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REGIONAL LABOUR MARKET ADJUSTMENT: ARE POSITIVE AND NEGATIVE SHOCKS DIFFERENT?

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Abstract: This paper analyses regional labour market adjustment in the Finnish provinces during 1971-96. It investigates the inter-relations of employment, unemployment and labour force participation to see how a change in labour demand is adjusted. The study questions the usual assumption that positive and negative shocks evoke similar adjustment processes. Instead, we test for the possibility that the effects of positive and negative shocks are asymmetric. The analysis reveals that there is little asymmetry in the adjustment to region-specific labour demand shocks, but adjustment to total (region-specific plus common component) shocks displays more asymmetry. The region-specific component of labour demand shock has short-lived effects on unemployment and participation, and its effect on employment is very small but permanent. Initially, most of the fall in employment is absorbed by unemployment and participation rate, but after a few years migration gets a larger role in the adjustment process.

Key words: Labour market, employment, unemployment, migration, asymmetric adjustment

1. Introduction

A worrying phenomenon is the slow but steady rise of unemployment in many developed countries in the 1980s and 1990s. The recession in the 1990s doubled or even tripled the number of unemployed in most European countries. Moreover, regional unemployment disparities in the European Union member countries seem to be at a permanently high level, with no apparent convergence in sight in the near future. It has been argued that these disparities are a result of different regional labour market adjustment dynamics following economic up- and downturns (Demertzis and Hughes Hallett, 1996). That phenomenon was observed in Finland as a result of the 1990s recession: some regions have recovered in only four years, whereas others have experienced worsening unemployment for 8 or 9 years in a row.

Labour market fluctuations are connected to fluctuations in the aggregate economy (Kydland, 1994; Millard et al., 1997). During contractions, workers adjust to falling labour demand by looking for a new job while remaining unemployed in their own area, exiting the labour force, or migrating to another area (Gordon, 1985a; Mauro and Spilimbergo, 1999). Seminal studies by Blanchard and Katz (1992) and Decressin and Fatas (1995) have established that the adjustment of labour markets to regional shocks occurs mainly via the participation rate (in Europe) or inter-regional migration (in the USA). More recently, Bentivogli and Pagano (1999) confirm that migration is much less responsive to relative unemployment differences in Europe than in the US. In Finland adjustment has taken place via the unemployment rate during the last decade (Böckerman, 1998). Those studies assume that the adjustment mechanism does not differ between positive and negative shocks. However, there are good theoretical reasons to believe that a drop in labour demand may well be adjusted differently than increasing demand. For example, exits from the labour force may occur rapidly during recessions (e.g. for family reasons), but re-entries can be much less flexible (e.g. mothers may need to stay at home even when labour market booms). Similarly, migration to other regions may be rapid when aggregate economy is booming, but negligible during recession, when few jobs are available anywhere in the economy.

The present study seeks to find new information about the labour market adjustment mechanisms in the Finnish regions. We analyse data on the 11 Finnish provinces during 1971-1996.[i] First we examine how a labour market shock (i.e. a change in the number of employed persons in the region compared to that in the whole economy) is absorbed by growing unemployment rate, falling participation rate (i.e. exits from labour force) and migration to other labour market areas. Next we test for the possible asymmetries of labour market adjustment when the region is hit by a positive or a negative shock. In other words, we formally examine whether there are differences in the mechanism of adjustment depending on the nature of the shock (i.e. positive vs. negative, boom vs. recession.).

The results suggest that, firstly, regional unemployment rates and employment growth tend to be rather persistent in Finland, due to regional homogeneity and notable similarity of regional changes in employment and labour force participation. Secondly,

in the symmetric case labour market adjustment initially occurs via unemployment and participation. Only after a few years, when much of the shock has already been absorbed, inter-regional migration becomes an important adjustment mechanism. Allowing for asymmetric reactions, we find that the adjustment process differs only slightly between positive and negative region-specific shocks. However, more asymmetry arises in response to a "total" (region-specific plus common national) shock.

The rest of the paper is organised as follows: the second chapter introduces the theoretical framework used in the analysis of regional labour markets. The third section discusses the general development of Finnish regional labour markets and analyses the mechanisms of adjustment. Possible asymmetries are analysed in the fourth section. The final section concludes the paper.

2. Regional labour market adjustment

2.1 Regional labour markets and economic fluctuations

The analysis of regional labour market adjustment during different phases of the business cycle is closely connected to labour mobility. How do the workers react who lose their jobs when there is a negative shock to regional labour demand, say, a recession? They may either stay unemployed in their area of residence looking for a new job, exit the labour force (i.e. become "discouraged") or move to another area. And, similarly, where do workers to new jobs come from? The channel of labour market adjustment to regional labour demand shocks has been analysed extensively by Blanchard and Katz (1992) and Decressin and Fatas (1995). Both of those studies emphasise the importance of regional dynamics, as opposed to national dynamics that may actually be a relatively poor aggregation of regional evolutions. Recent empirical work provides support for the decisive role of region-specific shocks and hints to the possibility that such shocks may propagate from region to region (Clark, 1998).

The earlier literature has, however, ignored some clear distinctions in the types of labour demand shocks that a region can be subject to. Importantly, a positive shock is likely to evoke different adjustment dynamics than a negative shock. There are good theoretical reasons to believe this. For one, migration behaviour is likely to differ between economic booms (positive shock) and recessions (negative shock), as external labour market opportunities, i.e. availability of jobs in other regions, differ in those two states. Indeed, it has been demonstrated that when the aggregate economy is in bust, inter-regional migration flows tend to be small, whereas migration during booms is usually very active (e.g. Ogilvy, 1979; Gordon, 1985b; Pissarides and Wadsworth, 1989; Milne, 1991; Green et al., 1998). Moreover, due to high union power in most western countries wages may be fairly inflexible downwards, meaning that firms cannot adjust to negative demand shocks by decreasing pay (see e.g. Bean, 1994 for a survey). Hence unemployment reacts more heavily. During booms firms can compete by increasing wages, which dampens labour demand and is likely to draw workers from outside labour force back to the market. Hence the effect on unemployment is likely to

remain smaller. And finally, whereas a negative shock may cause workers to exit labour force for family reasons (e.g. to start a family), they may not be able to return to labour force when a positive shock hits the economy (e.g. mothers of young babies cannot return to work immediately). Thus, the supply of labour may be more flexible in the case of negative than in the case of positive shocks. The asymmetry of positive versus negative shocks can be studied using techniques of monetary economics (Barro and Rush; 1980, Mishkin, 1982; Cover, 1992).

2.2 The similarity of regional labour market shocks

The main aim of the present study is to evaluate the effects of region-specific shocks. However, a large share most economic fluctuations tend to be shared by all regions of the economy. The extent to which regions experience similar annual employment changes can be estimated by running for each region

(1) $$\Delta\log(N_{it}) = \alpha_i + \beta_i\Delta(\log N_{et}) + \eta_{it},$$

where N_i represents the employment in region i and N_e the national average employment. The magnitude of the average R^2 of the regressions reveals the common component in regional shocks, and β_i the elasticity of regional employment with respect to national.

Obviously, if the national aggregate shock affects all regions similarly, there is very little tendency of such shocks to affect regional employment and unemployment disparities. In other words, the magnitude of region-specific shocks is very small. Conversely, if the importance of regional factors is great, then all regions tend to experience shocks differently, and regional disparities are likely to be affected. Indeed, earlier findings imply that much (over 40 per cent in the US and 80 per cent in the EU) of the employment fluctuation can be explained by the region-specific component of a shock (Decressin and Fatas, 1995; Clark, 1998).

2.3 The adjustment of regional labour markets

To study the region-specific component of labour demand shocks we need to isolate the regional changes from the common labour market changes shared by all regions. Moreover, following Decressin and Fatas (1995) we allow the possibility that regions react differently to aggregate fluctuations by introducing a number of region-specific variables. Firstly, the regional relative to national employment is:

(2) $$n_{it} = \log(N_{it}) - \bar{\beta}_i\log(N_{et})$$

where N is the number of employees, and the same for employment rate difference is:

(3) $$e_{it} = \log(E_{it}) - \bar{\delta}_i\log(E_{et}),$$

where E denotes regional employment rate. Note that $\log(E_{it}) \cong -U_{it}$ is used as an approximation for regional unemployment here. Hence, the regional relative to national unemployment rate is:

(4) $$u_{it} = U_{it} - \overline{\delta}_i U_{et}$$

where U stands for unemployment rate, and finally the regional relative to national labour force participation rate is:

(5) $$p_{it} = \log(P_{it}) - \overline{\xi}_i \log(P_{et}),$$

where P indicates labour force participation rate. Above variables may be calculated as simple log-differences from the national average if no differences in regional reactions to national development are found (i.e. $\beta_i=1$, $\delta_i=1$, $\xi_i=1$). However, if regions do react differently to the national aggregate changes ($\beta_i\neq1$, $\delta_i\neq1$, $\xi_i\neq1$), we must use the beta-, delta- and xi-differences defined above.

The relative importance of adjustment mechanisms to labour demand shocks can be analysed from the following system of equations:

(6) $$\Delta n_{it} = \lambda_{i10} + \lambda_{11}(L)\Delta n_{it-1} + \lambda_{12}(L)e_{it-1} + \lambda_{13}(L)p_{it-1} + \varepsilon_{i\rho t}$$

(7) $$e_{it} = \lambda_{i20} + \lambda_{21}(L)\Delta n_{it} + \lambda_{22}(L)e_{it-1} + \lambda_{23}(L)p_{it-1} + \varepsilon_{i\sigma t}$$

(8) $$p_{it} = \lambda_{i30} + \lambda_{31}(L)\Delta n_{it} + \lambda_{32}(L)e_{it-1} + \lambda_{33}(L)p_{it-1} + \varepsilon_{i\tau t}.$$

Using the analytical framework described above we can ascertain how a drop in regional employment is absorbed. We let period t changes in employment affect the participation- and employment rates, but not the other way round. In other words, we assume that all period t changes in relative employment are caused by labour demand factors, not supply factors. Assuming the symmetry of adjustment regardless of the direction of the shock, the result is simply reversed in order to derive the effect of a positive labour demand shock.

2.4 Asymmetry of positive vs. negative shocks

The above framework treats all shocks in the similar manner, i.e. the relative magnitude and timing of adjustment mechanisms is the same despite the nature of the shock. However, as explained above, it is possible that positive shocks evoke a different response than do negative ones. Using the methodology introduced by Cover (1992) we can test whether such asymmetries arise. We start by forming two further series of labour demand shocks. $\text{Neg}\Delta n_{it}$ is set to the equal the shock when the shock is a negative one, otherwise it is set to equal zero. $\text{Pos}\Delta n_{it}$ is set to equal the shock if the shock is a positive one, otherwise it equals zero. More formally

(9) $$\text{Neg}\Delta n_{it} = -\tfrac{1}{2}[\text{abs}(\Delta n_{it}) - \Delta n_{it}]$$

(10) $\text{Pos}\Delta n_{it} = \frac{1}{2}[\text{abs}(\Delta n_{it}) + \Delta n_{it}]$.

Assuming that the asymmetry arises only in the reactions of employment rate and participation rate we may simply enter the above variables in equations (7) and (8) instead of Δn_{it}. If employment should react asymmetrically to its own past development, depending on the direction of its lagged change, we would also have to modify equation (5) accordingly.

3. Labour market adjustment

3.1 Regional labour market during fluctuations: informal analysis of asymmetries

Throughout the paper we have argued that there may be asymmetries in reaction to positive versus negative labour demand shocks. Before proceeding to the formal analysis let us have a look at the development of regional labour markets in Finland during the last "business cycle", 1988-97. Those years were characterised by vast changes in regional labour demand, i.e. large shocks. We have actual data for the 19 Finnish NUTS3 regions on the flows (i.e. actual numbers, pools) of persons to (and from) employment, where we know if those individuals come from (go to) other regions, unemployment or if they enter (exit) the labour force. In an average region, employment grows moderately during boom periods (1988-89, 1994-97) and declines sharply in recession (1990-93) (figure 1). Also, the shares of migration, participation and unemployment of the total employment flow appear to differ considerably between boom and recession (figure 2).

Figure 1 *Sources of employment changes during boom and recession (average of 19 regions)*

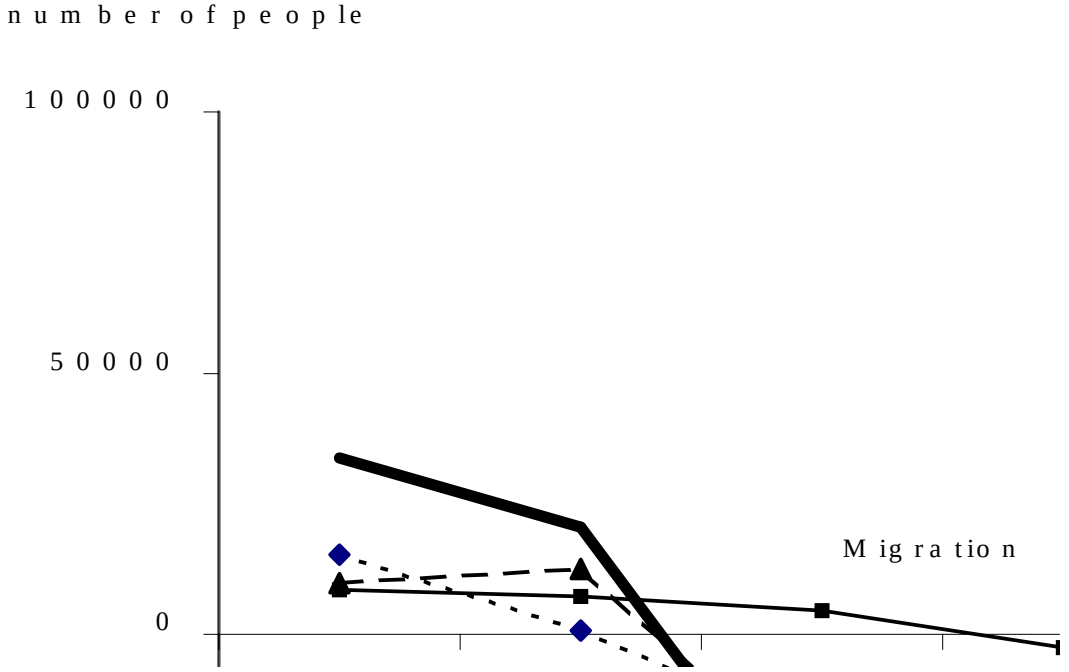
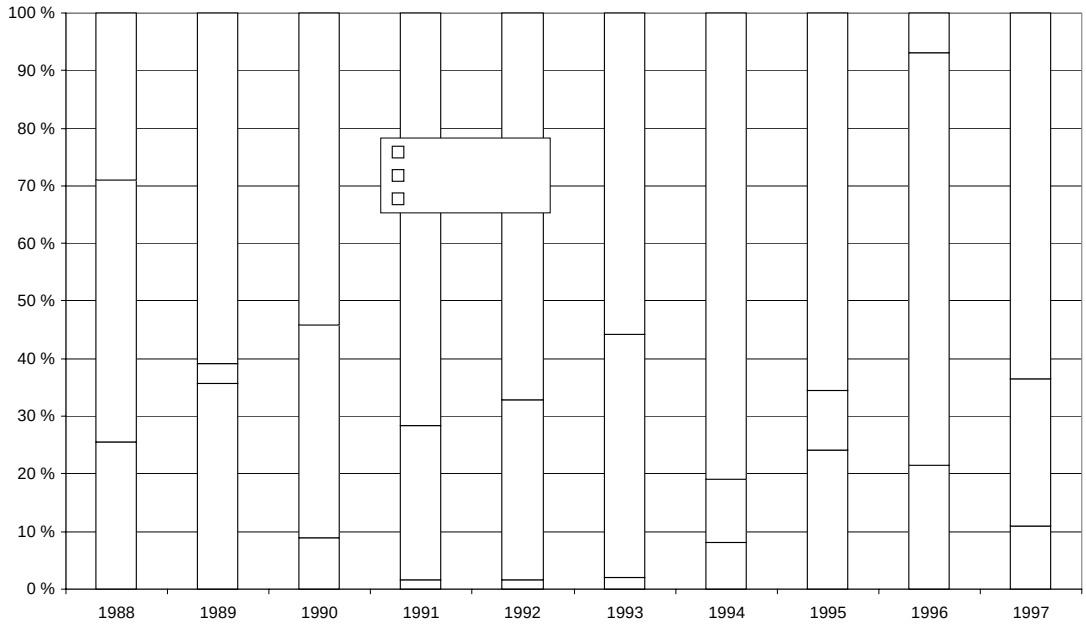


Figure 2 *Shares of non-labour force, unemployment and migration of the total employment change*



Dividing the annual regional observations into "positive shocks" (i.e. in year t regional employment grows by more than 0.3 per cent) and "negative shocks" (i.e. employment falls by more than 0.3 per cent), we obtain altogether 93 positive and 96 negative observations.[ii] Testing the differences between positive and negative shocks, it was found that the share of employment "adjustment" via migration does not differ significantly between positive and negative observations, whereas the shares of participation and unemployment do (table 1). Flows to and from unemployment adjust the greatest share of any employment change, but are greater when employment grows than when it falls. Conversely, the share of exits from labour force is greater than the share of entries, meaning that participation has a larger role in adjusting negative shocks.

Table 1 Positive and negative employment changes: differences in adjustment mechanisms

	Positive shock	**Negative shock**
Average employment change	1.8%	-4.9%
Average share of mechanism:		
Migration	0.087	0.070
(t-value)	(0.380)	
Participation	0.160	0.381
(t-value)	(22.23)	
Unemployment	0.753	0.549
(t-value)	(27.04)	
All mechanisms	1.000	1.000
N	93	96

*Notes: "Positive shock" includes all region/year-observations when employment growth is greater than +0.3%. "Negative shock" includes all region/year observations when employment falls by more than –0.3%.

Note, however, that the above analysis did not attempt to purge the regional shocks of the common economy-wide movements, but analysed the actual, observed effects of "total" (common plus region-specific part) shocks. Other studies (Blanchard and Katz, 1992; Decressin and Fatas, 1995) have looked exclusively at the regional component of the shocks. The adjustment to pure region-specific shocks may differ from the adjustment to overall shocks, as explained in previous section. Moreover, whereas the above analysis reveals the flows between "pools", it does not tell anything about how the "rates" are affected. In other words, it is interesting to see how a positive or negative change in employment affects the employment- and participation rate. Finally, 1988-97 is a very short and very untypical period in the Finnish history, and may thus be unrepresentative of the long-term development. To investigate the possible asymmetry in the adjustment to regional labour demand shocks we adopt a more formal approach in the following section to analyse a longer data set.

3.2 Common labour market disturbances and persistence

Below we use province level data for the 11 continental provinces of Finland during 1971-96. We first isolate the pure regional movements by calculating variables (2)-(5). In order to determine whether simple log-relative variables suffice, or whether beta-adjusted relative variables are needed, the degree of commonality in regional versus national employment shocks is estimated. We estimate (1) for each province and test whether β_i differs significantly from unity. The results indicate that most (74 per cent) of the regional employment changes are common to all provinces (table 2). The R^2 is particularly high in Kymi, Turku and Pori, and Uusimaa, where the aggregate changes dominate. Conversely, regional factors tend to dominate in Keski-Suomi and Pohjois-Karjala. Moreover, the β_i-coefficient is close to one for all provinces, indicating that regional employment moves together with the aggregate. We cannot reject the null hypothesis $\beta_i=1$ for any of the provinces. Unemployment rate and participation rate behave differently, however. The hypotheses $\delta_i=1$ and $\xi_i=1$ are rejected for several provinces at the 1 per cent level. We therefore opt for using the beta-, delta- and xi-adjusted differences in the next stage. Also, the use of beta-adjusted differences removes the otherwise arising multicollinearity problem between employment and participation.

Table 2 *Regression results for regional employment growth, unemployment rate and the log of participation rate*

Province	βi	R^2	δi	R^2	ξi	R^2
Uusimaa	0.96	0.93	0.89***	0.99	1.06	0.88
T&P	1.03	0.88	0.99	0.99	0.90	0.83
Häme	1.03	0.86	1.16***	0.99	0.59***	0.60
Kymi	0.91	0.85	1.06**	0.99	0.68***	0.66
Mikkeli	1.16	0.69	1.03	0.99	1.63***	0.85
P-Karjala	1.12	0.63	1.08**	0.98	1.73***	0.80
Kuopio	1.10	0.77	1.08***	0.99	1.32**	0.86
K-Suomi	1.06	0.62	1.14***	0.98	0.64	0.30
Vaasa	0.85	0.76	0.95	0.98	1.40***	0.86
Oulu	1.00	0.74	0.99	0.97	0.99	0.73
Lappi	1.26	0.69	1.15***	0.97	1.18	0.76

*Notes: The estimated equations are: $\Delta\log(N_{it}) = \alpha_{1i} + \beta_i\Delta\log(N_{et}) + \mu_{1it}$, $U_{it} = \alpha_{2i} + \delta_i U_{et} + \mu_{2it}$ and $\mathrm{Log}(P_{it}) = \alpha_{3i} + \xi_i\log(P_{et}) + \mu_{3it}$. Note that Uit = -log(Eit). The estimation periods are as follows: annual data for employment cover 1971-96, otherwise the period is 1976-96. *** signals a coefficient significantly different from 1 at 1%, ** significantly different from 1 at 5%.

The persistence of regional unemployment disparities is a commonly acknowledged phenomenon both in Finland (Pehkonen and Tervo, 1998) and abroad (Decressin and Fatas, 1995; Pissarides and McMaster, 1994). A regression of relative unemployment in 1996 on that in 1976 produces an R^2 of 0.08 with slope coefficient 0.25. Leaving out the outlier, Lappi, the R^2 rises to 0.2 (slope to 0.46). Hence relative unemployment in Finland is less persistent than in Europe, and about the same as in the US.[iii] Annual employment growth shows even more persistence: A regression of average employment growth in the region in 1983-96 on that in 1971-83 produces an R^2 of 0.28 and slope 0.73 (0.58 and 1.04, respectively, when excluding Lappi). Hence the persistence of

employment growth in Finland is much higher than in Europe or the US.[iv] These findings implicate that participation rate may have an important role in adjusting the changes in employment.

Before proceeding to the formal analysis we run unit root tests for relative employment, labour force participation and unemployment rate. In other words, we run for each province the following set of regressions, allowing for one lag for each variable.

(11) $\Delta n_{it} = \alpha_{1i} + \alpha_{2i}(L)\Delta n_{it-1} + \text{trend} + \eta_{it}$

(12) $\Delta p_{it} = \alpha_{1i} + \alpha_{2i}(L)\Delta p_{it-1} + \eta_{it}$

(13) $\Delta u_{it} = \alpha_{1i} + \alpha_{2i}(L)\Delta u_{it-1} + \eta_{it}$.

Due to the persistence of growth rates and the apparent trend in the provincial data, our prior for relative employment is that the series contains a unit root, i.e. H0: $\alpha_{2i}=1$.[v] Testing for the hypothesis we find that all coefficients obtain a negative sign (from -0.09 to -0.88), but can nevertheless reject the hypothesis only for 2 provinces. The difficulty of rejecting ADF-tests has been noted already in several studies (e.g. Eichengreen, 1992; Blanchard and Katz, 1992). Hence, staying with our prior we use relative differences, and not levels, of employment for the following analysis. Our prior for participation and unemployment is that the series are stationary.[vi] The coefficients were again negative in all cases (-0.12 to -0.86 for unemployment, and -0.32 to -1.2 for participation), but there were still provinces for which the hypothesis could not be rejected. Following Blanchard and Katz (1992) and Decressin and Fatas (1995) we proceed by not rejecting our prior, due to the negative coefficients and the low power of unit root tests. We use relative employment and participation for the following formal analysis.

3.3 The mechanism of labour market adjustment

Let us assume for now that regardless of the direction of the labour demand shock the same adjustment mechanism follows. Using this assumption we can compare the Finnish results with those for Europe and the US. Noting that relative employment change, relative employment rates and relative participation rates are inter-connected, we estimate the system of equations (6)–(8). We use two lags for each variable and pool the provinces together to form a cross-sectional time-series panel. We also allow for region-specific fixed effects.

The changes in relative employment are mainly explained by the first lag of each variable, while employment rate and participation rate are explained by the current employment change and lags for most variables (table 3). Figure 3 displays the response of employment, unemployment and labour force participation to a one-per cent negative shock in labour demand. The shock is absorbed both by participation and unemployment. It takes about 4 years for the effect on unemployment to disappear and about 6 years for participation. The effect on employment remains very small but permanent after 6 or 7 years. The remaining part of the shock is absorbed by migration,

which initially has a minor role to play. After a two years, when much of the shock has already been absorbed, its share grows markedly (table 4). The relative importance of unemployment rate as an adjustment mechanism wears off rather quickly, whereas the role of participation rate remains almost unchanged for the first five years.

Table 3 Regression results for labour market adjustment

Variable	Employment change model (8)	Employment rate model (9)	Participation rate model (10)
Constant	0.035 (1.92)*	-0.008 (-7.98)***	0.008 (7.13)***
Dn	-	0.383 (10.27)***	0.613 (14.75)***
Dn1	0.599 (2.54)**	-0.291 (-2.35)**	-0.243 (-1.76)*
Dn2	-0.083 (-1.40)	0.013 (0.43)	-0.037 (-1.08)
Le1	-0.907 (-3.52)***	0.882 (6.41)***	0.573 (3.74)***
Le2	0.621 (2.60)**	-0.372 (-2.97)***	-0.178 (-1.28)
Lp1	-1.212 (-5.29)***	0.565 (4.46)***	0.993 (7.03)***
Lp2	0.448 (1.70)*	-0.294 (-2.14)**	0.273 (1.55)
R^2 =	0.43	0.48	0.53
N =	209	209	209
Breusch-Pagan =	2.13	1.84	0.53
Hausman =	72.80***	73.53***	60.91***

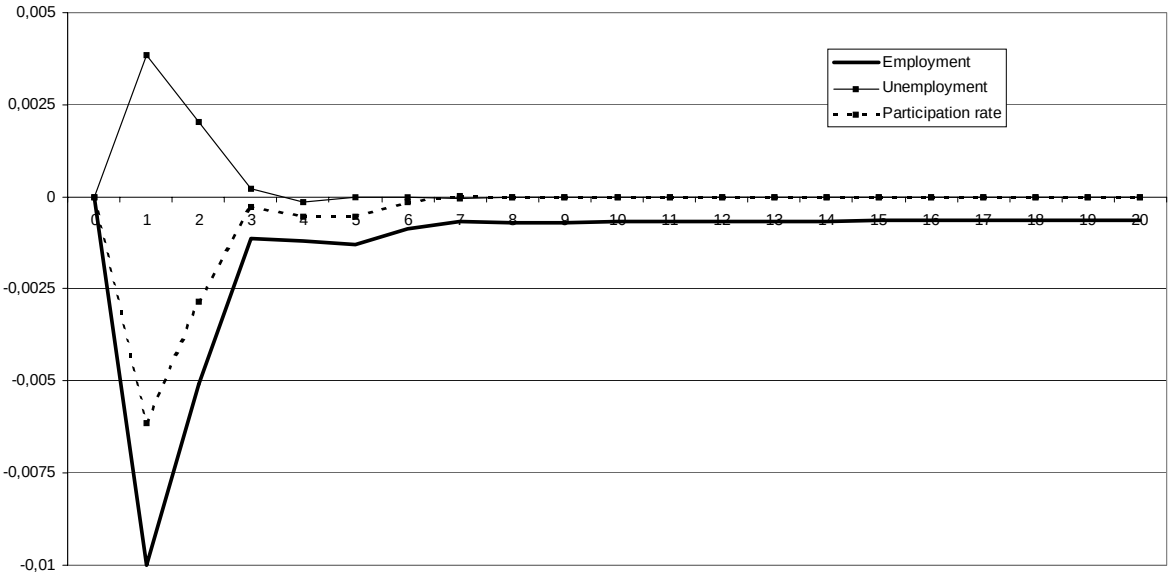
*Notes: Difference variables (Δ) indicated by D and level variables by L. Lags indicated by numbers (1 or 2). T-values are in brackets. Significance indicated by * (10%),** (5%) and *** (1%).

Table 4 Role of adjustment mechanisms

	Participation			**Unemployment**			**Migration**		
Year	Type of shock			Type of shock			Type of shock		
	Symm.	NegAS	PosAS	Symm.	NegAS	PosAS	Symm.	NegAS	PosAS
1	61.3%	62.4%	57.9%	38.3%	39.6%	38.4%	0.4%	-2.0%	3.7%
2	55.9%	63.1%	20.8%	40.3%	35.0%	47.0%	3.8%	1.9%	32.2%
3	22.8%	-61.8%	44.5%	20.2%	70.0%	-11.0%	57.0%	91.8%	66.5%
4	44.3%	36.6%	22.4%	8.4%	-6.4%	-28.0%	47.4%	69.8%	105.6%
5	41.5%	55.6%	0%	0%	0%	0%	58.5%	44.4%	100%
6	14.9%	17.6%	0%	0%	0%	0%	85.1%	82.4%	100%

* Notes: Type of shock refers to the assumption on symmetricity. Symm = Symmetric shock, NegAS = Negative shock, from asymmetric model, PosAS = Positive shock, asymmetric model

Figure 3 Response to a negative labour demand shock: symmetry assumed



These results differ somewhat from the European ones, where migration only plays a minor role. However, like in Europe, participation is the most important mechanism of labour market adjustment also in Finland (compare with Decressin and Fatas, 1995). The results are more or less in line with the US in the sense that the effects last about the same time (6 years) (Blanchard and Katz, 1992). Hence migration appears to be an important adjustment mechanism in a single-country context, where it evens out regional labour market imbalances. In a multi-country context the barriers of mobility are much higher. This finding is theoretically very plausible (Richardson, 1973; Gordon, 1985a).

4. Adjustment to positive and negative shocks: Are there asymmetries?

Continuing with the region-specific component of labour demand shocks, we now allow the possibility that a negative shock evokes different channels of adjustment than a positive one. We test this formally by re-running regressions (6)-(8), but now with the modified employment change variables in equations (7) and (8). It is assumed that employment change is not affected by current unemployment and participation rates, and there are no asymmetries in its own-lagged-change-adjustment. Hence equation (6) remains unchanged.

The results show, rather surprisingly, that there are only minor differences in the adjustment mechanisms to positive and negative shocks (table 5). The adjustment dynamics following a negative demand shock differ only slightly from the above (figure

4). Again, participation rate is the major adjustment mechanism, followed by unemployment in the first two years. After that, however, the adjustment process becomes less smooth: relative employment falls again and participation rate switches to positive for one period. For a positive shock the adjustment dynamics are by and large the same (figure 5), but the process is somewhat smoother. Also, migration becomes more important already in the second year, and the effects on both unemployment and participation disappear sooner. From this we conclude that Finnish provinces have a persistent structure of relative employment level and relative unemployment- and participation rates. Even if a region temporarily experiences a positive shock to its labour demand, relative to that of the whole of Finland, it soon returns to its original "rank" relative to other regions. Also, any beneficial effects on unemployment and participation are not long-lasting. Note, however, that these results refer only to the region-specific component of labour demand.

Table 5 Results for asymmetric models

Variable	Employment change model (8)	Employment rate model (modified 9)	Participation rate model (modified 10)
Constant	0.035 (1.92)*	-0.008 (-5.33)***	0.007 (4.70)***
Dn	-	-	-
Dn1	0.599 (2.54)**	-	-
Dn2	-0.083 (-1.40)	-	-
PosDn	-	0.384 (5.77)***	0.579 (7.81)***
PosDn1	-	-0.245 (-1.87)*	-0.269 (-1.85)*
PosDn2	-	-0.033 (-0.64)	0.025 (0.43)
NegDn	-	0.396 (7.24)***	0.624 (10.49)***
NegDn1	-	-0.339 (-2.51)**	-0.205 (-1.36)
NegDn2	-	0.055 (0.97)	-0.107 (-1.68)*
Le1	-0.907 (-3.52)***	0.894 (6.41)***	0.560 (3.60)***
Le2	0.621 (2.60)***	-0.379 (-3.00)***	-0.166 (-1.18)
Lp1	-1.212 (-5.29)***	0.575 (4.44)***	0.978 (6.77)***
Lp2	0.448 (1.70)*	-0.299 (-2.17)**	-0.226 (-1.47)
R^2	0.43	0.49	0.62
N	209	209	209
Breusch-Pagan	2.13	2.32	1.06
Hausman	72.80***	71.38***	34.86***

*Notes: Difference variables (Δ) indicated by D and level variables by L. Lags indicated by numbers (1 or 2). T-values are in brackets. Significance indicated by * (10%), ** (5%) and *** (1%).

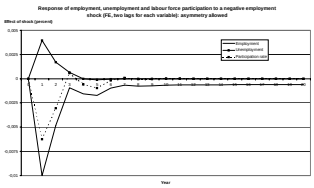
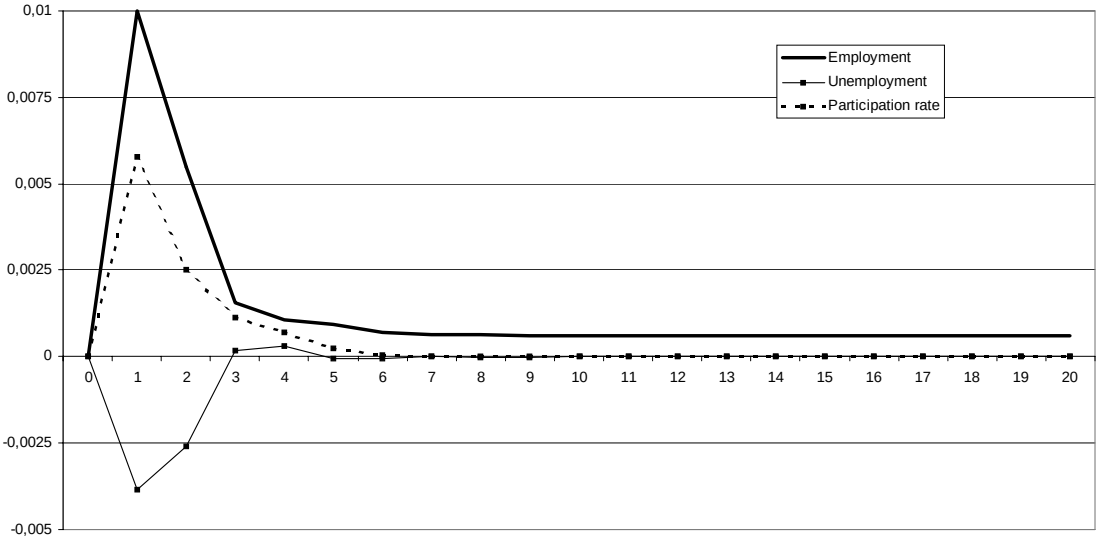


Figure 4 Response to a negative labour demand shock: asymmetry allowed

Figure 5 *Response to a positive labour demand shock: asymmetry allowed*



When the whole nation is experiencing positive development, the region-specific share of that development may in fact be very minor. For curiosity, we hence test the possible asymmetry of adjustment to positive and negative "total labour demand changes" (region specific plus common employment change).[vii] We estimate the same system of equations as above, adding a dummy variable for the recession years 1990-93.[viii] In turns out that there are much more asymmetries in response to the total shock than to the region-specific component of the shock (table 6). Both employment- and participation rate display significantly different coefficients between positive and negative shocks, corresponding to the findings of the informal analysis in section 3.1. However, the results for employment rate are not theoretically plausible here and will not be discussed further.

Table 6 *Effects of positive and negative employment shock on the rates of employment and participation*

	Region-specific model		**Total model**	
	Positive shock	**Negative shock**	**Positive shock**	**Negative shock**
Employment rate				
Sum of Coefficients	0.106	0.112	-0.663	-0.036
Departs from zero	0.53	0.54	13.17***	0.03
Departs from positive shock		0.00		26.67***
Participation rate				
Sum of Coefficients	0.335	0.312	1.028	0.439
Departs from zero	4.25**	3.38*	29.05***	4.59**

Departs from positive shock	0.01	21.48***

*Notes: * denotes statistical significance at the 10 % level, ** denotes statistical significance at the 5 % level, and *** denotes statistical significance at the 1 % level.

5. Conclusions

This paper analyses the adjustment of regional labour markets in Finland 1971 through 1997. The study focuses on labour market changes resulting from demand shocks. The aim was to identify the mechanism of adjustment to such shocks and compare the Finnish case to the European and U.S. experience. We found that a fall in labour demand leads to a small but permanent decrease in employment, and most of the change is absorbed by participation and unemployment, particularly in the first couple of years. After a few years, inter-regional migration gains a greater role as an additional adjustment mechanism. These findings correspond to the Blanchard and Katz's 1992 study on the U.S. regions. In Europe as a whole, however, migration generally plays a much smaller role in adjustment than in the single-country context (compare with Decressin and Fatas, 1995; Bentivogli and Pagano, 1999).

Contrary to earlier studies that assume a similar process to follow both negative and positive demand shocks, we allow for possible asymmetries. However, the adjustment dynamics after a fall and an increase in relative regional labour demand are surprisingly symmetric. The only difference is that the adjustment path of a negative shock is somewhat less smooth, and migration has a more delayed role. Hence, the effect of the region-specific component of labour demand change depends little on the direction of the change. On the other hand, the effect of the total labour demand change (region-specific- plus common component) displays more asymmetry. A negative shock has long-lasting effects on employment and is mainly absorbed by unemployment. However, it turns out that a positive shock has "perverse" effects in our model.

In conclusion, our results imply that the adjustment to positive and negative labour demand shocks should be studied separately, especially when studying the effects of total employment shocks. Finally, inter-regional migration seems to play some role in labour market adjustment. However, it seems that migration works as an equalising mechanism only in the single-country context (U.S., Finland) where the barriers of labour mobility are minimal. Finally, we did not account for the possibility that region-specific shocks may propagate from region to region. This fact should be considered in future studies.

References

Barro R. and Rush M. (1980) Unanticipated Money and Economic Activity, in Fisher S. (ed.) Rational Expectations and Economic Policy, University of Chicago Press, Chicago.

Bean C. (1994) European Employment: A Survey, Journal of Economic Literature, 32, 573-619.

Bentivogli C. and Pagano P. (1999) Regional Disparities and Labour Mobility: the Euro-11 versus the USA, Labour, 13, 737-760.

Blanchard O. and Katz L. (1992) Regional Evolutions. Brookings Papers on Economic Activity 1: 1-75.

Böckerman P. (1998) Regional Evolutions in Finland, Labour Institute for Economic Research, Discussion Papers 142.

Clark T. (1998) Employment Fluctuations in U.S. Regions and Industries: The Roles of National, Region-Specific, and Industry-Specific Shocks, Journal of Labor Economics 16: 202-229.

Cover J. (1992) Asymmetric Effects of Positive and Negative Money Supply Shocks, Quarterly Journal of Economics, 1261-1282.

Decressin J. and Fatás A. (1995) Regional Labour Market Dynamics in Europe, European Economic Review 39: 1627-1655.

Demertzis M. and Hughes Hallet A. (1996) Regional Inequalities and the Business Cycle: An Explanation of the Rise in European Unemployment, Regional Studies 30: 15-29.

Eichengreen B. (1992) Labour Markets and European Monetary Unification, in Masson P. and Taylor M. (eds.) Policy Issues in the Operation of Currency Unions, Cambridge University Press, Cambridge.

Gordon I. (1985a) The Cyclical Interaction between Regional Migration, Employment and Unemployment: a Time Series Analysis for Scotland, Scottish Journal of Political Economy 32: 135-158.

Gordon I. (1985b) The Cyclical Sensitivity of Regional Employment and Unemployment Differentials, Regulated Studies 19: 95-110.

Green A., Gregg P. and Wadsworth J. (1998) Regional Unemployment Changes in Britain, in Lawless P., Martin R. and Hardy S. (eds.) Unemployment and Social Exclusion, Regional Policy and Development Series 13, 95-115, Jessica Kingsley Publishers & London, London.

Kydland F. (1994) Business Cycles and Aggregate Labour Market Fluctuations, in Cooley T. (ed.) Frontiers of Business Cycle Research, Princeton University Press, Princeton, NJ.

Mauro P. and Spilimbergo A. (1999) How Do the Skilled and Unskilled Respond to Regional Shocks, IMF Staff Papers 46: 1-17.

Millard S., Scott A. and Sensier M. (1997) Labour Market over the Business Cycle: Can Theory Fit the Facts?, Oxford Review of Economic Policy 13: 70-92.

Milne W. (1991) The Human Capital Models and Its Econometric Estimation, in Stillwell J. and Congdon P. (eds.) Migration Models: Macro and Micro Approaches, 137-151, Belhave Press, London.

Mishkin F. (1982) Does Anticipated Policy Matter? An Econometric Investigation, Journal of Political Economy, 22-51.

Ogilvy A. (1979) Migration—The Influence of Economic Change, Futures 11: 383-394.

Pehkonen J. and Tervo H. (1998) Persistence and Turnover in Regional Unemployment Disparities, Regional Studies 32: 445-459.

Pissarides C. and McMaster I. (1984) Regional Migration, Wages and Unemployment: Empirical Evidence and Implications for Policy, LSE Centre for Labour Economics Discussion Paper 204, LSE, London.

Pissarides C. and Wadsworth J. (1989) Unemployment and Inter-regional Mobility of Labour, Economic Journal, 99, 739-755.

Richardson H. (1973) Regional Growth Theory, London, Macmillan.

Notes:

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Endnotes:

i Ahvenanmaa had to be excluded from the analysis since no reliable data exist for that region.

ii Any employment change between –0.3% and 0.3% was not considered as a ”shock”, simply as normal annual change, and was thus not included.
iii Decressin and Fatas (1995) show that the comparable R2’s for EU range between 0.23-0.32 and slope coefficients between 1.09-1.18, for the US the R2’s are around 0.17 as is the slope.
iv Again Decressin and Fatas (1995) obtain R2’s of 0.16 for Europe (0.10 for the US) with slope coefficients of 0.55 (0.25 for the US).
v Time-series graphs of relative employment clearly show a trend: relative employment constantly grows in Uusimaa and constantly diminishes in all other provinces. Figures available by request.
vi Here we have no reason to assume otherwise. The time-series graphs show no trend, but instead the provincial series appear very stationary. Figures available by request.
vii The unit root tests produced similar results as in section 3.2 (i.e. the region-specific shocks). In other words, we can run models with unemployment and participation levels, and employment changes.
viii Dummy variables are necessary here as the total change of employment in 1990-93 is dramatically different from any other period. In the region-specific models dummies were not needed as the relative variables did not exhibit a dramatic change during recession.