A Macroeconomic Analysis of Regional Migration in Finland, 1975-95

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Abstract: This study analyzes regional migration in the 85 Finnish subregions during the period 1975-95 using data on net in-migration rates. Both cross-section and panel data methods are employed. The regression analysis reveals that the direction of net in-migration flows can be explained by a set of regionally differing characteristics. Unemployment rates, tax rates, and the share of primary production affect net in-migration negatively, whereas the share of higher education and the growth of regional incomes have a positive effect. This indicates that regional disparities may not be alleviated by migration, but there is some evidence for a cumulative causation growth pattern induced by net in-migration flows.

I. INTRODUCTION

Migration is one of the most important equilibrating forces in the regional economy according to neoclassical theory and thus forms an interesting and topical object of study. This assumption has met a lot of criticism, though. For example, Evans (1990) and Leven (1985) argue that it is not realistic to expect migration flows to equalize interregional differences, as the reaching of such equilibrium would severely reduce migration flows. It is generally assumed that labor market adjustment occurs through the migration of labor from high-unemployment regions to those with low unemployment. On the other hand, it has been argued that jobs follow people (Borts and Stein 1964), implying that migration to given regions leads to increased economic growth in those regions. This means that a region that offers better opportunities than others draws in a net flow of labor and starts to accumulate human resources, which, in turn, enhances growth prospects in that region. This leads to faster economic growth, and the resultant higher wages cause even more migrants to move in. Thus, for example, Greenwood (1973) concludes that migration does not alleviate regional disparities but tends to increase them. The process of cumulative causation (Myrdal 1957), in which migration plays an important role in determining regional development prospects, reveals the reasons why some regions succeed in reaching a positive development path while others lag behind.

Factors affecting migration can be divided into regional characteristics and personal characteristics of the migrants. Similarly, migration research can be conducted at both macro- and microeconomic levels. The focus of the present study

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is at the macro level as we hope to find out which types of regionally differing factors are connected with net in-migration. Basically, the assumptions of the macro analysis are derived from the micro-level decision making of the migrants, but these factors cannot be traced due to the aggregated nature of the macro-level data.

There is a vast amount of empirical literature on interregional migration in various countries (see, for example, Greenwood et al. 1991 for an excellent review of recent migration literature). Migration patterns in Finland have recently been studied by Laakso (1998) and Vartiainen (1997). Both studies confirm that migration flows have lately experienced a rapid increase, with migration largely concentrated in a few urban areas located mainly in southern Finland. The same conclusion is reached in the present study. Table 1 reports the number of regions with positive and negative net in-migration in different periods. It seems that, in particular, the 1990-95 period displays an increasing concentration of population in fewer subregions. Figure 1 displays a map of the Finnish subregions, showing the main urban centers and population densities in 1997. Regional differences in unemployment rates vary markedly across subregions in Finland and the direction of migration seems to be towards growing regions with lower unemployment, i.e., regions marked on the map. Vartiainen (1997) concludes that the reason for this concentration stems from the fact that the most mobile groups (students and the unemployed) migrate to large towns with universities and other large town centers. Moreover, the net in-migration of employed persons is positive only in the largest towns. Laakso (1998) argues that even though we could expect migration to affect regional employment differentials, this has not been so much the case in Finland with differences in unemployment rates having remained stable since the 1970s (see also Pehkonen and Tervo, 1997).

TABLE 1
Number of Subregions with Positive, Negative, and Zero Net Migration Rates

Period	Positive net migration (Net migration rate > 0.001)	Negative net migration (Net migration rate < -0.001)	Zero net migration (-0.001 ≤ Net migration rate ≤ 0.001)
1975-1979	18	60	7
1980-1984	26	45	14
1985-1989	25	47	13
1990-1994	20	51	14

The present study analyzes regional migration in Finland during 1975-95 using macro-level data on the 85 subregions. Information on migration rates and various attributes that describe regional characteristics are used. Such factors are, for example, the growth of regional per capita taxable incomes, local tax rates, share of higher education, unemployment rates, and regional economic structures. Data for five-year periods are used to estimate a number of single-equation models for net in-migration. The data are compiled by Statistics Finland and are available as a regional database, ALTIKA.

The results show that, at the national level, migration flows tend to fluctuate from one period to another, according to aggregate economic cycles. On subregional level, it is observed that noticeable differences in regional net in-migration

rates continue to exist. Moreover, we observe that the faster regional incomes grow and the larger the share of population with higher education, the greater the net in-migration rate is. On the other hand, net in-migration is smaller in regions with a high tax rate and unemployment rate. Interestingly, many previous studies have failed to find a connection between the regional unemployment rate and migration (see Herzog, Schlottman, and Boehm 1993; Greenwood 1975). In the present study, however, unemployment turns out to be an important determinant of net in-migration. And finally, it is observed that regions in which the share of primary production is large tend to attract fewer migrants. These results imply that regional differentials in incomes and education may not be alleviated by migration, but it is possible that a cumulative causation process between regional growth and migration occurs.

FIGURE 1
Population Density in the Finnish Subregions (1977)

The second section introduces the theoretical basis for macro-level migration analysis and discusses the reasons for choosing net in-migration as the dependent variable. The data and empirical methods exploited are described in the third section, and the actual empirical findings are detailed in the fourth section. Finally, section five concludes the paper.

II. THEORETICAL BACKGROUND

Forms and Trends of Migration

The present study concentrates on analyzing migration from the macro-economic perspective, by evaluating the effect of certain regional characteristics on regional net in-migration. The basic idea is that both the origin and destination region have characteristics that cause in- and out-migration to occur, the difference between which is the net in-migration. These characteristics are called pull and push factors (Hoover and Giarratani 1985). We consider both pull and push factors as affecting the net in-migration flow simultaneously. Net in-migration is interesting from the aspect of regional development since we can determine what type of regions attract most migrants, which is likely to result in concentration of population in those regions. Moreover, if we include educational variables in the analysis, we will obtain information on the development path as to where human capital accumulates in certain regions, since the most highly educated individuals tend to be the most mobile (Chun 1996). In particular, regions that have a relatively high proportion of highly educated labor tend to have a positive net in-migration rate. We may expect such regions to start accumulating more and more human resources. This, in turn, further enhances their growth and development prospects.

It can be reasonably expected that migration rates change over time. The major components of short-term changes are due to cyclical variations of the aggregate economy (Hoover and Giarratani 1985). It is generally found that migration activity is higher when the aggregate economy is booming, whereas recessions tend to reduce regional migration flows. The long-run trends in migration rates are more difficult to analyze. On one hand, growth studies imply that regions are becoming more and more alike over time (which should reduce the incentives to migrate). On the other hand, people are becoming more mobile through education, experience, and incomes. These two counteracting forces make it hard to predict what the long-term development of migration will be.

Basis for the Macro Approach

The traditional macroeconomic approach forms a good starting point for the analysis of regional migration flows as it concentrates on studying the reasons for overt migration behavior. In short, the idea is to use a single-equation framework in which the explanatory variables are given regional characteristics that can be objectively measured (Cadwallader 1992).

$$(1) \quad M = f(O_i), \quad i = 1, \dots, n.$$

In the above equation, M is the net in-migration rate and O_i represents the vector of positive or negative attributes associated with the origin or destination region. Such attributes can be, for example, the regional income level, a measurement for the cost of living, an unemployment rate, population density, etc.

Studies using the macro approach concentrate on finding a set of variables that can be considered as the determinants of migration (see, e.g., Greenwood 1975, 1985; Chun 1996). These determinants can be divided into economic, quality of life, population composition, and public policy factors. The first group consists of attributes such as regional income differentials, cost-of-living differentials, employment opportunities, tax level differentials, and regional economic structures. When considering the composition of population, the regional level of education provides interesting aspects of study as the accumulation of human capital is closely linked with regional growth prospects. Shaw (1985), for example, finds that the higher the educational level of a region, the greater the in-migration rates.

Other factors affecting regional migration rates are population density, climate, local government expenditure and services provided, as well as quality-of-life factors. Many studies have found that climatic variables especially describe quality of life well in the amenity-oriented approach, particularly in countries with large geographic areas (Graves 1980). The amenity-oriented approach considers migration as resulting from differentials in regional "amenity bundles." According to this theory, migration occurs as long as these differentials are large enough. In contrast, migration can be seen as a cause of the changes in region-specific attributes (Vanderkamp 1989) and, thus, many studies focus on the causal relationships among net in-migration, regional per capita incomes, and employment (see, e.g., Chun 1996). Hence, migration should be seen in a larger regional context in which it both causes changes in regional differences and reacts to them.

Hypotheses on the Determinants of Migration

Turning now to the factors assumed to determine the direction of migration in the Finnish context, some specific hypotheses are presented. First, income growth is expected to have a noticeable positive impact on the net in-migration rate of a given region (Lowry 1966) and thus acts as one of the main determinants of migration. The growth of regional incomes represents the most recent economic success of a region, which obviously attracts in-migrants. On the other hand, employment opportunities are an important reason to migrate and therefore regional unemployment should induce a negative effect on net in-migration (Greenwood 1973; Van Dijk et al. 1989). Another negatively influencing variable is the local tax rate, as potential migrants also examine fiscal factors when deciding where to move (Cebula 1979).

The characteristics of the population are also expected to affect regional migration rates. First, it is generally found that the most educated people are also the most mobile (Herzog and Schlottman 1984; DaVanzo 1982). In contrast, educated people tend to concentrate in areas that offer the best employment opportunities and, therefore, regional education level should influence net in-migration

positively (Porell 1982; Chun 1996). Finally, as the production of the agricultural sector is diminishing, it offers fewer jobs than before and, therefore, a high share of primary production in a region should have a negative impact on net in-migration. The share of primary production is taken here to distinguish urban regions from the rural ones.

III. DATA AND METHODS OF ANALYSIS

To analyze the phenomenon of regional migration, subregional data are used for the period 1975-95. The empirical analysis is divided into three sections. First, descriptive exploration is used to map out the temporal nature of migration flows at the national level. Second, the paper uses cross-sectional modeling to define the relationship between net in-migration and certain factors characterizing the subregions. Third, panel data estimation is exploited in order to confirm the robustness of cross section estimates.

In the cross-sectional estimations, data for five-year periods were used for the time span of 1975-95. The exploitation of five-year data in this section is due to the availability of certain regional information only for this time span. In the empirical analysis, we examine the factors affecting subregional migration patterns using net in-migration as the dependent variable. The net in-migration rate is counted as the sum of net in-migrants per population in five-year periods. The explanatory variables include structural and economic factors that are considered important from the viewpoint of subregional migration. These variables are the growth of logarithmic income during the *previous* period (GROWTH), the share of population with higher education (HIGHEREDUC), the tax level (TAX), the share of labor force in primary production (PRIMARY), and the unemployment rate (UNEMP). The explanatory variables are registered at the beginning of each five-year period. However, the income growth variable is the measurement of the previous time period, i.e., the values of growth variables explaining net in-migration during 1980-85 are counted from the time period of 1975-1980, and so on. This is done so as to avoid the endogeneity problem arising from simultaneous determination of net in-migration and income growth. The definitions of the variables used and a summary of data description are presented in Appendices 1 and 2.

The panel data analysis concludes the empirical part of the study. The panel is formed by stacking the four cross sections described above (like Barro and Lee 1994 or Barro 1997) and is exploited to complement the cross-sectional analysis. The main benefits of this approach are: i) the ability to observe the heterogeneity of data; ii) a larger number of observations; and iii) a better possibility to analyze dynamic relationships between variables (Baltagi 1995; Moisisio 1998). For the present study, the main advantage was the possibility to control for region-specific components.

IV. EMPIRICAL FINDINGS

Characteristics of Aggregate Level Migration

Let us first look at the outcomes of the descriptive analysis explaining the development of migration rates at the national level. Figure 2 shows the evolution of annual in- and out-migration rates (municipal) at the national level from 1975 to 1995. The national levels of out- and in-migration seem to proceed at almost exactly the same pace and magnitude. Hence, net foreign migration has not played a marked role but has remained minor. These temporal differences in migration activity are likely to be related to economic trends. In general, high migration activity is associated with economic booms and low migration rates are related to recession periods.

FIGURE 2
Evolution of In-Migration and Out-Migration in Finland, 1975–95

The Determinants of Subregional Migration—Cross Section Estimation

The dependent variable of the macro model estimated is the ratio of net in-migrants per population. The quantity of net in-migrants is defined as their sum in each of the five-year periods. Ordinary least squares (OLS) estimates for three different time periods are summarized in Table 2.

TABLE 2
Least Squares Estimates of Subregional Migration by Period

	Period 1980-85		Period 1985-90		Period 1990-95	
Variable	B*	P [T > t]**	B	P [T > t]	B	P [T > t]
PRIMARY	-0.030	0.183	-0.078	0.050	0.345	0.149
GROWTH	0.545	0.000	1.083	0.004	0.481	0.130
HIGHEDUC	0.458	0.008	0.301	0.122	0.511	0.001
TAX	-0.627	0.042	-0.598	0.142	-0.411	0.240
UNEMP	-0.209	0.000	-0.479	0.000	-0.128	0.061
CONSTANT	0.055	0.259	0.066	0.372	0.017	0.787
	N = 85 R ² = 0.51		N = 85 R ² = 0.61		N = 85 R ² = 0.36	

* B = estimated coefficient.

** P [|T| > t] = probability value for the estimated coefficient.

As expected, the coefficient on income growth is positive for all periods and this result is in line with previous findings (see, e.g., Chun 1996). The result is

statistically significant at the 5% level in the first and second periods. Hence, regions with a high growth of income are expected to attract in-migrants.

The coefficient on higher education also has a positive sign for every period, as expected, and the outcome is mostly significant at the 5% level. The results lend support to the phenomenon of cumulative causation, as it is generally found that people with a higher educational level are more eager to move (see, e.g., DaVanzo 1982; Porell 1982; Herzog and Schlottman 1984; Tervo and Ritsilä 1998).

The sign of the coefficient on primary production varies between subperiods. However, the variable gets a statistically significant coefficient only for the second subperiod when it is negative, as expected. A region that displays a high share of workers in the primary production sector is likely to lose jobs and less likely to generate new ones, as the production in that sector is constantly diminishing (Appendix 2). Moreover, the process of urbanization draws population into main urban centers that display a high share of services and an extremely small share of primary production.

The level of taxation shows a negative coefficient for all periods, as expected. Thus, a high level of taxation can be interpreted as preventing the accumulation of regional human capital (that most migrants represent). The result is statistically significant at the 5% level only for the first subperiod.

The coefficient on the regional unemployment level has a negative sign for all periods, as expected, and this result is also in line with previous findings (see, e.g., Haurin and Haurin 1988). However, most of the previous studies fail to find a clear connection between regional unemployment and migration behavior (see, e.g., Greenwood 1975, 1985; Herzog, Schlottman, and Boehm 1993; Tervo and Ritsilä 1998). Here, net in-migration decreases with a high regional unemployment level. The result of the regional unemployment variable is again statistically significant at the 5% level, except for the last subperiod.

Table 3 displays the predictions for selected regions using the coefficients from cross section regressions and the actual net in-migration rates. This procedure is performed in order to test the consistency of this model. The results imply that the model is consistent to some extent, as the predicted signs are generally correct. It seems that the model succeeds best in its predictions for periods 1980-85 and 1990-95, for the regions selected here.

TABLE 3
Predictions of the Cross-Sectional Models for Selected Regions

Subregion	Predicted and Actual Net Migration Rates					
	1980-85		1985-90		1990-95	
	Predicted	Actual	Predicted	Actual	Predicted	Actual
HELSINKI	0.029	0.022	0.010	0.022	0.039	0.016
OUTOKUMPU	-0.026	-0.031	-0.078	-0.043	-0.024	-0.027
JYVÄSKYLÄ	-0.002	-0.007	-0.063	-0.007	-0.019	-0.010
OULU	-0.020	0.008	-0.093	-0.050	-0.020	-0.044

V. THE DETERMINANTS OF SUBREGIONAL MIGRATION— PANEL DATA ESTIMATION

The final stage of the empirical analysis consists of estimating net in-migration by exploiting panel data, where the panel was formed by stacking the cross sections analyzed above. The dependent variable of the panel estimation is the ratio of net in-migrants per population. The quantity of migrants is defined as above. The following presentation describes step by step the progress towards the model presented in the paper.

As our data set contains all the subregions, we do not have any problems with the generalization of results in a cross-sectional respect. However, in terms of the time dimension, the data set (four periods) does not cover the whole population. Due to this characteristic of the data set, the choice of a suitable estimation method is not simple.

Before one can join the cross-sectional data set and the time series data set into a pooled panel data set, the assumptions of fixed constants and β -coefficients over time and over cross section units have to be checked. One way to test these assumptions is to exploit the Chow test. The hypotheses of the Chow test are $H_0: \beta_i = \beta$ against $H_1: \beta_i \neq \beta$.

First, the assumption of simultaneously fixed constants and β -coefficients over time is tested. For this purpose, both restricted and unrestricted models are estimated. The restricted model assumes fixed constants and β -coefficients over time. Formally (Hsiao 1986):

$$(2) \quad y_{it} = \alpha_1 + \sum_{k=2}^K \beta_k x_{kit} + e_{it}.$$

where y is the dependent variable, β is the estimated coefficient, x_i 's are the exogenous variables, and sub-indices k , i , and t are the identity numbers for the exogenous variable, individual, and time period, respectively. In turn, the unrestricted model assumes that all coefficients vary over time and over individuals. Formally (Hsiao 1986):

$$(3) \quad y_{it} = \alpha_{lit} + \sum_{k=2}^K \beta_{kit} x_{kit} + e_{it}.$$

The actual test of restrictions is carried out according to the following equation (Hsiao 1986):

$$(4) \quad \frac{(SS_3 - SS_1) / [(T-1)(K+1)]}{SS_1 / [NT - T(K+1)]} \sim F_{(T-1)(K+1), NT-T(K+1)},$$

where SS_3 is the restricted residual sum of squares, SS_1 is the unrestricted residual sum of squares, T is the number of time periods, K is the number of explanatory variables, and N is the number of cross-sectional units (subregions). In our analysis, these assumptions are not fulfilled, and hence H_0 is rejected (see Table 4). Thus, a further analysis on joining the time series and cross-sectional data is needed.

Second, if H_0 is rejected in the Chow test, we can identify whether the β -coefficients are fixed over time, while constants may vary over time (within-estimation):

$$(5) \quad y_{it} = \alpha_{1t} + \sum_{k=2}^K \beta_k x_{kit} + e_{it}.$$

In this case, the Chow test is carried out according to the following equation (For further details, see Hsiao 1986, pp. 18, 32):

$$(6) \quad \frac{(SS_2 - SS_1) / [(T-1)K]}{SS_1 / [NT - T(K+1)]} \sim F_{(T-1)K, NT-T(K+1)},$$

where SS_2 equals the residual sum of squares from the within-estimation. The results of this test are not in line with the assumptions, and the pooling of the time series and cross-sectional data sets into a panel data set is statistically restricted (see Table 4).

The results of the Chow test for pooling suggest that none of these specifications passes the test for pooling. However, the Chow test for pooling has an assumption of homoskedasticity of error terms. Hence, to test the relevance of the Chow test we need to carry out a test for heteroskedasticity. This study exploits a Lagrange multiplier test (Breusch-Pagan) for identifying possible heteroskedasticity of error terms. The results show that heteroskedasticity indeed exists. Thus, the Chow test becomes unreliable and the results of our panel estimation cannot be straightforwardly rejected (Baltagi, Hidalgo, and Li 1996). Furthermore, the stability of the estimated coefficients of the cross-sectional analysis supports the relevance of panel estimation in this context.

In order to find the best estimation method, three further specification test statistics were used: Breusch and Pagan's Lagrange multiplier statistic, Hausman's chi-squared test, and Ramsey's RESET test (For further details, see Godfrey 1988, pp. 158-160; Greene 1995, pp. 290-291, 306-307; and Spanos 1986, p. 555). The outcomes of these tests suggest the following procedure.

The large values of the LM statistic favor the fixed effects model/random effects model over the classical regression model. The large values of the Hausman statistic argue in favor of a fixed effects model over a random effects model. We also use a simplified Ramsey RESET test procedure in which we add powers of the dependent variable to the estimated function. The RESET test shows that the linear specification of the model is correct (see Table 4).

The modeling proceeds parsimoniously. Least squares (LS) estimates for three different specifications of the fixed effect model are summarized in Table 4.

In specification 1, with five explanatory variables, the coefficient on income growth is positive, as expected, and the result is in line with previous findings (see, e.g., Chun 1996). The result is statistically significant at the 5% level. Hence, regions with a high growth of income are expected to attract migrants. The coefficient on higher education also has a positive sign, as above, but the outcome is not significant.

TABLE 4
Least Squares Estimates of Subregional Migration (Panel Data Estimation)

Variable	Specification I		Specification II		Specification III	
	B*	P [T >t]**	B	P [T >t]	B	P [T >t]
PRIMARY	-0.127	0.008	-0.130	0.002	-0.133	0.002
GROWTH	0.250	0.004	0.247	0.004	0.285	0.001
HIGHEDUC	0.143	0.440	—	—	—	—
TAX	-0.187	0.515	—	—	—	—
UNEMP	-0.085	0.252	-0.092	0.199	—	—
CONSTANT	—	—	—	—	—	—
	N = 255		N = 255		N = 255	
	R ² = 0.748		R ² = 0.750		R ² = 0.749	
SPECIFICATION I		SPECIFICATION II		SPECIFICATION III		
Least squares with group dummy variables.		Least squares with group dummy variables.		Least squares with group dummy variables.		
The value of first Chow-test for pooling is 3.68 ~ F (12 , 237). Critical value: 1.57.		The value of first Chow-test for pooling is 4.53 ~ F (8 , 243). Critical value: 1.70.		The value of first Chow-test for pooling is 0.705 ~ F (6 , 246). Critical value: 1.80.		
The value of second Chow-test for pooling is 3.37~ F (10 , 237). Critical value: 1.63.		The value of second Chow-test for pooling is 4.50 ~ F (6 , 243). Critical value: 1.80.		The value of second Chow-test for pooling is 0.924 ~ F (4 , 246).Critical value: 1.97.		
Breusch-Pagan 55.12 ~ χ^2 (1)		Breusch-Pagan 74.56 ~ χ^2 (1)		Breusch-Pagan 99.55 ~ χ^2 (1)		
Hausman 24.52 ~ χ^2 (5)		Hausman 19.14 ~ χ^2 (3)		Hausman 51.92 ~ χ^2 (2)		
RESET		RESET		RESET		
9.2 ~ F (89 , 165) < 32.45 ~ F (92 , 162)		9.52 ~ F (87 , 167) < 33.43 ~ F (90 , 164)		9.56 ~ F (86 , 168) < 33.68 ~ F (89 , 165)		

*B = estimated coefficient.

**P [|T| > t] = probability value for the estimated coefficient.

A negative sign is obtained for the coefficient on primary production, and this result is also in line with the cross section findings. The coefficient for this variable is statistically significant at the 1% level. The level of the taxation variable also has a negative coefficient, as does the coefficient of the regional unemployment level. These results correspond to the cross-sectional estimates. Therefore, a region's net in-migration decreases with a high regional unemployment level. As in the case of taxation, the result of the regional unemployment variable does not reach any statistical significance.

The following two specifications comply with the outcomes of specification 1 by applicable parts. The coefficients of income growth and primary production seem to be stable regardless of specification changes and their statistical significance increases along the parsimonious procedure. Moreover, the similarity between panel data and cross section estimates shows that the results obtained by both methods are relevant and quite robust.

VI. CONCLUSIONS

The present study analyzed regional migration patterns in the 85 Finnish subregions during 1975–95. Models for regional net in-migration were estimated using both panel data and cross section methods and employing a single-equation framework. It was assumed that certain region-specific attributes explain why some regions gain a larger number of net in-migrants while others lose migrants. The results show that, first, a region's in-migration rate tends to be greater if its

per capita income level grows faster or it has a higher proportion of highly educated inhabitants. This indicates that the already prosperous regions especially tend to attract migrants, and the future prospects of such regions look relatively promising (i.e., growing regional income and education means more human capital). Secondly, a large share of primary production and high regional unemployment rate and local tax rate seem to reduce migration to such regions. Unlike many previous studies, the present study found a negative connection between unemployment rates and regional migration behavior (particularly in the case of cross section regressions). This implies that regional differences in unemployment rates could be alleviated by migration, assuming that it is the unemployed who are moving out of high-unemployment regions in search of a new job. However, if lagging regions tend to lose productive, highly educated labor in their negative net in-migration flows, their growth prospects may be further worsened. In order to confirm which of these scenarios is actually being realized, one would need data on the characteristics of the migrants for the whole time period, which is, unfortunately, not available.

According to the results obtained in the present study, it seems that migration cannot be seen as an equilibrating mechanism in the Finnish regional economy. Instead, the trend is towards greater concentration of population and economic activity. It can be argued that migration may be involved in a cumulative causation process that could eventually lead to centralized regional development with a few urban growth centers and a large number of agricultural, peripheral regions.

To conclude, it seems that the differences in economic variables help to explain why the migration experience differs so widely across Finnish subregions. However, all differences in net in-migration rates cannot be explained by structural, income, unemployment, tax, and education differentials. Hence, it is assumed that the characteristics of migrants also have a marked impact on inter-regional migration flows. However, these characteristics residing behind the observed macroeconomic variables cannot be revealed in a macro analysis. Moreover, to confirm whether it is economic differences that affect migration or vice versa, it would be necessary to perform causation tests. These issues give scope for further research.

APPENDICES

APPENDIX 1

Variables Used in the Econometric Estimations

DEPENDENT VARIABLE				
Variable			Scale	Operational Definition
Rate of net migration			Continuous	Sum of migrants per 5-year period (per population in the beginning of the period).

EXPLANATORY VARIABLES				
Variable	Abbreviation	Expected Effect	Scale	Operational Definition
Growth of income level	GROWTH	+	Continuous	Growth rate of income level per population.
Population with higher education	HIGHEDUC	+	Continuous	The share of population with at least the lowest level of tertiary education (equivalent of 13-14 years).
Share of primary production	PRIMARY	-	Continuous	The share of workforce in primary production.
Taxation	TAX	-	Continuous	Rate of taxation per taxable income
Regional unemployment	UNEMP	-	Continuous	Regional rate of unemployment (partly aggregated from the municipal level).

APPENDIX 2

Summary of Data Description

Variable	Time Period	Mean	Min	Max	Std. Dev.
NET MIGRATION	1975-80	-0.01	-0.062	0.040	0.02
	1980-85	-0.01	-0.076	0.049	0.02
	1985-90	-0.01	-0.052	0.043	0.02
	1990-95	-0.01	-0.050	0.040	0.02
GROWTH RATE OF INCOME LEVEL	1975-80	0.07	0.032	0.105	0.02
	1980-85	0.05	0.035	0.074	0.01
	1985-90	0.04	0.029	0.063	0.01
	1990-95	-0.01	-0.030	0.020	0.01
SHARE OF HIGHLY EDUCATED INHABITANTS	1975	0.03	0.017	0.093	0.01
	1980	0.04	0.024	0.116	0.01
	1985	0.04	0.026	0.121	0.02
	1990	0.05	0.031	0.136	0.02
	1995	0.07	0.046	0.157	0.02
SHARE OF PRIMARY PRODUCTION	1975	0.28	0.012	0.540	0.15
	1980	0.23	0.010	0.460	0.12
	1985	0.21	0.009	0.420	0.11
	1990	0.17	0.009	0.360	0.09
	1995	0.15	0.008	0.360	0.08
TAXATION	1975	0.16	0.131	0.175	0.01
	1980	0.16	0.144	0.180	0.01
	1985	0.17	0.150	0.185	0.01
	1990	0.17	0.153	0.190	0.01
	1995	0.18	0.170	0.190	0.01
REGIONAL UNEMPLOYMENT RATE	1975	0.06	0.013	0.188	0.04
	1980	0.07	0.015	0.182	0.03
	1985	0.07	0.010	0.140	0.03
	1990	0.09	0.020	0.150	0.02
	1995	0.21	0.050	0.330	0.05

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