Housing, dynamics of regional labour markets and migration

by

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Abstract:

The aim of this study is to explore the structure and the dynamics of regional labour markets in terms of gross migration flows. The study applies a panel of 85 Finnish regions over the period of 1988-1997. The results imply that different factors can have similar effects on net changes in migration by various means of affecting gross changes.

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1. Introduction

Migration has been at the centre of regional economics for decades and it seems to gain ever more importance. Most of the developed countries are entering into the era of declining labour force as the baby boom generation closes the retirement age. Consequently, in the near future regional economies need to compete against each other even more to attract new workers into regions to avoid potential labour shortages. This places new challenges both to the economy as a whole and to regional economies particularly.

Provided that the working-age population is spatially mobile, migration contributes to more efficient resource allocation of increasingly scarce labour resources across regions. This improves the matching process of regional labour markets, which in turn reduces frictional unemployment and improves the competitiveness of the economy as a whole. The mobility of workers depends on various aspects that are related to labour market opportunities, housing markets, amenities etc. In addition, public policy typically intervenes regional labour markets by favouring contracting regions. This pattern is especially true in the Nordic welfare states, which have traditionally been characterized by massive flows of income transfers by the central government to overcome the large and equally persistent regional disparities. To be able to assess the adjustment of regional labour markets and, accordingly, the competitiveness of regional economies in attracting new workers, one must have an idea of the relative importance of different determinants of migration. This is a broad issue of interest in this study.

This study investigates migration in Finland, using both net flow and gross flow data on inter-regional migration between NUTS-4 regions that correspond to 85 travel-to-work areas. The time period under examination covers the years from 1988 to 1997. Finnish regions have similar labour market institutions with collective bargaining, similar legislation and similar education systems. This homogenous institutional setting is, however, connected to wide and persistent regional disparities, see Pehkonen & Tervo (1998). One explanation for this feature is that fairly equal wage distribution together with universal social security system and progressive taxation reduces the migration incentives of individuals. Migration incentives may have been dampened even further through explicit aims of reducing underlying disparities between regions. This aim is

implemented by targeting active labour market programmes and state grants at disadvantaged regions that are mostly located in Eastern and Northern Finland. Interestingly, migration flows have increased after the great slump of the early 1990s and this increase coincides with a reduction in state grants. This gives us an unique opportunity to examine the role of the public sector in holding down the spatial mobility of workers. These issues have remained relatively unexplored, at least in the Finnish context, due to the limited number of Finnish migration studies, see Pekkala & Ritsilä (2000).

The investigation of gross flows offers the possibility to get a better picture on the interactions between different markets and migration. It is a well-documented fact that in- and out-migration are strongly and positively correlated, for the discussion of this compositional effect see e.g. Westerlund (1998) and Tervo (2001). Given this stylized feature one is tempted to think that the same factors hinge behind both migration flows. The estimation results of this study, however, strongly reject this view. It is shown that different variables can have similar impact on net-migration, having totally different gross-migration effects. Accordingly, the policy recommendations are different according to whether a region is losing or gaining population through the process of migration. This means that the focus on the net migration rates can provide spurious conclusions on the impact of regional policy variables.

The current study is by no means the first to examine separately the net-migration and the gross flows of migration. Ever since Lowry's (1966) results implied that the behaviour of in-migrants could be studied separately from out-migrants, gross flows have been examined separately in a number of empirical studies.[1] However, this study differs from most of the previous studies by the following overlapping means. First, we are able to examine the impact of labour and housing markets on migration flows of the working-age population. The advantages of concentrating on the working-age population has been recognised before, see e.g. Pissarides & McMaster (1990), but the available migration data has usually not been detailed enough for the appropriate use of this measure. The essential role of housing markets in the adjustment of regional labour markets has strongly been stressed, for example by Oswald (1996), but this issue has not been addressed by focusing on gross flows of migration. Thus, this study is able to provide an answer to the question how binding the contraints given by housing markets

actually are in terms of in- and out-migration. In other words, the decomposition of the net migration rates into gross migration flows yields more detailed empirical evidence on the mechanisms behind the phenomenon.

Second, we employ the measures of internal reorganisation of regional labour markets, together with the conventional labour market variables, in exploring the possible connection between the internal and the external reallocation of resources. In particular, we investigate the connection between internal, plant-level mobility of jobs and workers, as discussed in Davis and Haltiwanger (1999), and spatial mobility of workers. It is hypothesised that internal reorganisation within plants in a region increases the mobility of the working-age population, since the opportunities to get a job arise in dynamic labour markets. In this case we would observe positive correlation between inter-regional adjustment of labour markets and intra-regional adjustment of labour markets. A panel of the Finnish regions is indeed highly suitable to explore this issue, because there has been a great deal of internal turbulence of regional labour markets as a part of the great slump of the 1990s and the following export-led recovery over the period of investigation.

Thirdly, the Finnish case provides an interesting opportunity to investigate the role of extensive local public sector (taxes, grants etc.) in the determination of migration in a Nordic welfare state. Thus, the study is able to provide insights on the impacts of specific regional policy variables that are frequently used in an effort to manipulate migration flows.

Despite the great number of earlier studies on migration, there are still relatively uncovered methodological issues left in the literature on migration. One potential difficulty in modelling migration flows is that many of the dependent variables cannot be convincingly argued to be truly exogenous. This places some doubts on the results produced by conventional panel data estimation methods. To examine the robustness of the results, we experiment with various GMM estimation models that allow us to instrument potentially endogenous variables with their lagged levels. Albeit this modelling framework is subject to criticism and proper instruments for potentially endogenous variables are superior to lagged values, we believe that the framework offers the second best solution for testing and dealing with the endogeneity problems.

Especially, since our data set does not offer persuasive instruments for all potentially endogenous variables in the data set.

In addition, unlike conventional fixed effect models, the adopted estimation procedure offers the possibility to construct a dynamic panel data model with lagged endogenous variables, see Arellano & Bond (1991). The motivation for the dynamic specification of explanatory variables is given in the Treyz et. al. (1993) study in which it is argued that migration may respond to lagged economic variables due to the time required to collect and act upon the available information. Lagged dependent variables, on the other hand, are employed as catching up potential state dependence in migration flows.

The rest of the study is organised as follows. The second section provides theoretical underpinnings for empirical models. The third section introduces the data and discusses briefly the evolution of migration flows in Finland. In the next section the empirical model is introduced. The fifth section presents the empirical estimates of the effects that regional labour markets, housing markets, amenities and public sector have on gross migration flows. Conclusions close the study.

2. Theoretical considerations

The underlying motivation for the following empirical part of the study can be derived as an optimising behaviour of individuals. Following Shaw (1986), the probability of migrating to region i, $P(M_i)$ exceeds zero if and only if the difference between the individual's discounted utility streams in location i, $U_i(t)$, exceed the discounted utility streams in the current location o, $U_o(t)$ i.e.

(1) $$0 < P(M_i) \leq 1, \text{ if and only if}$$

(2) $$U_i(t) = \int_{t=0}^{n} Q_i(t) e^{-rt} dt - C > \int_{t=0}^{n} Q_o(t) e^{-rt} dt = U_o(t),$$

where Q refers to the overall (existing or expected) quality of life, r is the discount factor and C refers to the fixed costs of migration. Accordingly, migration can take place if the discounted gross gain from moving exceeds the cost of moving. At the

regional level out-migration is an increasing function of the discounted gross gains, whereas in-migration is a declining function of the same gain. Net-migration is then the difference between in- and out-migration and the factors that affect these flows. In particular, it should be noted that the equations above do not necessarily restrict the determinants of utility terms to be the same between gross migration flows. Accordingly, different variables can have similar net-migration effects, having totally different gross-migration effects. This means that the focus on the net migration rates provides an incomplete picture of adjustment of regional labour markets.

In this study, we express $P(M_i)_t$ as a function of lagged migration, c(M), labour market characteristics, f(x), fiscal variables, g(y), housing market variables, h(z), and other factors (especially the industry-structure of the regions), l(w), that may affect the migration flows:

$$
\begin{aligned}
(3) \qquad P(M_i)_t = {} & c(M)_{t-n} + f(EJR, CF, UNT, INCOME, DGDP)_{t-n} \\
& + g(DEBTS, TAXINC, GRANTS)_{t-n} \\
& + h(ACCOPRIC, OWNHOME)_{t-n} \\
& + l(AGED, UNSK, CRIME, AGRI, ELEC, SERV, PUBL)_{t-n}.
\end{aligned}
$$

Lagged migration is included to capture the stylized feature that migration flows tend to be persistent in a sense that the rate of net migration is usually positive for the same regions for quite some time. In other words, lagged migration aims to capture the potential state dependence in migration flows. Migration has traditionally been seen as a main device in equilibrating the regional system of labour markets, see e.g. Mueller (1982) and Ghatak et. al. (1996). This equilibrating effect depends largely on regional unemployment (UNT) and regional earnings (INCOME). In neo-classical models of migration individuals are expected to move from high unemployment regions to low unemployment ones (Harris & Todaro, 1970). According to this view, the process equilibrates unemployment and income differences across regions. Unemployment may also serve as an indicator for job opportunities influencing the expected income in a region, see e.g. Pissarides & McMaster, (1990), or, as in the context of hiring function, unemployment may influence the mobility through the activity of the unemployed in job search outside the home region, Savouri & Jackman, (1992). In a similar fashion to

UNT, the growth rate of regional GDP (DGDP) may serve as one determinant of overall job opportunities in a region.

Along with the traditional labour market factors that have been related to migration flows, conventionally neglected measures of gross job and worker flows are included among the labour market characteristics, viz. the excess job reallocation rate (EJR) and the churning rate (CF), see Davis & Haltiwanger (1999). EJR is an index of simultaneous gross job creation and destruction. If this measure is positive, the magnitude of gross job reallocation in a region exceeds the change in net employment. In other words, EJR is an indicator of underlying heterogeneity of labour-demand adjustment at the plant-level of the regions. CF, on the other hand, is called the excess worker turnover rate since it compares worker flows with job flows; larger the magnitude of CF larger are the worker flows (hirings and separations of workers) compared to job flows (creation and destruction of jobs). What is more, these variables summarise the job creation/destruction and the hirings/separations in the population of establishments and, thus, provide a more detailed picture on the process of internal reorganisation of regional labour markets than conventional job turnover variables that are based on aggregate data.

These two factors are thought of complementing the unemployment rate in examining the effect of labour markets on migration. As Fields (1976) argued, the unemployment rate is an imperfect indicator of job ability. Individuals living in regions with high internal labour market dynamics may have better prospects of finding a job than those living in regions with relatively sluggish labour markets. Similarly, it is possible that individuals move to regions where internal labour markets are dynamic, regardless of high unemployment. By including these variables in the model, it is possible to assess whether the internal dynamics of labour markets provides an explanation for several findings according to which regional labour markets have only limited influence on migration, for discussion on this issue, see e.g. Westerlund (1998).

Public policy, and its impact on the allocative efficiency of the economy in terms of labour mobility, has been under examination in several studies, see e.g. Shaw (1986), Westerlund (1998), Day & Winer (2001) and Fishback et. al. (2001). The controversies about the significance of the public policy still exists. For instance, in the Canadian

context Shaw (1986) concludes that fiscal structure that subsidises residence in contracting regions have crowded-out the influence of traditional market based variables on migration. In a recent study Day & Winer (2001) conclude, however, that the impact of public policies have a small impact on the volume of migration. Even though the exact magnitude of the impact of public policies is somewhat uncertain, they have been found to affect migration flows. Thus, their presence is justified also in this study due to the presence of large-scale local public sector in a Nordic welfare state.

Since labour market institutions and legislation are similar across Finnish regions, the differences in public policies arise mainly from income transfers to regions. There are three types of fiscal factors controlling for regional differences in the financial situation, viz. long-term debts (LDEBT), received taxes (TAXINC) and state grants (GRANT). The last two variables are directly connected to public policies. Equality among individuals, in terms of schooling, social welfare and health care has been the main argument for state grants (Moisio, 2002). Accordingly, the grants have been the highest in contracting regions. During the 1990s the state grant system has been under several reforms that have almost halved the total sum of state grants paid to regions. This decline has been partially compensated through the tax system by giving regions a larger share of company taxes. The potential effect of changes in the tax system on migration flows are captured by the TAXINC variable. Finally, LDEBT completes the set of fiscal variables.

Housing markets have been allowed to affect migration flows through housing prices (ACCOPRIC) and the share owner-occupied houses (OWNHOUSE). Housing has a special role in the evolution of regional accumulation of resources and in the adjustment of regional labour markets. Individuals need to live relatively close to their working place and housing costs form almost entirely the regional differences in the cost of living in Finland. In particular, it has to be noted that changes in housing prices may have different effects on in-migration and on out-migration. At the receiving end, an increase in housing prices may slow down in-migration since higher accommodation prices may constrain some households who prefer to move, see Cameron & Muellerbaeur (1998). In original locations an increase in housing prices may have two opposite effects, see Böheim & Taylor (2000). On the one hand individuals may cash in on their property and move elsewhere and, on the other hand, appreciating value of the

asset may reduce the propensity to migrate. During the economic downturns, the impact of decreasing housing prices may have completely different effect on the mobility of individuals. This may generate capital losses to households and, by this means, reduce the propensity to migrate, see e.g. Henley (1998).

Owner occupation (OWNHOME) is recently connected to higher unemployment both at the regional level (Oswald, 1996) and at the country level (Layard & Nickell, 1999), One explanation for these findings is that owner occupation forms an obstacle to mobility by locking people to regions. If this is the case, higher owner occupation is connected to smaller out-migration flows and to the sluggish adjustment of regional labour markets, with other things being equal. This effect is then shown as higher unemployment rates. Thus, it is interesting to see whether this hypothesis holds true in the empirical estimations by using a panel of regions.

When it comes to other determinants of migration flows, differences in the demographic factors of regions influence the potential to generate mobility. In individual-level studies it is a common finding that young and highly educated individuals have a higher propensity to move, see e.g. Ghatak et. al. (1996). The proportion of individuals aged 55 or over from the population (AGED) and the proportion of unskilled individuals (basic schooling) from the working age population (UNSK) are included in the model to control for these effects.

Many of the factors above can be placed in the context of push and pull factors that have gained a lot of attention in new economic geography models of economic agglomeration, see e.g. Krugman (1992). Many of these effects have been discussed in regional science before, e.g. in the gravity models that aim at explaining migration flows, see Mueller (1982). In this study the number of serious crimes per 1000 inhabitants (CRIME) is included as a one of the push effects to check whether regional differences in crime have any effect on migration flows. Finally, industry shares of total production (AGRI, ELEC, SERV, PUBL) are among the factors explaining migration flows. These serve as additional control variables to take account the economic boom in electronics and the economic downturn in agriculture that are likely to affect the inter-regional mobility of workers across the Finnish regions during the 1990s.

3. The data

The study exploits the fact that Finland is divided into 85 sub-regions (the so-called NUTS4-level in the European Union). The borders of these regions follow quite closely those of commuting districts, which makes this regional division of Finland an attractive platform to investigate the dynamics of regional labour markets. The yearly observations cover the period from 1988 to 1997.

The measurement of internal turbulence of regional labour markets applies a large longitudinal data of employees over the period from 1987 to 1997 (Böckerman and Maliranta, 2001). The calculation of gross job and worker flows is based on plant-level elaboration. Employment Statistics constitutes the backbone for the measurement of regional gross job and worker flows. The public sector is excluded from the analysis owing to the great number of practical problems to derive the measures of gross job and worker flows.

The variables that characterize the evolution of gross migration flows and the structure of the economic fundamentals in the Finnish regions are collected by using aggregate data from Statistics Finland. The linked panel data of this study is constructed by matching the measures of gross and worker flows and gross migration flows with the economic fundamentals.

Moreover, the study is focused on prime-age population, because it constitutes the most active segment of population in terms of regional labour market adjustment. However, the applied data does not contain information about migration flows between the Finnish regions based on origins and destinations of migration. In other words, the data contains information about the aggregate rates of in- and out-migration for the Finnish regions. The following analysis of migration is therefore based on the aggregate rates of migration that aim to capture various general equilibrium relationships that are indeed impossible to investigate by using individual-level data as such.

Table 1 contains a description of the selected variables and Appendix 1 contains descriptive statistics. Figs. 1-2 report the in- and out-migration in the Finnish regions. The maps show that the rate of in-migration tends to be high in Southern Finland

compared to Eastern and Northern Finland. In contrast, Fig. 3 shows that the rate of out-migration tends to be quite high also in the certain regions of Southern Finland. In particular, the maps reveal that there is indeed a strong positive correlation between the measures of in- and out-migration across the Finnish regions over the period of investigation. However, the rate of net-migration is indeed negative for the lagging regions of Eastern and Northern Finland.

4. Empirical specifications

To examine the dynamic process of migration flows we specify the following dynamic model:

$$Y_{it} = \sum_{k=l}^{P} a_p Y_{i,t-k} + \sum_{k=l}^{P} b_p X_{i,t-k} + h_i + d_t + e_{it} \,. \tag{4}$$

where Y stands for the selected measure of migration flow and **X** is a vector of explanatory variables. The impacts of these variables are allowed to influence migration flows from lags l to p. The unobserved regional effect, η_i, is taken to be constant over time and specific each region i. The individual effects are allowed to correlate with the explanatory variables. Any time-specific effects that are not included in the model are accounted by the regional-invariant time effects, δ_t. Finally, the remaining disturbances, e_{it}, are assumed to be independently and identically distributed over i and t.

The model set up in equation (4) can be consistently estimated by employing the Arellano-Bond (1991) GMM method for the first differenced equation. Although differencing eliminates the individual effects, it induces negative correlation between the lagged dependent variable, ΔY_{it-1}, and the disturbance term $\Delta\varepsilon_{it}$. The Arellano-Bond method overcomes this problem by employing linear orthogonality conditions, $E(Y_{i,t-s}\, \Delta\varepsilon_{it}) = 0$ for $t = 3, \ldots, T$ and $2 \le s \le t-1$ and $p = 1$, as instruments for the lagged dependent variable. In addition, all leads and lags of strictly exogenous explanatory variables can be employed as instruments for all equations in first differences.

If the assumption that the explanatory variables are strictly exogenous with respect to ε_{it} does not hold, some of the explanatory variables are correlated with the disturbance

term as $E(X_{it}\,\varepsilon_{is}) \neq 0$ if $s \leq t$. In this case the valid instrument set for period t consists of lagged values of dependent variable $Y_{i,t-s}$, $s \geq 2$ and of the lagged values of endogenous variables $X_{i,t-s}$ $s \geq 2$. Accordingly, the set of valid instruments gets larger as t increases. Monte Carlo experiments show that the use of full set of moment conditions in the later cross-sections may result in over fitting biases in the estimates, see Arellano and Honore (2000). For this reason, it is advisable to remove the least informative instruments from the instrument set.

Dependent variables at time t are based on the migration flows between the last weeks of periods t-1 and t. These are related to a set of strongly exogenous variables and to a set of endogenously determined variables. Strongly exogenous variables are allowed to influence migration flows from periods t-1 and t-2. In the case of endogenous variables, the effects are allowed to arise from the current period, t, and from the period t-1. In what follows, different specifications of both instrument sets and various sets of endogenously modelled explanatory variables are reported. In the most general model several variables describing labour markets, housing markets and the financial situation of municipalities are modelled as endogenous.

Optimally all potentially endogenous variables are instrumented with proper instruments. Unfortunately our data set does not contain economic instruments that could be argued to be truly independent of migration flows. Consequently, we opted for the second best and employed the lagged levels of potentially endogenous variables as instruments. According to the Sargan test for the validity of instruments, see Arellano & Bond (1991), our endogenous specifications improve the statistical properties of the estimated models. This gives us some confidence that the estimation framework indeed helps to ease potential endogeneity problems between migration, labour markets, housing markets and public policy.

5. The results

The estimation results are reported in Tables 2 and 3. The first specification (1) in Table 2 corresponds to strictly exogenous variables with the maximum number of instruments employed in modelling the lagged endogenous variable. In the next specification (2) in Table 2 the number of instruments is reduced to two. Table 3 reports the two sets of

results referring to endogenous specifications. The first model (3) reports the results of specification in which TAXINC and GRANTS of the fiscal variables, and ACCOPRICE of the housing variables, are treated as endogenously determined. Finally, the column (4) gives the parameter estimates of the model in which also EJR, CF and UNT are instrumented by their lagged levels. For consistency the number of instruments as well as the number of lagged dependent variables have been set to the same values as in Table 2.[2]

There are few observations worth making when comparing the results of different specifications. First, the parameter estimates are not sensible to the exact number of instruments employed. Second, specifications with strictly exogenous variables have considerable difficulties in passing the SARGAN test for the validity of instruments. This might be a consequence of endogeneity problems among the regressors, as implied by endogenous specifications in Table 3 that pass the implemented statistical tests. Third, the significance level of some of the explanatory variables change after modelling them as endogenous. Most importantly, the unemployment rate is found to affect migration only after modelling it as endogenous. There are also some changes among the fiscal variables. Regardless of these changes, the results are surprisingly similar across different specifications. This is an important observation since it gives additional confidence on previous studies that have largely relied on the assumption of strict exogeneity.

As regards the local labour market variables, the estimation results reveal that the external and internal reorganisation of regional labour markets are indeed closely related to each other. In particular, the net-migration flow and the excess worker turnover rate (CF) are significantly and positively associated with each other. This effect arises mainly through out-migration suggesting that potential migrants have better job opportunities in dynamic labour markets, the finding which gives an additional insight on the dependence between local labour markets and the mobility of individuals. This is largely consistent with the view put forward in Fields (1976) according to which the unemployment rate alone gives an imperfect picture on regional labour markets. In contrast to CF, the excess job reallocation rate (i.e. simultaneous gross job creation and destruction) seems to be less important in the determination of gross migration flows across regions.

The impact of the unemployment rate, on the other hand, is well established only after specifying it as endogenous, see column (4) reported in Table 3. This finding is not that surprising given that the unemployed are found to be more mobile than the employed, see e.g. Herzog et. al. (1993), and that this kind of selective migration is reflected in regional unemployment through migration flows. In particular, the results reported in columns (4) imply that regions with high unemployment tend to have high out-migration rates, with other things equal. As discussed earlier, this view of migration as an equilibrating mechanism of regional unemployment differentials is consistent with several theoretical models ranging from neo-classical model to the models based on the hiring function.

The results also underline that the net migration rate is positively related to regional economic growth and earnings. These effects arise from greater in-migration to fast growing regions with high income. Out-migration, on the other hand, is not found to be related to DGDP and INCOME. Taken together these observations imply that the reorganisation of labour markets across regions is able to improve the allocation of scarce labour resources. In addition, the fact that there is a large-scale in-migration to regions with strong economic growth means that migration across regions has been able to ease labour shortages likely to occur in regions where economic expansion is rapid. By these means, a surge in migration flows has most likely contributed to the matching efficiency of regional labour markets during the 1990s.

When it comes to housing markets, they seem to form the main mechanism that slows down the migration flows between regions. An increase in regional housing prices discourages net-migration by constraining in-migration. Interestingly, there are no evidence that housing prices influence out-migration contrasting the locking-in view according to which the crash of housing markets at the end of the 1990s slowed down the regional adjustment process. This may be a consequence that the two opposite effects discussed in Böheim & Taylor (2000), i.e. the cashing-in effect and the appreciating value effect, cancel each other.

The other determinant of housing markets, viz. owner-occupancy has a lessening impact on net-migration. Interestingly, this effect is found to arise completely through lower in-migration rates. There are no statistically significant connections between out-migration

and the rate of owner-occupancy. This observation gives support to the views expressed in Oswald (1996) according to which owner-occupancy is connected to high regional unemployment. However, the explanation for this finding is totally different. According to our results, this follows from the lack of rented houses in potential in-migration regions, not from the unwillingness of the owner-occupancy unemployed to move.

Turning next to public policies, the results indicate that the public sector has a rather minor role in the determination of gross migration flows across regions. Indeed, it is quite hard to reach strong conclusions about the specific impacts of local public sector on migration flows. Having said that, the elaboration of net-migration of employees reveals that an increase in the long-term debt held by municipalities in a given region leads to an increase in net-migration. An increase in the share of local taxes divided by the number of population tends to reduce net-migration. One explanation for this finding is that some of the prime-age employees are willing to out-migrate from the regions that have high municipal taxes. In addition, the results show that the grants by central government to local public sector has no role in the determination of gross migration flows across regions.

In addition to the factors above, the estimations include various aspect of regional differences that are well in line with a priori expectations. It is well-established that highly educated are more mobile than individuals with low education. This is also evident in the estimation results, UNSK having a statistically significant, downward impact on out-migration.

Another factor hinging behind the observed migration flows is the industry-structure of a region. Finland recovered from the deep recession at the beginning of the 1990s via export-led recovery. This was, by a large part, driven by the electronics which experienced a sharp improvement both in production and in employment. A boom in the electronics is reflected in the results as an increase in both in- and net-migration. If the electronic sector experienced a rapid increase, the agricultural sector has been steadily declining during the 1990s. This has induced an increase in out-migration from regions where the share of agriculture is high, with other things being equal. Finally, the results imply that the welfare state has managed to keep criminality under control despite high

levels of unemployment across regions; CRIME has no statistically significant push effect on the mobility of individuals.

All in all, the results imply that migration equilibrates regional labour markets. People are pulled to regions with high income and rapid economic growth from regions where job opportunities are scant. This adjustment process is, however, slowed down by a large share of prime-age individuals with only basic education living in departing regions and by housing markets. High housing prices as well as a large share of owner-occupancy in potential destination regions discourage mobility. The industry-structure of a region either enhances or slows down the mobility, public policies having little significance in this adjustment process despite the fact that Finland is a Nordic welfare state.

6. Conclusions

The aim of this study was to explore the structure and the dynamics of regional labour markets in terms of gross migration flows. The study applied data on a panel of detailed Finnish regions. The results implied that different economic fundamentals can have similar effects on net changes in migration flows by various means of affecting gross changes. This means that investigation of gross flows of migration can reveal interesting patterns of adjustment that are impossible to discover by focusing solely on net migration flows.

The results showed that there are certain industry-effects that have shaped migration flows across regions. In particular, the pool of available workers has been reallocated increasingly to the regions that have experienced an increase in the share of electronics during the recovery from the great slump of the early 1990s. In other words, migration has contributed deeply to the reorganization of economic structure in terms of sectoral composition.

The net migration rate is positively related to regional economic growth and earnings. The stylized feature of adjustment that there is a large-scale in-migration to the regions with strong economic growth means that migration across regions has been able to solve

at least some of the bottlenecks induced by the rapid regional expansion of economic activity in certain regions of Finland during the 1990s.

The study included variables that capture the internal restructuring of the Finnish regions measured by the rates of gross job and worker flows. The results showed that the internal and the external reorganization of regional labour markets are indeed closely connected. In particular, an increase in the internal turbulence at the plant-level yields a stimulus to in-migration to those regions. This kind of perspective on migration has been a largely neglected issue in the earlier literature. Thus, the inclusion of the variables that capture the internal reorganization of the regions seems to be an important and largely unexploited avenue for theoretical considerations and the topic certainly requires further empirical studies.

Housing markets constitute binding contraints for migration flows across the Finnish regions. In particular, a striking result was that there is an interesting asymmetric relationship between regional housing prices and migration flows. Namely, there is evidence for the perspective that an increase in regional housing prices discourages net-migration to those areas. This effect arises due to the fact that there is less in-migration to those regions that have seen their housing prices risen recently. In contrast, there is no evidence for the perspective that out-migration is discouraged by housing market evolution. Thus, the theoretical considerations on the connection between housing and migration should focus on the distinction based on gross flows of migration. There is also more migration to the regions that have a relatively large rental housing stock. In other words, the build-up of rental houses seems to be a key when increasing the underlying flexibility of regional labour markets in a country that is characterized by large and persistent disparities in the unemployment rates across regions.

The results further indicated that local public sector seems to play a rather minor role in the determination of gross migration flows across regions in a Nordic welfare state. Indeed, it is quite hard to reach strong clear-cut conclusions about the impacts of local public sector on migration flows. However, there is empirical evidence for the perspective that the adverse effects of accumulation of economic activity in terms of committed crimes is yielding a decline in net-migration to those regions. This feature is

a disbenefit of the stylized feature that the recent surge in migration in Finland has definitely been able to improve the allocation of scarce labour resources across regions.

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Figure 1. In-migration in the Finnish regions (the average from 1988 to 1997).

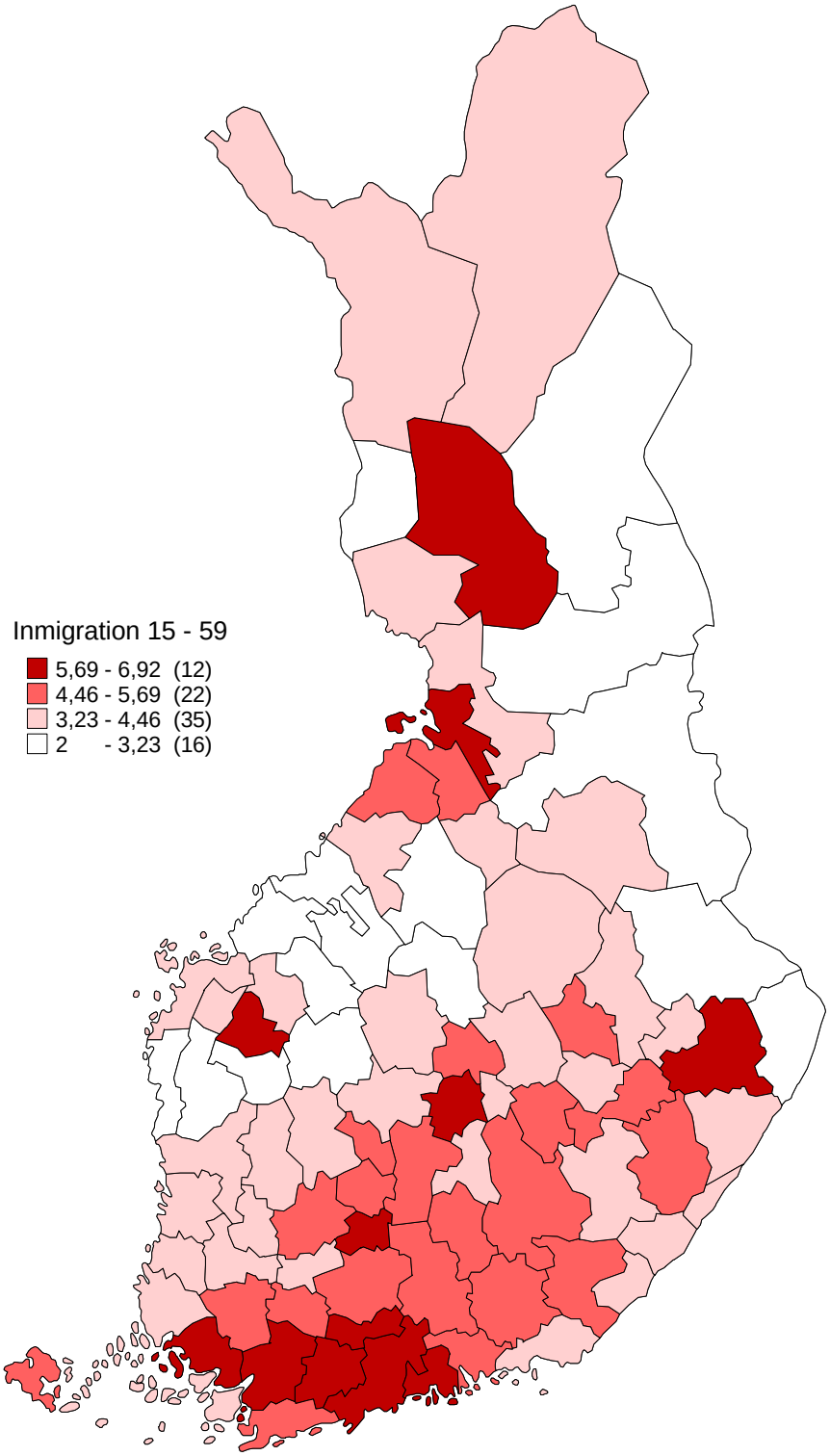

Figure 2. Out-migration in the Finnish regions (the average from 1988 to 1997).

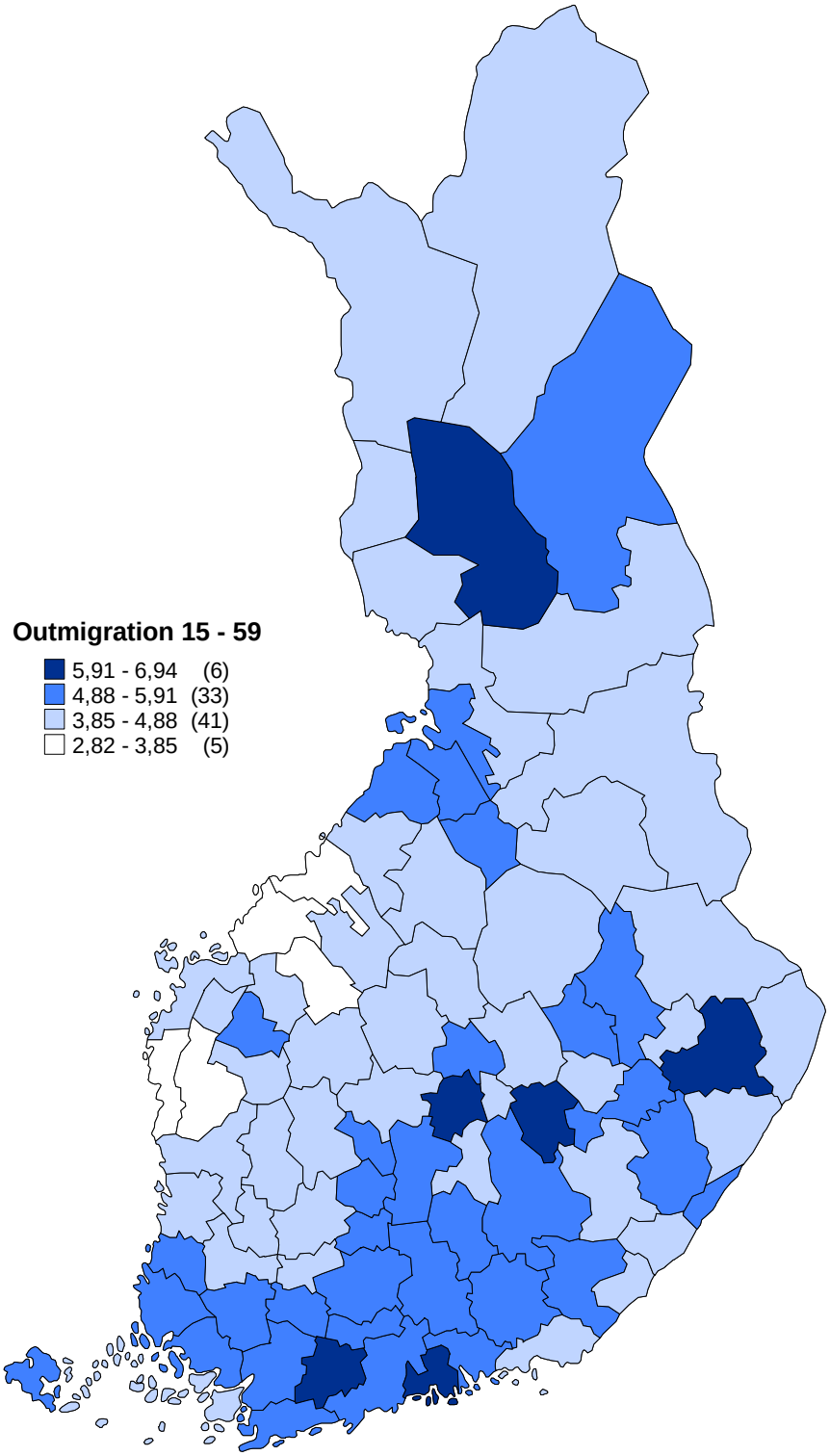

Figure 3. Net-migration in the Finnish regions (the average from 1988 to 1997).

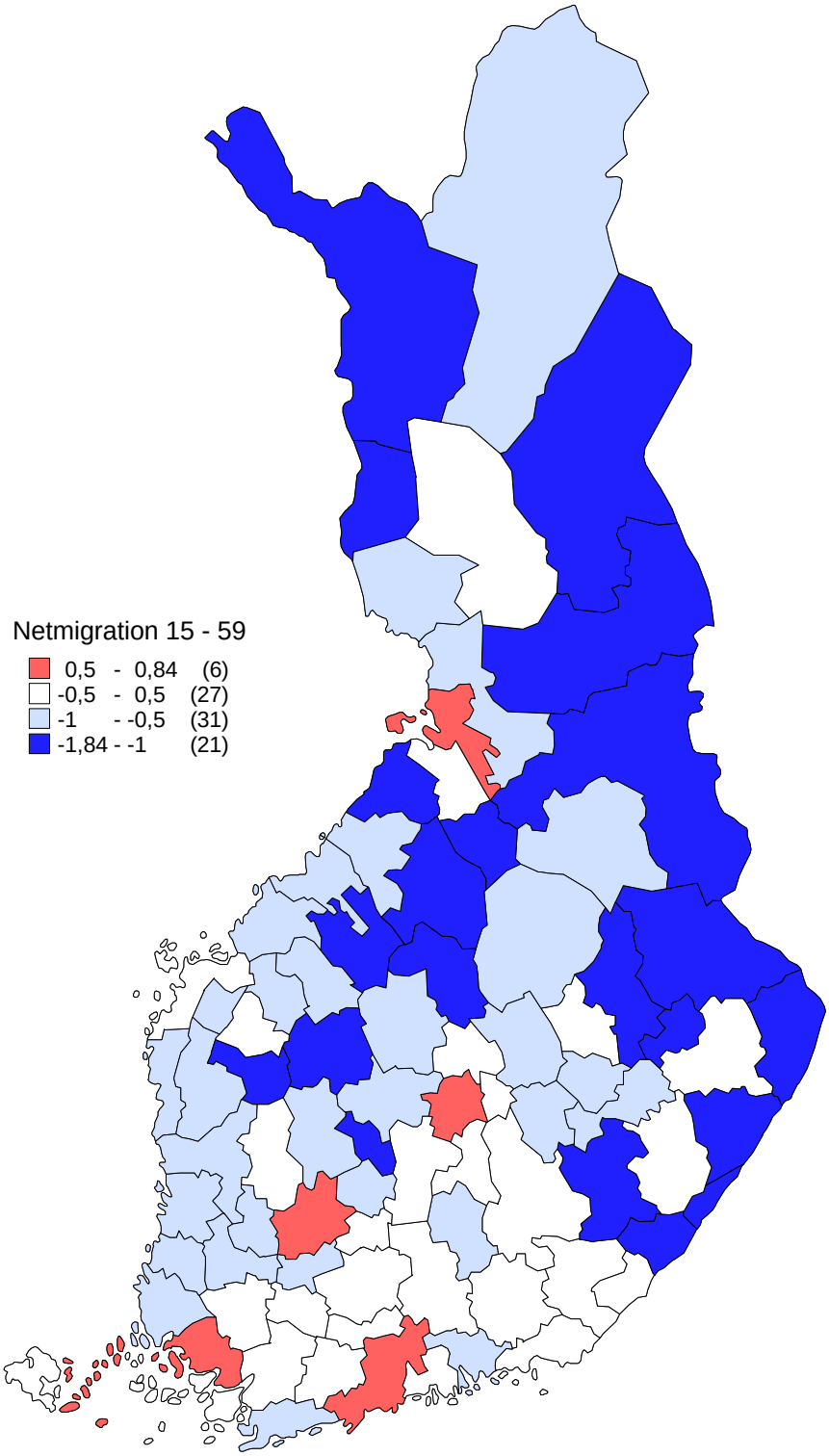

Table 1. The description of the applied variables.

Variable	Definition/measurement
The measures of migration flows	
In-migration	Gross inward migration of the prime-aged individuals (15-59) at time t divided by the prime-aged population at time t-1 in region i, %
Out-migration	Gross outward migration of the prime-aged individuals (15-59) at time t divided by the prime-aged population at time t-1 in region i, %
Net-migration	In-migration – Out-migration in region i, %
Labour market variables	
EJR	Excess job reallocation rate = (job creation rate + job destruction rate) - | job creation rate - job destruction rate | in region i
CF	Churning rate = (hiring rate + separation rate) - (job creation rate + job destruction rate) in region i
UNT	The unemployment rate in region i
INCOME	Income subject to state taxation in region i / income receivers in region i
DGDP	Change in regional GDP in region i, %
Municipal variables	
DEBTS	Long-term debts in region i / population in region i, 10 000 FIM
TAXINC	Tax revenues of municipalities in region i / population in region i, 10 000 FIM
GRANTS	State grants in region i / population in region i, 10 000 FIM
Housing markets	
ACCOPRICE	Average price of houses in region i, 10 000 FIM
OWNHOME	The share of owner-occupied houses from total area in region i, %
Other control variables	
AGED	The number of individuals aged 55 + in region i / population in region i
UNSK	The number of individuals with basic education in region i / population aged 15 + in region i
CRIME	The number of serious crime offences in region i / 1000 inhabitants in region i
AGRI	Value added by agriculture in region i / regional GDP in region i, %
ELEC	Value added by electronics in region i / regional GDP in region i, %
SERV	Value added by private services in region i / regional GDP in region i, %
PUBL	Value added by public sector in region i / regional GDP in region i, %

Table 2. Determinants of migration flows – exogenous specifications.

Dependent	Net-migration		In-migration		Out-migration	
	(1)	(2)	(1)	(2)	(1)	(2)
Dependent $_{t-1}$	0.081	-0.191**	-0.102	-0.122	0.378**	0.268
$_{t-2}$	-0.185***	-0.212***	-0.118*	-0.128*	0.079	0.072
Labour markets variables						
EJR $_{t-1}$	0.006	0.003	0.002	0.002	-0.006*	-0.005
$_{t-2}$	0.001	0.001	0.001	0.001	-0.003	-0.003
CF $_{t-1}$	0.001	0.002	0.001	0.002	0.001	0.002
$_{t-2}$	0.019**	0.015**	0.008	0.008	-0.012**	-0.009*
UNT $_{t-1}$	-0.018	-0.018	-0.015	-0.007	0.026	0.015
$_{t-2}$	-0.037	-0.037	-0.016	-0.008	0.032	0.025
INCOME $_{t-1}$	0.045***	0.034**	0.025*	0.040***	0.004	-0.005
$_{t-2}$	0.012	0.014	0.024	0.024	-0.011	-0.014
DGDP $_{t-1}$	0.015***	0.013***	0.008**	0.009**	-0.003	-0.004
$_{t-2}$	0.005	0.004	0.011***	0.011***	0.005	0.004
Municipal variables						
DEBTS $_{t-1}$	-0.012	-0.013	-0.028	-0.017	-0.037	-0.034
$_{t-2}$	0.060	0.047	-0.034	-0.021	-0.073**	-0.062*
TAXINC $_{t-1}$	0.985	0.968	0.647	0.838	-0.272	-0.427
$_{t-2}$	-0.304	0.006	0.417	0.631	0.914*	0.654
GRANTS $_{t-1}$	-1.218	-1.354	-1.100	-1.063	0.219	0.234
$_{t-2}$	1.741**	1.293*	1.460**	1.006*	-0.344	-0.485
Housing markets						
ACCOPRICE $_{t-1}$	-0.036	-0.014	-0.025	-0.018	0.038	0.037
$_{t-2}$	-0.150***	-0.107***	-0.142***	-0.135***	0.020	0.012
OWNHOME $_{t-1}$	-0.071**	-0.084***	-0.067**	-0.053**	0.005	0.003
$_{t-2}$	0.015	0.003	0.007	0.012	-0.025	-0.030
Other control variables						
AGED $_{t-1}$	0.211	-0.024	0.210	0.149	-0.003	-0.004
$_{t-2}$	-0.024	0.340*	-0.075	-0.058	-0.078	-0.078
UNSK $_{t-1}$	0.437**	0.309	0.114	0.135	-0.463***	-0.462***
$_{t-2}$	-0.103	-0.086	0.160	0.159	0.278*	0.216
CRIME $_{t-1}$	-0.007	-0.015	-0.004	0.002	-0.005	-0.005
$_{t-2}$	-0.020	-0.026*	-0.007	-0.003	0.011	0.009
AGRI $_{t-1}$	-0.008	0.002	-0.010	-0.008	-0.012	-0.011
$_{t-2}$	-0.030**	-0.022*	0.011	0.011	0.035***	0.034***
ELEC $_{t-1}$	0.038*	0.032	0.040**	0.036**	0.005	0.001
$_{t-2}$	0.000	0.019	0.019	0.024	0.013	0.004
SERV $_{t-1}$	0.002	-0.002	-0.014	-0.011	0.008	0.003
$_{t-2}$	-0.010	-0.016	-0.012	-0.017	-0.010	-0.013
PUBL $_{t-1}$	0.033	0.033	0.032	0.037**	0.002	-0.001
$_{t-2}$	0.023	0.030	0.030	0.029*	-0.004	-0.005
Test statistics						
WALD	0.00	0.00	0.00	0.00	0.00	0.00
SARGAN	0.00	0.00	0.08	0.02	0.02	0.50
AR(2)	0.57	0.07	0.76	0.89	0.71	0.75
Instruments						
Lag length	all	2	all	2	all	2

Table 3. Determinants of migration flows – endogenous specifications.

Dependent	Net-migration		In-migration		Out-migration	
	(3)	(4)	(3)	(4)	(3)	(4)
Dependent $_{t-1}$	-0.112	-0.001	-0.065	-0.045	0.294**	0.326**
$_{t-2}$	-0.194**	-0.084	-0.112	-0.070	0.077	0.107
Labour markets variables						
EJR $_{t-1}$	0.003	0.024**	0.003	0.006	-0.003	-0.004
$_{t-2}$	0.001	-0.009	0.001	-0.002	-0.003	0.005
CF $_{t-1}$	0.006	0.051***	0.001	0.017*	0.001	-0.032**
$_{t-2}$	0.020**	-0.005	0.008	0.003	-0.012**	0.006
UNT $_{t-1}$	-0.027	-0.119***	-0.007	-0.041	0.019	0.121***
$_{t-2}$	-0.056*	-0.019	-0.003	-0.034	0.039*	-0.001
INCOME $_{t-1}$	0.077***	0.061***	0.067***	0.031**	-0.025	-0.031
$_{t-2}$	-0.004	0.044**	0.002	0.020	-0.007	-0.022
DGDP $_{t-1}$	0.014**	0.019**	0.008**	0.011**	-0.007	-0.008
$_{t-2}$	0.003	0.004	0.011***	0.010***	0.005	0.004
Municipal variables						
DEBTS $_{t-1}$	-0.053	-0.015	-0.031	-0.025	-0.018	-0.037
$_{t-2}$	0.080**	0.066*	-0.015	-0.001	-0.078**	-0.061
TAXINC $_{t-1}$	1.205	-1.874*	1.854	0.498	0.973	2.231**
$_{t-2}$	1.256	0.052	1.877	2.631**	0.176	1.542*
GRANTS $_{t-1}$	1.258	1.844	-1.020	0.466	-0.787	-0.444
$_{t-2}$	0.925	-0.133	-0.536	-1.641	-1.516	-1.369
Housing markets						
ACCOPRICE $_{t-1}$	-0.066	-0.048	-0.091	-0.119**	-0.070	-0.045
$_{t-2}$	-0.165**	-0.091	-0.134*	-0.093	0.099	0.052
OWNHOME $_{t-1}$	-0.058*	-0.061*	-0.050*	-0.073***	-0.010	-0.006
$_{t-2}$	0.008	0.014	-0.023	-0.018	-0.049**	-0.030
Other control variables						
AGED $_{t-1}$	0.145	-0.041	0.110	0.064	-0.125	0.006
$_{t-2}$	0.232	0.401*	-0.051	0.100	-0.036	-0.141
UNSK $_{t-1}$	0.280	0.551**	0.140	0.246	-0.389***	-0.470***
$_{t-2}$	-0.020	-0.268	0.085	-0.045	0.146	0.240
CRIME $_{t-1}$	-0.021	-0.016	0.018	0.029	0.027*	0.024
$_{t-2}$	-0.036*	-0.035	0.008	0.018	0.037**	0.040**
AGRI $_{t-1}$	0.003	0.003	-0.003	0.006	-0.006	-0.001
$_{t-2}$	-0.019	-0.020	0.016	0.010	0.029***	0.025**
ELEC $_{t-1}$	0.008	-0.004	0.034*	0.033	0.017	0.036*
$_{t-2}$	0.021	0.055**	0.015	0.020	-0.007	-0.032*
SERV $_{t-1}$	0.005	0.008	-0.004	0.003	-0.001	0.001
$_{t-2}$	-0.009	-0.027	-0.013	-0.024	-0.008	0.000
PUBL $_{t-1}$	0.036	0.048	0.023	0.034	-0.013	-0.015
$_{t-2}$	0.022	-0.004	0.033	0.020	-0.001	0.014
Test statistics						
WALD	0.00	0.00	0.00	0.00	0.00	0.00
SARGAN	0.50	0.99	0.42	0.99	0.83	0.99
AR(2)	0.07	0.16	0.43	0.38	0.60	0.08
Instruments						
Lag length	2	2	2	2	2	2

Appendix 1. Descriptive statistics from 1988 to 1997.

	Mean	s.d.	Min	Max
The measures of migration flows				
In-migration	4.33	1.28	1.61	8.54
Out-migration	4.89	1.02	2.04	8.47
Net-migration	-0.56	0.76	-2.69	3.17
Labour market variables				
EJR	25.16	7.88	8.63	84.35
CF	20.61	5.84	7.27	51.58
UNT	15.83	7.73	0.80	34.05
INCOME	71.09	10.76	42.55	116.57
DGDP	1.08	6.48	-22.31	32.87
Municipal variables				
DEBTS	4.99	1.55	0.95	12.02
TAXINC	0.88	0.18	0.53	1.67
GRANTS	0.85	0.23	0.22	1.48
Housing markets				
ACCOPRICE	4.53	0.78	3.61	10.73
OWNHOME	67.51	4.39	53.00	77.00
Other control variables				
AGED	26.66	3.77	17.45	39.34
UNSK	51.86	5.26	35.42	65.60
CRIME	4.39	1.97	1.04	12.26
AGRI	15.18	9.29	0.34	41.98
ELEC	3.11	3.65	0.00	47.85
SERV	32.31	7.32	17.66	63.51
PUBL	20.24	5.54	8.11	40.13

[1] For recent empirical studies, see e.g. Day & Winer (2001), among others.

[2] The results are neither sensitive to the number of lagged dependent variables nor the exact number of instruments. These unreported results are available from the authors on request.