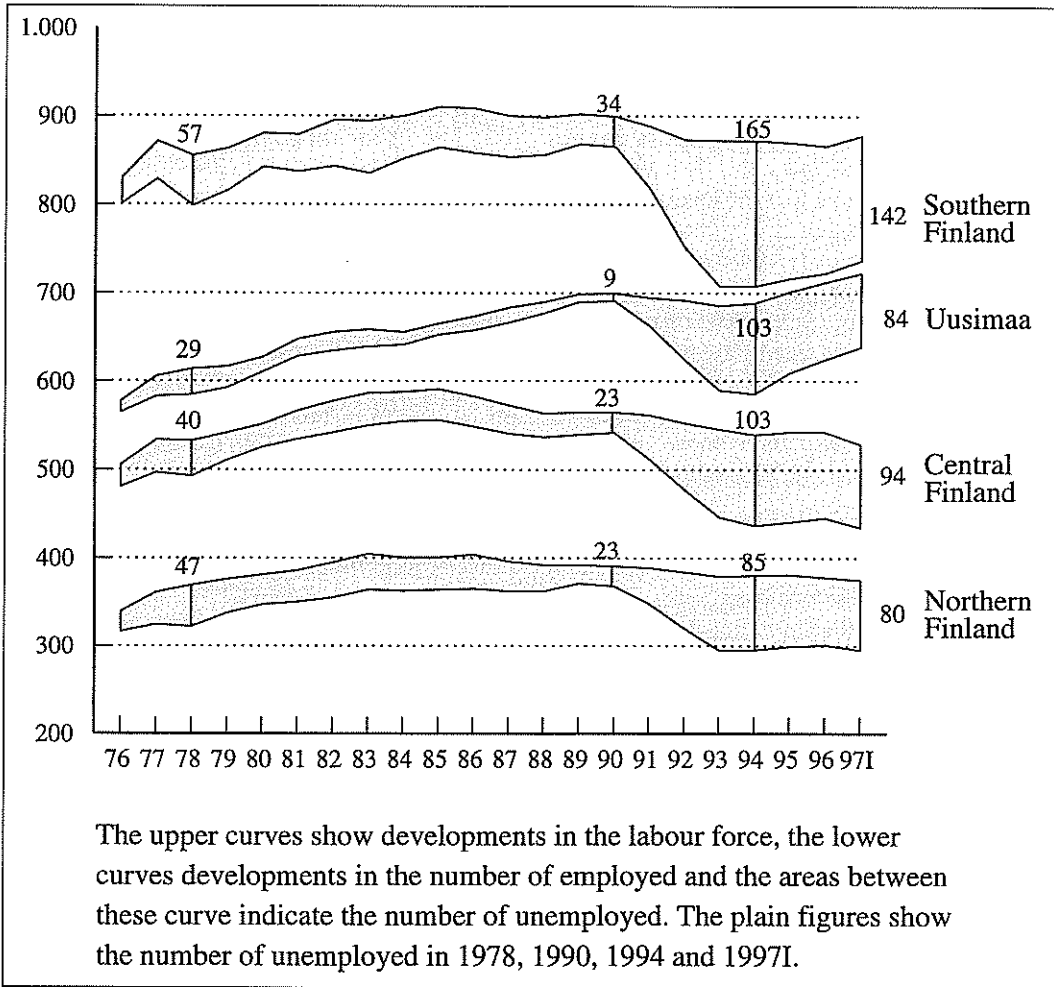


Figure 1. Regional labour market development in Finland, 1976–1997I.

with the earlier recession in 1978, the number of unemployed in 1994 was not now even two-fold in Northern Finland while in Uusimaa it was over threefold. This would speak in favour of narrowed unemployment differentials.

4. The dynamics of regional unemployment differentials

4.1 Development in four regions

Below, the dynamics of regional unemployment differentials in Finland in 1987 – 1997 is analysed. The data is monthly, containing un-

employed job-seekers, based on Employment Service Statistics of the Ministry of Labour. The last month available is February 1997.

Figure 2 shows the development of national unemployment rate and the differences of the national and regional unemployment rates in the four regions in 1987–97. The differences indicate regional unemployment development in absolute terms. Figure 3 introduces two measures of regional unemployment development of which the first one measures it in absolute terms and the second one in proportional terms. In the first indicator, the sum of the absolute values of regional differences was calculated and divided by 10. The other measure is the coeffi-

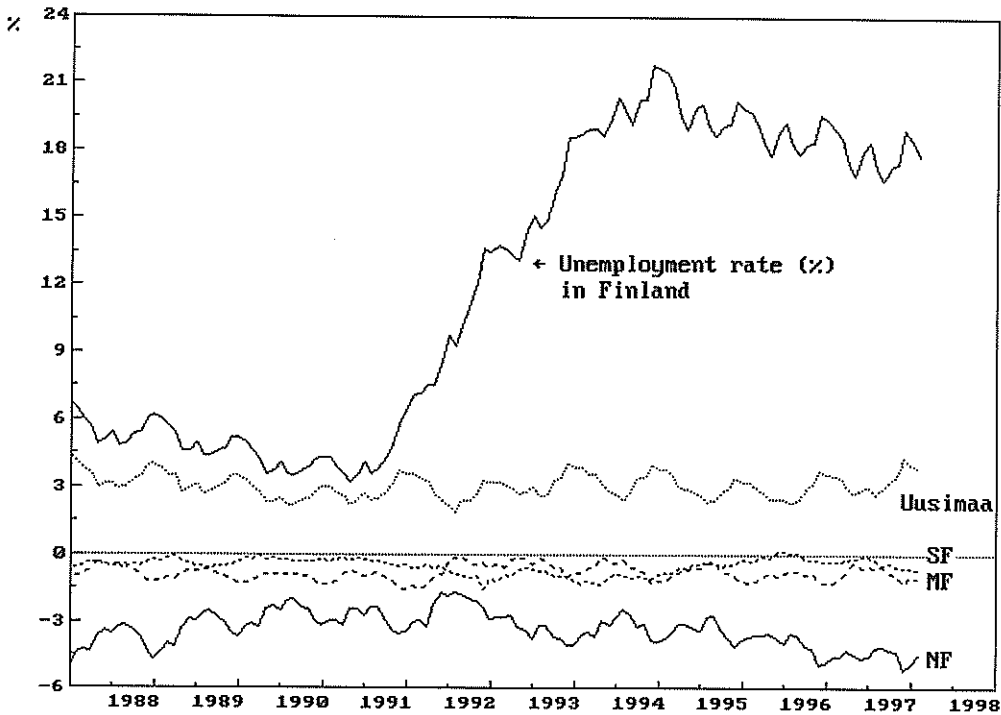


Figure 2. Developments in differences between national and regional unemployment rates, 1987(1)–1997(2).

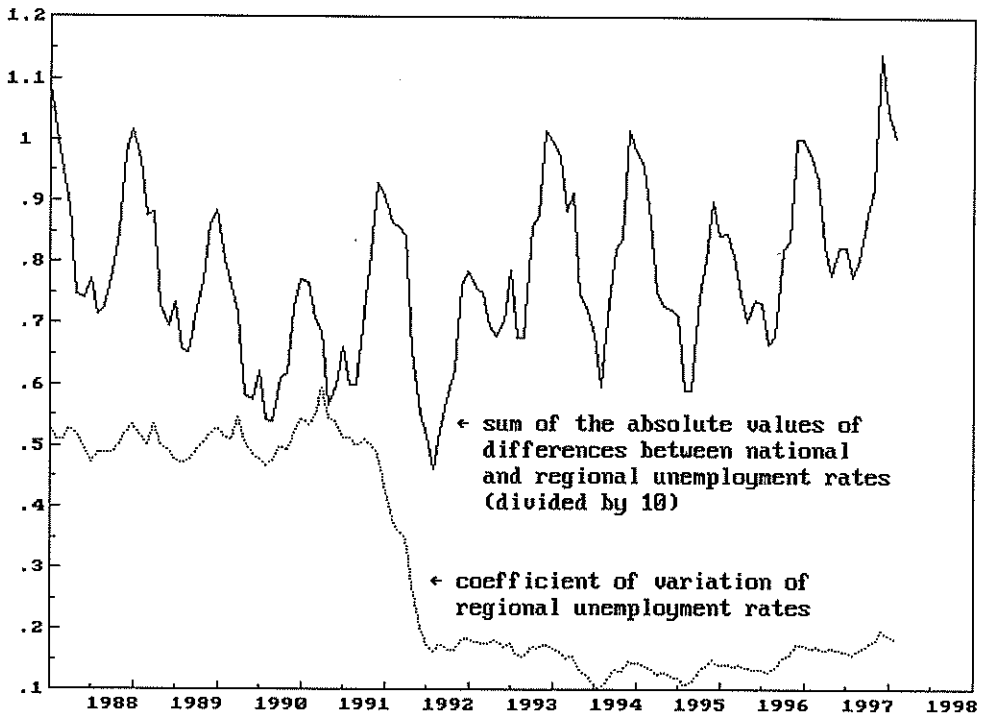


Figure 3. Development in regional unemployment differentials measured in absolute and proportional terms, 1987(1)–1997(2).

cient of variation of regional unemployment rates which indicates proportional development in regional unemployment.

The national unemployment rate was 6.7% at the beginning of the period (Figure 2). It fell in the years 1987–90 and remained at a very low level at the beginning of the 1990s, being slowest in 1990(5), 3.2%. The unemployment rate started to rise sharply around 1990(11), decelerated slightly from 1992 and reached its peak, 21.8%, in 1993(12), after which it has slowly decreased. At the end of the period, 1997(2), the unemployment rate was 17.8%.

Contrary to earlier experiences, *absolute* differences in regional unemployment rates seem to have remained rather stable in 1990–93 (Figure 2), even narrowing during the early stages of the downturn. However, after 1993 absolute differences seem to have slightly grown. This finding is supported by the indicator measuring absolute differences presented in Figure 3. These results show that absolute differences were smallest around mid-1991, after which they have grown.

The development of the coefficient of variation of regional unemployment rates clearly indicates a narrowing of unemployment differences (Figure 3). This proportional narrowing was rapid at the very outset of the recession and had leveled out by the end of 1991.

As expected, the share of unemployed in Uusimaa, which is a low unemployment area, increased dramatically during the recession. The increase was very rapid at the beginning of the recession and leveled out later. This share was less than 10% in 1990 and more than 20% at the end of 1991, peaking at 24.1% in 1994(2). Correspondingly, these shares decreased in other regions, particularly in Northern Finland, which is traditionally the high unemployment area. In Southern Finland, the share has remained rather stable.

In all, these findings would show that new unemployment caused by the recession has been distributed among the regions differently compared the earlier unemployment, resulting in narrowed proportional differences. Even the absolute differences narrowed at first. These findings would also suggest that, contrary to earlier experiences, the development of region-

al unemployment differentials was close to our first basic alternative according to which the recession does not distinguish between low and high unemployment regions. Jobs vanished equally in all regions regardless of their earlier unemployment, or economic, situation. This is, however, only a crude interpretation and does not take into account variation through time. This dynamics will be examined more thoroughly in the following analysis.

4.2 Regional response models

The relationship between regional and national unemployment may simply be investigated by regressing the rate of unemployment for a particular region on that for the country as a whole (e.g. Gordon, 1985). The basic approach is to estimate the following equation:

$$(1) \quad y_t = \beta_0 + \beta_1 x_t + \varepsilon_t$$

where

y_t is the regional unemployment rate at time t ;

x_t is the national unemployment rate at time t ;

ε_t is a disturbance term; and

T is the number of observations.

The slope parameter β_1 in equation (1) may be interpreted as a measure of the responsiveness of regional unemployment to changes in the national rate. With untransformed unemployment rates (linear relationship) the parameter provides a measure of cyclical sensitivity in absolute terms. In multiplicative relationship with logged unemployment rates the same parameter indicates the relative sensitivity in proportional terms. If the first basic alternative depicted in Section 2 takes place the response coefficients of a linear equation will be equal to one, while in the second alternative they will be steeper in high unemployment areas than in low unemployment areas. On the contrary, the response coefficients of a multiplicative equation are equal to one in the second alternative, while in the first alternative they are steeper in low unemployment areas compared with high unemployment areas.

Earlier studies have shown that, typically, the estimated response coefficients in linear formu-

Table 1: OLS regression of regional on national unemployment rates, 1990(10) – 1997(2)

Region	Linear regression (absolute variations)		Log-linear regression (proportionate variations)	
	Response coefficient	R ²	Response coefficient	R ²
Uusimaa	0.978 (0.014)	0.986	1.441 (0.029)	0.970
Southern Finland	0.992 (0.010)	0.992	0.947 (0.007)	0.996
Central Finland	0.995 (0.010)	0.992	0.897 (0.011)	0.989
Northern Finland	1.091 (0.019)	0.979	0.842 (0.016)	0.974

Note. Bracketed values are standard errors.

lations are less than one in low unemployment areas and greater than one in high unemployment areas. As far as Finland is concerned, Okko (1981b) showed that those coefficients were 0.57 and 1.87 for the labour districts of Helsinki and Rovaniemi for the period 1963–80. These labour districts are the ones in which unemployment rates have been lowest and highest, respectively.

For the period of high unemployment, 1990(11) – 1997(2), the estimated response coefficients in the linear formulations turned out to be quite near to one in all four regions (Table 1). The estimated coefficient was 0.98 in Uusimaa, 0.99 in Southern Finland, 0.99 in Central Finland and 1.09 in Northern Finland. In log-linear formulations, the estimated response coefficient of Uusimaa was 1.44, while in other regions they were less than one, 0.95, 0.90 and 0.84, respectively (Table 1). These results confirm the conclusion that the overall development during the present recession has been near to the development patterns depicted in our first basic alternative.

From our point of view, a more interesting point than the overall situation of the response coefficients is their temporal development in the course of the time when Finland entered a high unemployment era. In the estimations above, the parameters were assumed to be constant over the whole period. Only if the structure of the regression model is allowed to vary through time, may the question of how region-

al unemployment responses have changed through time then be investigated. Elements of changing unemployment relationships may be incorporated into our analysis by subdividing the total time period and by estimating models for these sub-periods separately. Another possibility is to use recursive estimation technique which also allows changes in the regression model over time to be tracked in terms of parameter estimates. It has also the advantage that changing regional unemployment responses can be investigated without any a priori imposition of particular sub-periods.

To understand the basis of recursive estimation, consider the general linear model based on T time periods

$$(2) \quad y = X\beta + \varepsilon$$

where

y is the (T x 1) vector of observations on the dependent variable;
X is the (T x K) matrix of observations on the K independent variables
β is the (K x 1) vector of regression coefficients; and
ε is the (T x 1) vector of disturbances (assumed to have mean zero and variance σ²).

Treating each row (time period) of equation (2) separately gives the form

Table 2: OLS regression of regional on national unemployment rates in five sub-periods, linear model

Region and sub-period		Response coefficient	R ²
Uusimaa	1987(1) – 1988(12)	0.313 (0.036)	0.777
	1989(1) – 1990(12)	0.364 (0.039)	0.797
	1991(1) – 1992(12)	0.968 (0.031)	0.978
	1993(1) – 1995 (1)	0.798 (0.106)	0.712
	1995(2) – 1997 (2)	0.830 (0.124)	0.661
Southern Finland	1987(1) – 1988(12)	0.963 (0.045)	0.954
	1989(1) – 1990(12)	1.087 (0.031)	0.983
	1991(1) – 1992(12)	1.039 (0.013)	0.996
	1993(1) – 1995 (1)	0.986 (0.073)	0.889
	1995(2) – 1997 (2)	0.960 (0.053)	0.934
Central Finland	1987(1) – 1988(12)	1.216 (0.071)	0.931
	1989(1) – 1990(12)	1.272 (0.033)	0.985
	1991(1) – 1992(12)	0.930 (0.024)	0.985
	1993(1) – 1995 (1)	1.203 (0.056)	0.953
	1995(2) – 1997 (2)	1.226 (0.041)	0.975
Northern Finland	1987(1) – 1988(12)	1.973 (0.070)	0.973
	1989(1) – 1990(12)	1.633 (0.093)	0.934
	1991(1) – 1992(12)	1.106 (0.038)	0.975
	1993(1) – 1995 (1)	1.147 (0.097)	0.859
	1995(2) – 1997 (2)	1.057 (0.118)	0.778

Note. Bracketed values are standard errors.

$$(3) \quad Y_t = x_t' \beta_t + \varepsilon_t, \quad t = 1, 2, \dots, T$$

where

Y_t and ε_t are now scalars,
 x_t' is a row vector of K observations on the independent variables at time t ; and β_t is the $(K \times 1)$ vector of regressions coefficients at time t .

If the regression relationship is constant over time, then

$$(4) \quad \beta_1 = \beta_2 = \dots = \beta_T = \beta$$

Recursive estimation consists of estimating the T -period relationship of equation (2) by sequentially updating the OLS estimates a row at a time for $t = K + 1, K + 2, \dots, T$. The initial estimate must be based on the first K observations to produce a full-rank solution. The updating formulae for the least squares outcome are given in Doornik and Hendry (1994, p. 267–8; see also Hepple 1979).

In the first phase of the empirical analysis, we subdivided the total time period into five

equal-sized sub-periods and estimated models for these sub-periods separately by OLS. The sub-periods were 1987(1) – 1988(12), 1989(1) – 1990(12), 1991(1) – 1992(12), 1993(1) – 1995(1) and 1995(2) – 1997(2). Table 2 and Figures 4–7 present these results for the four regions.

The estimation results would suggest that regional responses have changed in the course of the time. As expected, the estimated response coefficients of the first two sub-periods, which represent time before the recession, were small in Uusimaa and high in Northern Finland. Over the next two years, when the absolute differences in regional unemployment rates even slightly decreased, the situation reversed. Since then, the situation seems to have been restored in Southern Finland and Central Finland, where also the initial changes in estimated response coefficients were rather small. There has, however, been only slight restoration in Uusimaa and no restoration at all in Northern Finland.

In the second phase of the analysis, we estimated recursively regional response models by OLS for two contrasting regions, Uusimaa and

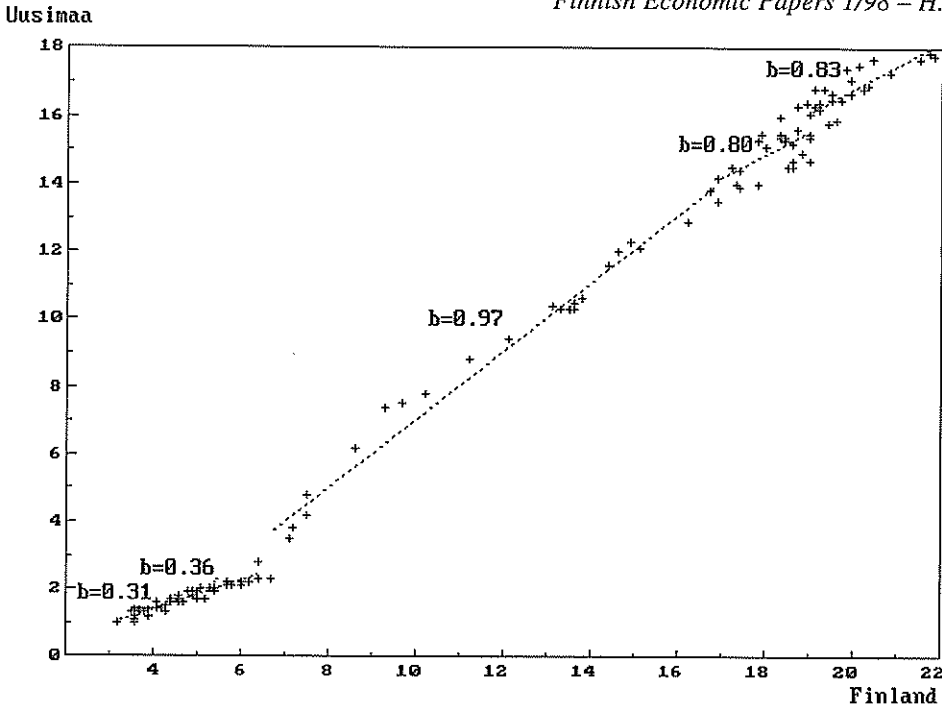


Figure 4. Cross-plot of national unemployment rate to Uusimaa unemployment rate with five sequential regression lines and their slopes.

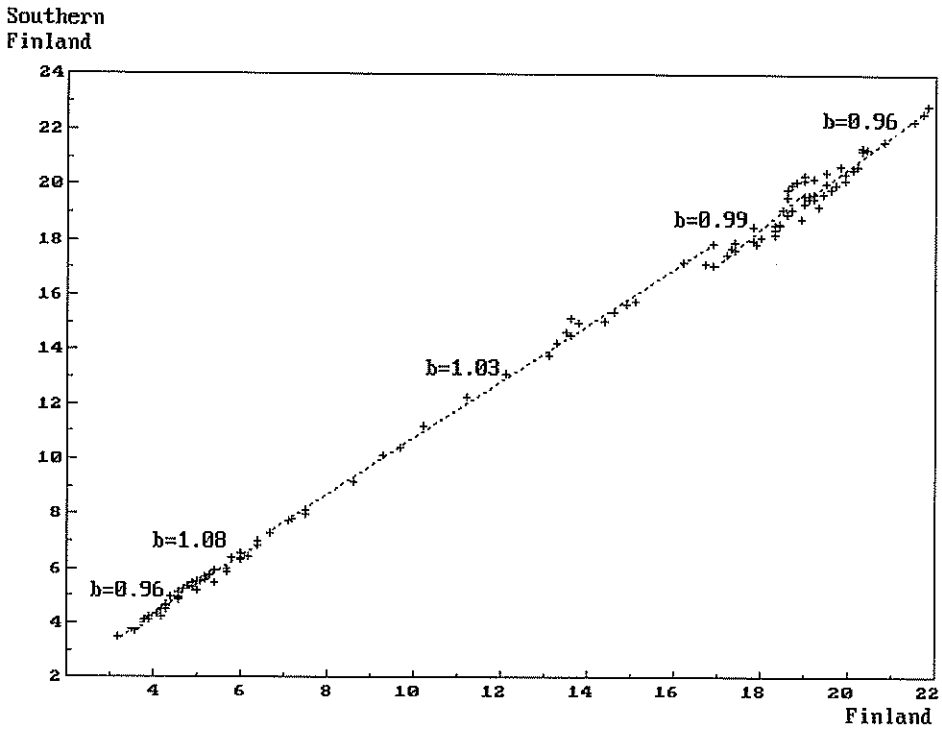


Figure 5. Cross-plot of national unemployment rate to Southern Finland unemployment rate with five sequential regression lines and their slopes.

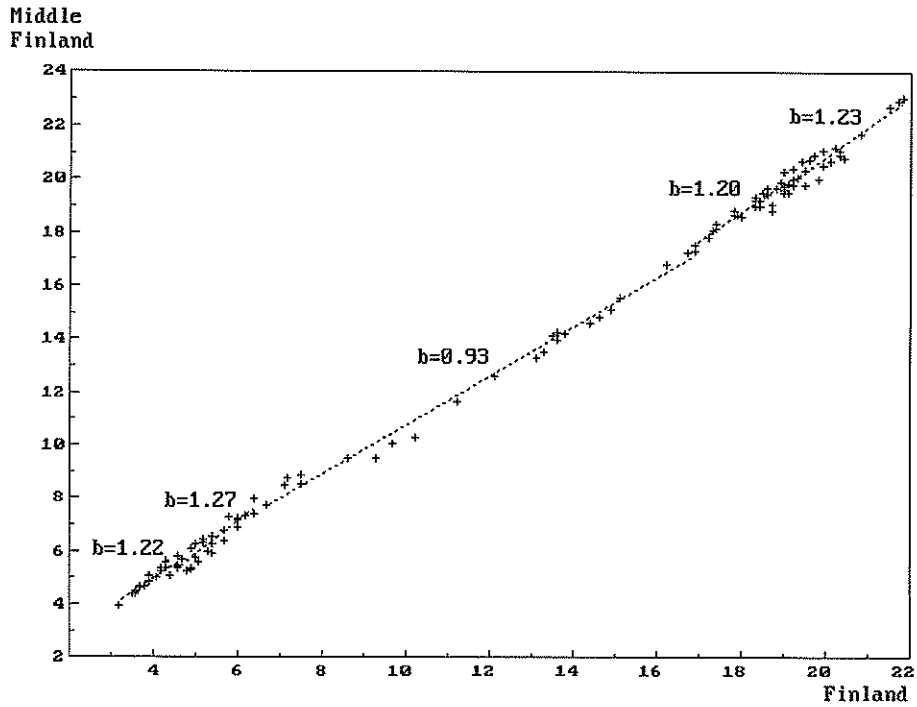


Figure 6. Cross-plot of national unemployment rate to Central Finland unemployment rate with five sequential regression lines and their slopes.

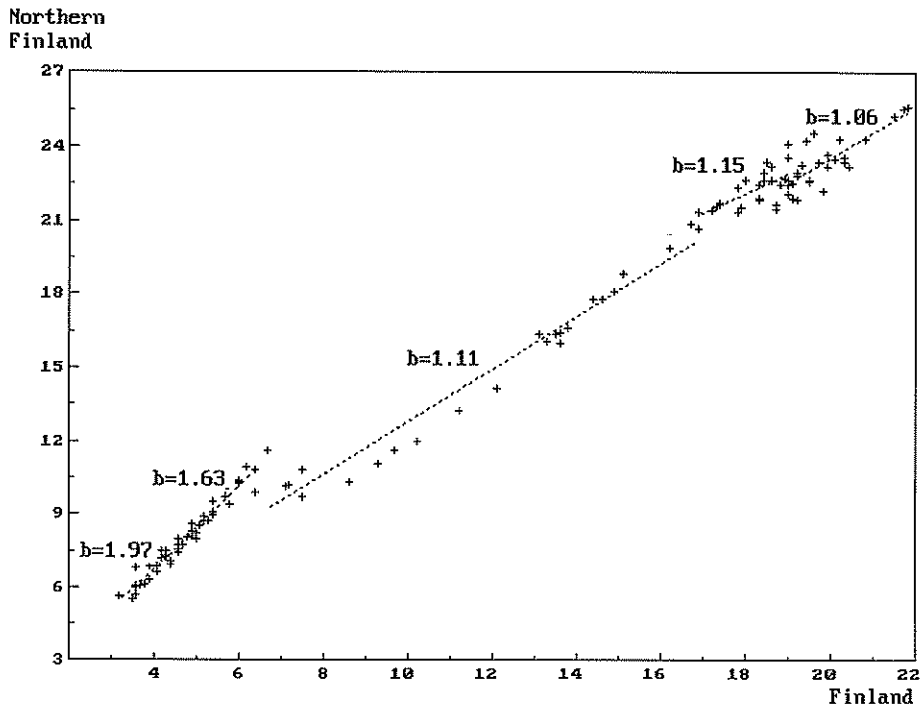


Figure 7. Cross-plot of national unemployment rate to Northern Finland unemployment rate with five sequential regression lines and their slopes.

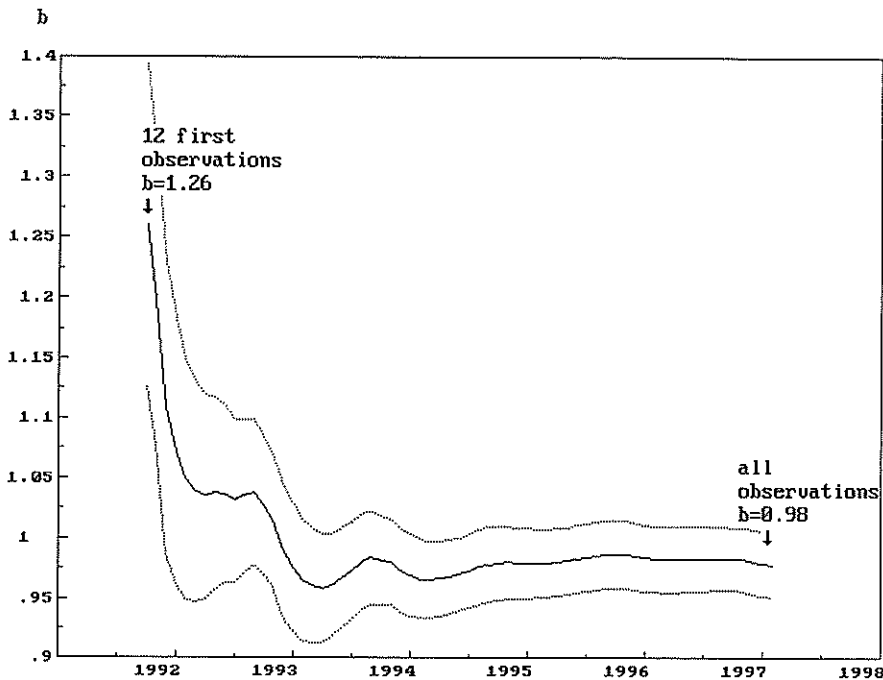


Figure 8. Development of the response coefficient (with ± 2 * standard errors) in recursive estimation 1990(11) – 1997(2), Uusimaa.

Northern Finland. The estimations concern the high unemployment period 1990(11) – 1997(2) and the sample starts from the observations of the period 1990(11) – 1991(10). The estimates are recalculated adding observations one at a time, up to the last observation 1997(2). The output generated by the recursive procedures is most easily studied graphically. Figures 8 and 9 show the graphs of the estimated response coefficients. The development in these coefficients indicate the change in the responsiveness of regional unemployment to the development in the national rate in the high unemployment era.

These graphs clearly show the patterns of development, according to which the response coefficient has decreased from 1.26 to 0.98 in the low unemployment area and increased from 0.65 to 1.09 in the high unemployment area. Accordingly, at the very outset of the recession the response coefficients were even reversed, but reached rapidly their present level near to unity, at which level they have now stayed already for over three years.

5. Conclusions

The results suggest that the burden of the unexpectedly sharp rise in national unemployment has been more equally shared among regions than in previous recessions in Finland, at least the one in the 1970s. Areas previously relatively immune from job losses also appear to have suffered badly.

It appears that the dynamics of regional unemployment differentials has changed in Finland in the 1990s when aggregate unemployment climbed within a few years from about 3% to over 20%. While the normal relationship between regional and national unemployment rates has been neither linear nor multiplicative, but in between these two cases, it appears now to have been quite near to the first alternative. New unemployment divided up between regions in accordance with the labour force (jobs) of each region. This implies that there has been fundamental structural changes in the Finnish economy which have also altered regional labour market relationships. Absolute differenc-

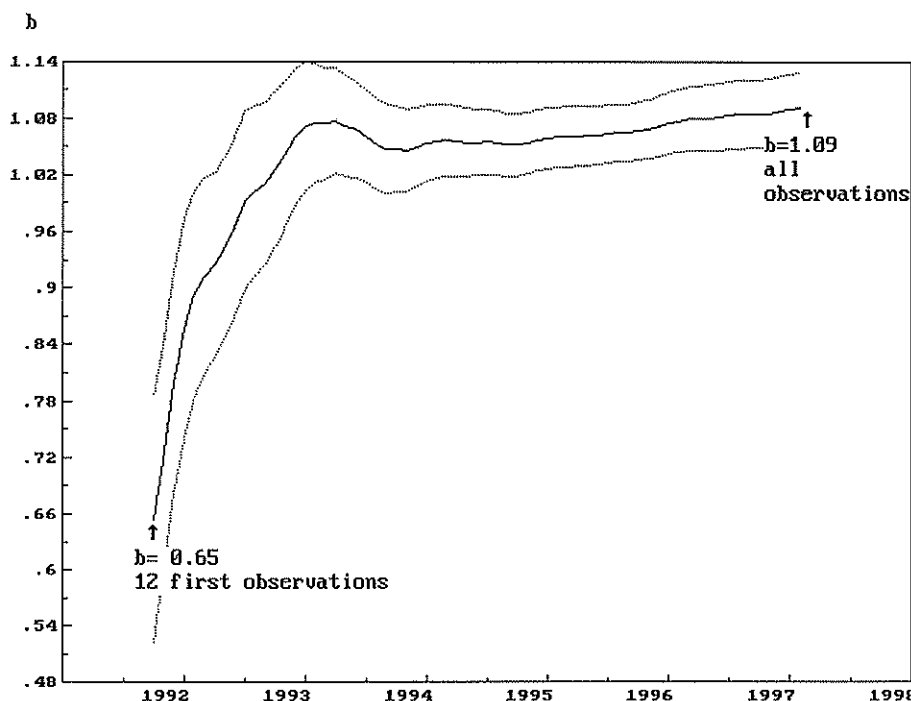


Figure 9. Development of the response coefficient (with ± 2 * standard errors) in recursive estimation 1990(11) – 1997(2), Northern Finland.

es in regional unemployment rates even narrowed at the early stages of the recession, while towards the end of the period they seem to have slightly increased. Further research is needed to explain how and why the change in dynamics has occurred.

Notwithstanding these developments, significant and persistent regional unemployment rate differentials still remain in Finland. Whether new unemployment induced by the economic crisis has only temporarily changed the fixed patterns of regional unemployment differentials as it has divided among regions in accordance with the size of their labour forces remains to see. It might still be possible that the established situation in unemployment differentials will be restored provided that aggregate unemployment decreases near to its level before recession.

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