WORKER TURNOVER, STRUCTURAL CHANGE, AND INTER-REGIONAL MIGRATION: EVIDENCE FROM FINLAND*

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I study the effects of regional labour market conditions on inter-regional migration using province-level panel data on bilateral migration flows and disaggregated labour market flows. My results indicate that hires from unemployment and job separations leading to unemployment have sizeable effects on migration. The effects of hires from and separations to other labour market states, while statistically significant, appear smaller. Further, the results suggest that inter-industry and inter-firm shifts in employment are immaterial for migration. Taken together, inter-regional migration is largely affected by regional differences in unemployment and the employment opportunities available for unemployed workers. (JEL: J61, J63)

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1. Introduction

The determinants of inter-regional migration have been the subject of numerous empirical studies in recent decades. Regardless of whether micro-level or macro-level data is used, measures related to the labour market are routinely included as explanatory variables in migration models. Despite the improved availability of detailed regional-level labour market data and contrary to various theoretical arguments, the majority of these studies use the regional unemployment rate as the key labour market variable. Arguing that other aspects of local labour markets also may be of relevance to potential migrants, some authors have used additional variables to explain inter-regional migration flows. Examples include Carlsen, Johansen and Røed (2006), who include measures of labour market tightness and Hämäläinen and Böckerman (2004), who include excess job reallocation and churning variables. Exceptions of this kind are still rare, so that the relationship between local labour market conditions and migration remains unclear. However, it can be concluded that the additional aspects considered in the aforementioned studies are important.

This article aims at contributing to the literature by considering new variables to characterise local labour markets and to explain inter-regional migration flows in Finland from 1988 to 1996. Two recent studies on migration motives of Nordic migrants have found that long-distance moves are much more often related to employment than short-distance moves (Lundholm, Garvill, Malmberg and Westin, 2004; Niedomysl, 2011). Majority of long-distance movers in these studies report main migration motives other than employment, such as education, social reasons (family), living environment and housing, and other reasons. However, Niedomysl (2011) points out that although employment is relatively rarely stated as the main migration motive, long-distance move is very often associated with a job change. As the author notes, employment may often be a precondition for migration even if the main motive is something else. I study migration between large regional units (provinces) because differences in labour market conditions are likely to be more important in determining long-distance migration than short-distance migration. My data is well suited for studying the determinants of migration for various reasons. The data is on bilateral migration flows so that I am able to control both the source region and destination region characteristics. Further, I observe gross rather than net migration flows. Gross flows are much larger than net flows; therefore, my migration measure does not exclude a large part of the moves, like in many of the earlier studies. The key explanatory variables come from a linked employer–employee data set with a sufficient degree of disaggregation. Using disaggregated job and worker flow data, I construct measures closely related to those local labour market phenomena, which, according to search-theoretic considerations and evidence from previous empirical studies, have the potential to influence migration decisions but have not been used previously. More specifically, I explore the roles of worker turnover (hires and separations) and change in the structure of employment as well as 'churning' as determinants of migration. Importantly, hires and separations are disaggregated by the associated labour market transition of the worker. This enables me to explore the potentially heterogeneous effects of hires from and separations into unemployment and other hires and separations. Industry-level information on job and worker flows allows me to measure structural change by job reallocation across industries and across establishments. By using panel data on bilateral gross migration flows between provinces, I am able to simultaneously identify the effects of source and destination regions' characteristics on migration between the two regions. I address the potential endogeneity of the labour market variables by using GMM estimation.

My results show that hires and job separations in regions have sizeable effects on migration. Hires by local employers hinder

out-migration and increase in-migration whereas job separations increase out-migration and decrease in-migration. The effects of these labour market flows are found to be strongly heterogeneous with respect to the source labour market status of the hired workers and destination status of the separated workers. Specifically, my results reveal that a hire from or a separation into unemployment has, in general, a larger effect on migration than a hire from or a separation into employment or outside the labour force. The rate of unemployment is an important push factor but does not seem to significantly affect in-migration. These results are both in line with previous micro-level evidence on individual migration propensities and in accordance with theoretical predictions on the link between local labour markets and mobility. I also find that simultaneous hires and separations have a negative effect on in-migration, possibly reflecting increased competition for jobs. Even though I observe a lot of changes in the structure of employment, that is, employment shifts between industries and between establishments within regions, I find no evidence that this affects inter-regional migration.

The article is organised as follows. In Section 2, I briefly discuss the background and sketch the theoretical underpinnings of the article. Section 3 describes the data and defines the variables. In Section 4, I introduce the methodological strategy. Section 5 presents the empirical results and discussion, and Section 6 concludes.

2. Background and theoretical considerations

The theoretical treatment of inter-regional migration dates back to the human capital framework by Sjaastad (1962). A similar line of thinking is adopted in the classic two-region model of migration by Harris and Todaro (1970). The central feature of the framework is that by moving or staying, individuals maximise the expected return on their human capital. The expected return in a region depends on local labour market opportunities, consisting of the probability of being employed and the wage level. The human capital approach has since been widely used in theoretical and empirical studies relating local labour markets and migration.

Following the example of the theoretical Harris-Todaro model, most empirical migration studies have used unemployment rate and wage as the variables characterizing local labour market conditions. In some papers, the net growth of employment has also been used. However, the level of unemployment and the net change in employment hide a considerable amount of dynamics in the labour market (see Davis, Faberman and Haltiwanger, 2006). Generally speaking, a lot of simultaneous creation and destruction of jobs, or hiring and separation of workers, is observed. Related to migration, Fields (1976, 1979) already has pointed out that the unemployment rate and the net employment growth are not necessarily sufficient to capture the features of labour markets that are relevant to individuals who make migration decisions. This means that they fail to correctly measure the labour market opportunities for potential migrants, which could explain the mixed empirical results on the effect of the unemployment rate in the literature (e.g., Furceri, 2006; Hatton and Tani, 2005; McCormick and Wahba, 2005; Parikh and Leuvensteijn, 2003). Further, the unemployment rate not only measures labour demand but may also capture individual migration propensities, a point made explicit by Pissarides and Wadsworth (1989). Indeed, studies using micro-level data have shown that personal unemployment increases the propensity to migrate (e.g., Antolin and Bover, 1997; Böheim and Taylor, 2002; Nivalainen, 2004). Jackman and Savouri (1992) point out that this is because unemployed workers are more active in job search. This may partly explain the finding of some studies using regional-level data (e.g., Jackman and Savouri, 1992; Etzo, 2011) that regions with

high unemployment experience greater out-migration.

Because of the problems associated with using the unemployment rate as the only labour market variable (in addition to the wage level) in the migration equation, some studies have adopted different theoretical approaches and used alternative explanatory variables. In particular, job search and matching models have proved useful in analyzing migration and in finding variables to characterise local labour markets in empirical analyses. Jackman and Savouri (1992) present a theoretical matching model, in which some workers search for and are matched to jobs that are not located in their home region. Inasmuch as these matches lead to inter-regional mobility of workers, migrations may be seen as the outcome of successful inter-regional job search. This is in contrast to the Harris-Todaro model where workers cannot search for jobs that are located outside their home region. Clearly, however, distant search should be allowed in a realistic spatial model of modern labour markets (for a theoretical model of optimal search and mobility, see Molho, 2001). Based on their theoretical model, key explanatory variables of bilateral migration flows in Jackman and Savouri's (1992) analysis are the vacancy and unemployment rates. These are included for both the source and destination region of each migration flow. Empirical results for the effects of these variables are in line with the matching model: regions with relatively high vacancy rates and low unemployment rates experience less out-migration and more in-migration. Similar results are found for Sweden by Westerlund (1997, 1998). The assumption of inter-regional job search that gives rise to inter-regional worker mobility has also been made in some studies estimating regional matching functions (for an overview of this literature, see Petrongolo and Pissarides, 2001).

Some other empirical studies, while adopting the human capital model as the theoretical framework, include alternative labour market indicators in a model of interregional migration flows. Carlsen et al. (2006) measure local labour market tightness by the rate at which local unemployed workers aged 25–59 years exit from unemployment. The authors find a statistically significant positive effect on net in-migration to Norwegian counties for this variable. Hämäläinen and Böckerman (2004) do not attempt to measure local job-finding probabilities directly, but they suggest that regions with more internal reorganisation in the labour market are more attractive to workers. They use labour market flow data to calculate measures of excess job reallocation and churning. These variables are shown to be positively associated with net in-migration to Finnish regions.

All the studies mentioned above, which have used alternative labour market variables in the migration equation, have focused on the dynamic features of labour markets. It appears that changes in local labour markets are intimately related to migration flows. However, there is no prior evidence on the effects of hires and job separations on migration.[1] It seems that the use of any of the aforementioned alternative explanatory variables (including those used in this article) could have been justified by either the human capital model or by search theory. However, as discussed earlier, search theory is apparently the more realistic framework to study inter-regional migration. Thus, I discuss my hypotheses and interpret my results in the light of search and matching. In general, search and matching models predict that interregional migration is linked to both inputs (stocks of vacancies and unemployed) and outputs (hirings) of the matching process. It is clear that the input and output variables are correlated. Carlsen et al. (2006) include outflow from unemployment, unemployment and vacancies in their models. They find that the effects of the outflow variables are statistically significant, whereas the effects of vacancy and unemployment are not. I focus on the effects of the output variables of the matching function, but I also include unemployment in my models.

1 Exceptions are two early papers by Fields (1976, 1979). He finds that hires and separations are highly correlated with inter-regional net migration flows.

I assume that individuals are also able to search for employment outside their home region. With some probability, an inter-regional match of a worker and job leads to migration of the worker (workers may also commute). Therefore, positive changes in demand for labour by firms in a region result in in-migration through hires of workers from other regions. In turn, out-migration is hindered by demand increases because, as a result, more local job seekers are likely to find a local match. Carlsen et al. (2006) have also stressed the importance of hiring. However, my perspective is different from theirs in two respects. Firstly, I assume that individuals first search and then move ("contracted migration") rather than move to be able to search in another region ("speculative migration"). It follows that the overall amount of hiring in local firms rather than merely the hiring of local workers matters. Secondly, I take into account on-the-job search and job search by those outside the labour force. Whereas many empirical migration studies focus on the effect of employment opportunities for the unemployed, I believe that moves related to job changes should not be ruled out *a priori*.[2] This implies that migration may be expected to depend on all hires rather than hires of unemployed workers only. It should be noted that the difference between the number of local hires and the total number of hires is likely to be small, whereas including hires of employed workers (and those outside the labour force) in addition to hires of unemployed workers is more consequential due to the large number of job-to-job transitions.

Whether the worker will be recruited from the same region or from another region is likely to depend on the characteristics of the job. In particular, jobs in different sectors may attract in-migrant workers to a different extent. Especially when hires take place in sectors with a tight local labour market situation, firms may resort to recruiting workers from other regions. Further, Anderson and Burgess (2000) have argued that employers may have a preference for employed applicants and that the source of a new hire is important. This means that jobs taken by unemployed workers are different from jobs taken by job switchers, or that hires from unemployment and hires from employment reflect different conditions in the labour market.[3] Also, because the propensity to migrate depends on a worker's labour market status, as noted earlier, hires from unemployment and hires from employment may have differential effects on inter-regional migration. Recognising the potentially different effects on migration of different kinds of jobs created gives rise to my key hypothesis that the labour market indicators used in an empirical migration model should be disaggregated to take into account the potential heterogeneity of effects.

The extent to which hires by firms lead to recruitment of workers from another region depends on search activity by both local workers and workers from the other region. Relatively active search by local workers increases the likelihood of local matches, whereas active search by the other region's workers increases the likelihood of interregional matches. It can thus be hypothesised that fierce competition for jobs locally or, put differently, an active local pool of job seekers, decreases in-migration and increases out-migration. The latter effect arises because the local market is less tight from the perspective of local workers and because active local job seekers are likely to search actively outside their home regions as well. In a basic matching function, the number of unemployed is used as a proxy for the number of workers who are potentially matched to available jobs. Jackman and Savouri (1992) point out that unemployment duration may affect individual job search effort and they include the share of long-term unemployed as an additional regressor in their migration equation. I share the view that local unemployment alone is

2 Van Ommeren, Rietveld and Nijkamp (1999) have discussed these moves in the light of search theory.

3 Yashiv (2008) surveys studies of US labour market dynamics. The author makes a clear distinction between flows with different sources of hires and destinations of job separations and reports that the flows differ in the way they behave over the business cycle.

an insufficient measure of the competitive situation in a region. It is clear that the local competition for jobs is most strongly increased by negative labour demand changes that lead to job separations. Newly laid-off workers are likely to search relatively actively and thus decrease the opportunities available for in-migrant workers. In turn, the theoretical effect of voluntary separations (quits) on migration is more ambiguous since quits may be associated with job changes (due to labour supply or demand changes) or, for example, retirement. Altogether, separations are likely to change the competitive situation in the local labour market and thus are potentially an important factor in explaining inter-regional matches and migration.

As in the case of hires, the relevance of separations may differ according to the sector and the resulting labour market transition. In particular, separations in sectors where workers are concurrently hired by other firms may lead to job-to-job changes rather than to hiring of workers from outside the region. In turn, sectoral shifts in employment are likely to be associated with in-migration since local newly separated workers may not be qualified for the available job opportunities. Robson (2009), who studies empirically the effect of structural change on regional labour market performance, lists inter-regional migration as one of the adjustment mechanisms to sectoral shifts in employment. In addition to sector, the resulting labour market status of a separating worker is also likely to matter. Separations that lead to unemployment are often due to lay-offs and thus increase local competition for jobs, whereas separations leading to other labour market states (employment, out of the labour force) may not be that influential.

In the empirical analysis that follows, I estimate a model of inter-regional migration. The key explanatory variables reflect the labour market changes (hires and separations) that are potentially important in the light of the discussion above. In particular, I am interested in differential effects of different kinds of hires and job separations. The importance of the source labour market status of a hire and the destination of a separation is tested. Further, I test the hypothesis that local changes in the structure of employment (i.e., employment shifts between sectors and firms) lead to increases in local skills mismatch that induce work-related in-migration and stimulate out-migration.

The discussion above suggests that the labour market conditions of both the source region and the destination region affect migration through inter-regional search behaviour. With my data, I am able to simultaneously include variables concerning the source region and destination region of each migration flow, which will add accuracy to my results. Further, I observe the gross migration flows between regions, which are much larger than the net migration figures used by many other studies.

3. Data and empirical specification

To model inter-regional mobility, I use data on gross bilateral migration flows of people of economically active ages (15–74)[4] between 19 Finnish provinces in the years 1988 to 1996.[5,6,7] Provinces are administrative regions and, thus, differ from regional labour markets, which would be the ideal regional units in a study such as mine. Most of my variables are not available at the regional labour market level and, thus, a province-level data set is used. However, it is more often the case that a province includes many local labour market areas than that a province border crosses a

4 Individuals aged 15–74 years are the population for which the official employment statistics were calculated in the sample period. I use this age group to have measures for the same subpopulation in both sides of the regression equation. Using alternative age groups (15–64 or 25–64) yielded similar results (available on request).

5 For descriptive statistics of the variables in the data, see the appendix.

6 Due to the special character of the region and due to lack of some data, I exclude the autonomous island of Åland from the analysis.

7 I chose years 1988–1996 because the regional aggregates of the labour market flows were available for these years. Although the period of study is not very recent, I believe that the motives for employment-related migration (e.g., finding new employment) do not fundamentally change and, therefore, the main conclusions hold for later years.

regional labour market.[8] Therefore, most of the migrations in my data are people moving from one local labour market to another.

The migration data provided by the Statistics Finland covers all registered moves, that is, every change in the registered place of living of Finnish inhabitants. Because, according to the law, every Finnish inhabitant is obliged to have a registered address, and inhabitants are only eligible for the public services in their home municipality, the data is of high accuracy and likely to capture virtually all residential moves. Altogether, the data consists of 342 units of observation, which are the province pairs. In the analysis, I am able to use a total of 2,736 observations.

The key set of explanatory variables is obtained from a linked employer-employee data set.[9] The data includes province-level gross rates of job creation and destruction as defined in Davis, Haltiwanger and Schuh (1996) and worker flows into and from employment. I can separate between the flows from and into unemployment and the flows from and to other labour market states. Further, flow data is disaggregated by industry, which allows us to measure the degree of employment shifting between industries and between establishments within the industries. The combination of job and worker flows also allows us to calculate a variable reflecting excess worker turnover (churning).

The empirical migration equation to be estimated is

$$(1) \qquad ln\left(\frac{M_{ijt}}{Pop_{it}}\right) = \alpha_{ij} + x'_{it}\beta + x'_{jt}\gamma + \delta_t + \epsilon_{ijt}$$

where M_{ijt} is the number of migrants aged 15–74 years from source to destination province, Pop_{it} is the population (in thousands) aged 15–74 years in the source province, and x' is a vector of explanatory variables. The indices i, j, and t stand for source province, destination province, and year, respectively. Parameters of the model are α, the fixed effect of a particular pair of provinces; β and γ, the coefficient vectors; and δ_t, the fixed effect for year t. ϵ is the error term.

The elements of the vector that are of interest in this article are the variables characterising local labour markets of the source and destination provinces. In addition to the conventional labour market variables such as the unemployment rate, a proxy of the wage rate, and the net change in the number of jobs, I calculate variables that describe the dynamics of the labour markets in two aforementioned separate dimensions. In the following detailed introduction of my variables, I leave out the indices to simplify the expressions. All the variables are calculated for each of the provinces and for every year. Time-invariant factors of provinces and province-pairs such as geographical distance are captured by the fixed effects .

The regional labour market flow data covers business sector establishments, excluding farming, public sector, and social and personal services. I will use the following labour market flow variables in my baseline specifications: hires (*H*); hires from unemployment (*HU*); hires from other sources, that is, from employment and outside the labour force (*HOTH*); separations (*S*); separations into unemployment (*SU*); separations into other destinations (*SOTH*); and industry-specific hires and separations (and , where denotes the industry).[10] It is interesting to note at this point that there is a modest negative correlation between hires from unemployment (*HU*) and hires from other sources (*HOTH*), as well as between the separation variables *SU* and *SOTH*.[11] This is in line with the idea that I will get measures of rather diverse labour market phenomena by disaggregating the flows by

8 Most of the employment-jobs ratios are close to 1 in the provinces. I also compared the available regional labour market classification (2008) to provinces, and only in rare cases there are municipalities from more than one province within a regional labour market.

9 I would like to thank Petri Böckerman for making this data available. For a description of the data, see Böckerman and Maliranta (2001). An earlier paper using variables from the same employer-employee data to study migration is Hämäläinen and Böckerman (2004).

10 The definitions of the variables can be found in the appendix.

11 The correlation coefficients are –0.27 (HU and HOTH) and –0.46 (SU and SOTH).

source and destination. Since my hire and separation variables exclude some industries, I also control for the total net change in employment in these industries (*NETO*). The flows, as well as most other variables (those representing absolute numbers), are divided by population (aged 15–74 years) in the province.

As in the majority of earlier studies, I include the unemployment rate (*U*) and a proxy for the wage level (*WINC*) (in 1,000 euro) in my models. The wage level proxy is calculated as total wage income divided by the number of wage earners in the province.[12] I control for the industrial composition of jobs in provinces and the differences in industrial composition between the source region and the destination region. For this, I include the shares of jobs in agricultural (), industrial (), and construction () sectors in the source and destination region. Industrial dissimilarities between the two regions are captured by an index parallel to the "comparability index" in Jackman and Savouri (1992). More specifically, the dissimilarity index (*DIS*) is calculated as the sum of squared differences (between the source and the destination) in the shares of 14 industries.

To sufficiently control for other factors possibly affecting migration, I include an extensive set of province-level variables. For the source province, I control for demographic characteristics of the population. These controls include the number of population aged 15–74 years with different education levels (five categories), the number of inhabitants in different age groups (six categories), the number of children, the number of elderly people (above 74 years), and the number of retired people aged 15–74 years, all divided by the total population aged 15–74 years. For both source and destination province, I control for the share of owner-occupied housing, the number of newly enrolled university students (divided by population aged 15–74 years), the share of population living in municipalities classified as urban areas, and the share of population living in municipalities classified as densely populated areas. Average house prices and rents (per square metre) are also included for both provinces to account for differences in living costs. To account for the possible substitutive (commute rather than move) or complementary (move as a result of commuting) role of commuting in the migration decision, I include the ratio of the number of employed inhabitants to the number of jobs as a measure of the net inter-regional commuting. In all regressions, I also include year dummies.[13]

4. The estimation method

In some of the more recent studies of inter-regional migratory flows, it has been noted that not only do labour market conditions affect migration, but the reverse may also be true (see e.g., Furceri, 2006; Hämäläinen and Böckerman, 2004). Theoretically, this may occur, for example, if a positive exogenous in-migration shock increases labour supply in the region. This could lead to an increase in the number of jobs, a reduction or an increase in the unemployment rate, and a change in the wage rate. For this reason, possible endogeneity of regressors needs to be taken into account in the statistical analysis. Further complication arises from the possible dynamic nature of migration. In some earlier studies, past migration flows are found significant in explaining subsequent flows. In a fixed effects panel setting, including the lagged dependent variable is likely to bias the estimates. I solve these problems by exploiting the panel nature of the data and using the dynamic panel data GMM method by Arellano and Bond (1991) in estimating equation (1).[14] In the method, the equation

12 Using average wage as a proxy may be problematic because the variable may partly measure working hours and, thus, labour demand and labour supply. The problem of lacking wage rate information is common in migration literature, and many studies use either wage rate information covering some sectors only (e.g., Carlsen et al. 2006) or average income (e.g., Hämäläinen and Böckerman 2004).

13 For the sake of brevity, the results concerning these additional controls are not reported in the tables but are briefly commented in the text whenever noteworthy. Full result tables are available on request

14 All models are estimated using the Stata xtabond2 module created by David Roodman (2003).

is first differenced and then estimated using the generalised method of moments (GMM). Arellano and Bond (1991) have shown that, in a panel context, values of the endogenous regressors and the dependent variable lagged two or more periods can be used as instruments. Regressors that are predetermined rather than endogenous need to be lagged one period. To keep the instrument matrix reasonable in size, my instrumenting strategy is to use only the two-period lagged values of endogenous regressors and only one-period lagged values of predetermined regressors.[15] I further restrict the set of instruments to include only the twice-lagged dependent variable and the lagged labour market variables, that is, the hiring and separation variables (lagged twice), net change in employment in other industries (lagged twice) and the unemployment rate (lagged once). This leads the number of instruments in my models to range from 68 to 124, which I consider sufficiently large but not excessive. It should be noted that all the variables included in the instrument matrix serve as instruments for all the regressors. Instead of relying only on lagged regressors as instruments, I have added some 'genuine' instruments. These are investments divided by gross domestic product and exports divided by the turnover in firms located in the province. Both of the variables are positively associated with local labour demand and, thus, increase hirings and decrease job separations. Investments increase production capacity, and exports reflect the demand for local products. These variables are measured at province-level, are lagged one period, and are included for both the source region and the destination region. I believe that these instruments are valid in the sense that they are likely to affect the local labour market events but are not linked to out-migration or in-migration directly.

Using the described method to estimate an equation in first differences has been shown to have some potential weaknesses. Arellano and Bover (1995) and Blundell and Bond (1998) have suggested that a problem of weak instruments may be present, especially if the time series of regressors are highly persistent. To correct for this, the authors propose an alternative method (system GMM) where additional moment conditions are introduced. For my data, I believe that weakness of instruments is not a major concern because the variables of interest, in particular the flow variables, are not very persistent over time. Moreover, according to simple correlation coefficients, twice-lagged level variables have better predictive power for first-differenced variables than twice-lagged differences have for level regressors. Therefore, I find the difference GMM method suitable, and preferable, for my aims. In particular, I use the two-step GMM estimator because, with an appropriate finite sample corrected varianceestimate, it has been found to be superior to the one-step estimator (see Windmeijer 2005).

5. Results

5.1. The effects of hirings and job separations

The findings of the analyses are reported in Table 1, where I present three alternative specifications of the migration equation. Specification (a) includes the total hiring and total separation variables. In specifications (b) and (c), these variables are decomposed by labour market status of workers and by industry, respectively.

The impression from the results in column (a) is that there is something wrong with the model specification. None of the coefficients shown in the column is statistically significant. The probable explanation for this is found by looking at the results from specification (b), where worker flows are disaggregated by source (*HU* and *HOTH*) and destination (*SU* and *SOTH*) labour market status. I can see that the effects of flows differ markedly in size depending on the source and destination labour market status. Thus, in specification

15 For example, Windmeijer (2005) considers restricting the number of instruments as an advantageous strategy.

(a), incorrect restrictions on the parameters are imposed. I believe that this is the primary reason for the statistical insignificance of the coefficients in that specification. In (b), most coefficients are of the expected sign, and many of them are significantly different from zero.

Table 1. Determinants of inter-regional migration

	(a)		(b)		(c)	
Source province (out-migration)						
H	3.05	(3.63)	–		–	
HU	–		–31.24***	(10.51)	–	
HOTH	–		0.14	(1.71)	–	
H_{ind}	–		–		–1.27	(2.33)
H_{constr}	–		–		–1.74	(5.07)
H_{serv}	–		–		4.63*	(2.81)
S	3.50	(9.12)	–		–	
SU	–		–3.98	(4.99)	–	
SOTH	–		–0.19	(2.36)	–	
S_{ind}	–		–		–1.47	(3.01)
S_{constr}	–		–		5.97	(7.92)
S_{serv}	–		–		–0.26	(5.21)
NETO	–17.54	(14.45)	–6.24**	(3.14)	–1.20	(3.85)
U	14.18	(10.52)	11.38***	(2.66)	–0.84	(2.58)
WINC	0.01	(0.16)	0.07	(0.06)	0.01	(0.04)
JOB_{pri}	0.08	(11.62)	8.62	(5.52)	0.61	(4.66)
JOB_{ind}	5.61	(5.85)	2.08	(3.92)	–0.28	(3.13)
JOB_{constr}	–10.51	(9.33)	6.26	(5.02)	4.13	(5.55)
Destination province (in-migration)						
H	2.37	(2.52)	–		–	
HU	–		17.76**	(8.6)	–	
HOTH	–		–0.48	(1.35)	–	
H_{ind}	–		–		1.76	(1.85)
H_{constr}	–		–		5.47	(4.22)
H_{serv}	–		–		4.03*	(2.09)
S	–3.11	(3.55)	–		–	
SU	–		–17.25**	(3.41)	–	
SOTH	–		–4.59**	(1.83)	–	
S_{ind}	–		–		–2.44	(2.29)
S_{constr}	–		–		–5.66	(6.32)
S_{serv}	–		–		–8.54**	(4.34)
NETO	–6.45	(4.36)	2.96	(2.8)	1.73	(2.95)
U	4.14	(4.21)	–2.80	(2.24)	–1.86	(1.82)
WINC	0.08	(0.09)	0.07*	(0.04)	0.06**	(0.03)
JOB_{pri}	–2.38	(5.81)	–0.50	(2.68)	–5.09*	(2.61)
JOB_{ind}	–0.41	(5.11)	1.01	(2.8)	–4.71**	(2.37)
JOB_{constr}	6.60	(6.16)	6.34	(4.31)	1.47	(4.84)
DIS	–9.72	(27.9)	–8.19	(14.59)	–1.97	(9.4)
lagdep	–0.28	(0.24)	–0.01	(0.11)	–0.03	(0.09)
No. of instruments	68		96		124	
Hansen	0.637		0.853		0.031	
AR(2)	0.536		0.562		0.382	

Notes: Two-step GMM with Windmeijer correction. Dep. var.: log migration rate (per 1,000 persons) to the destination province. N = 2,736. Additional controls (see Section 3) and year dummies included. Robust standard errors in parentheses. * denotes significance at 10% level, ** at 5% level and *** at 1% level.

Results from specification (b) show that hiring from unemployment (*HU*) has a sizeable and statistically significant negative effect on out-migration. In contrast, the coefficient of hires from other sources (*HOTH*) is statistically insignificant. Therefore, hiring hinders out-migration insofar as unemployed workers are hired. I do not find statistically significant effects on out-migration for worker separations (*SU* and *SOTH*). It thus seems that the transition of workers from employment to nonemployment does not increase local competition for jobs enough to induce out-migration.[16] Further, job changes (to local and nonlocal jobs) by the workers in local firms, captured by *SOTH*, are not associated with out-migration. I am able to identify the result commonly found in earlier literature, which is that more out-migration occurs when the rate of unemployment is higher. Net change in employment in other sectors (*NETO*) decreases out-migration.[17]

The results from specification (b) concerning in-migration underline different features of the labour market than the ones that are important for out-migration. Most importantly, the unemployment rate of the province does not enter significantly, even though the coefficient has the expected sign. Worker flows seem to matter more. Worker flow from unemployment to employment (*HU*) enters positively and significantly. Hires from other sources (employment and outside the labour force) (*HOTH*) do not seem to have a role in attracting migrants. This result, together with the result that job separations leading to other labour market states than unemployment does not induce out-migration, may indicate that long-distance residential changes associated with job changes are rare. In model (b), both flows from employment to unemployment (SU) and to other destinations (SOTH) have statistically significant negative effects on in-migration, although the effect of the flow to unemployment is distinctively larger. Further, higher wage income is associated with higher in-migration. Measures of industrial structure and its dissimilarity between the source and destination region enter without statistical significance, although the coefficient is negative, as expected.

The results from specification (c), where worker flows are disaggregated by industry, imply that sectoral boundaries do not generate the aforementioned heterogeneity in the effects of labour market flows. My data contains an industry classification of seven industries.[18] For specification (c), I have aggregated these to form flow variables for three main industries: mining, manufacturing, and energy (*ind*); construction (*constr*); and services (*serv*). This classification corresponds to the industry classification of the industry share variables (JOB_{ind} and JOB_{constr}). As in specification (a), most of the coefficients are insignificant. Also the diagnostics of the model are troublesome because the Hansen test of overidentifying restrictions rejects the hypothesis that the instruments are not correlated with the errors of the model. I believe that these problems are, as in specification (a), due to misspecification of the model and the resulting weak explanatory power of the regressors.

Thus far, my results highlight the role of a large pool of unemployed and limited labour market possibilities for them as factors that induce out-migration. In turn, people move to regions with abundance of labour market possibilities for unemployed job seekers and low flow out of employment (especially into unemployment). It seems that inter-regional matching of unemployed workers and jobs is more important than inter-regional job changing.

16 The relatively generous unemployment benefits in the beginning of the unemployment spell may discourage search activity by newly unemployed workers (captured by SU).

17 An analysis with industry-disaggregated NETO reveals that the (mostly negative) net changes in agricultural employment are behind this result. Thus, decreases in agricultural employment have had a role in driving people away from some provinces.

18 The industries are: (1) mining, manufacturing, energy, etc.; (2) construction; (3) trade; (4) hotels and restaurants; (5) transportation, etc.; (6) finance; and (7) real estate, business services, etc. Experimenting with models that separate between all seven industries or with alternatively classified variables did not result in different conclusions than those obtained with specification (c).

5.2. The effects of structural change, reallocation, and net employment changes

I estimate three additional model specifications, in which I allow the net change in employment to have a differential effect from simultaneous hires and separations. By doing this, I assess the robustness of my earlier findings and test my second hypothesis, which is that changes in the structure of employment in regions are related to inter-regional migration. To measure structural change, simultaneous hires and separations are decomposed into three parts: employment shifts between sectors, employment shifts between firms, and simultaneous hires and separations within firms.

Although all job openings may be available for potential in-migrants, hires in excess of simultaneous separations may be more effective in attracting workers from other regions because they are associated with an increase in total employment. The results of specification (b) in Table 1 also hint that it can be the net change that matters most as I found that the coefficients of the destination province's flow from unemployment to employment and flow from employment to unemployment are almost equal. This would mean that simultaneous hires and separations may leave in-migration unaffected. To assess the validity of this idea, I include separate measures of net changes in employment and simultaneous hires and separations simultaneously in my estimations.

In the job and worker flow literature, simultaneous hires and separations are routinely divided into two components: excess job reallocation and excess worker turnover (see Burgess, Lane and Stevens 2000 and Davis et al., 1996). Excess job reallocation can be further decomposed into two components: reallocation across industries and reallocation within industries (see Davis et al., 1996; Davis and Haltiwanger, 1992 and Dunne, Roberts and Samuelson, 1989). In the calculation of my measures of net employment changes and simultaneous hires and separations, as well as the measures of structural change, I use the conventions of the earlier literature.

First, I define the total excess reallocation (*ER*). *ER* is the number of hires with simultaneous job separations, and it equals the smaller of hiring (*H*) and separation (*S*).[19] In other words, *ER* is the total number of separation-hire pairs that are not needed to attain the net employment change at the level of the (local) labour market as a whole. Notice that every hire and job separation is captured by either *ER* or the net change in employment (*NET*) because $H + S = |NET| + 2 \times ER$.

The next step is to decompose excess reallocation (*ER*) into three parts: employment shifts between industries (*ERB*), employment shifts between establishments (within the industries) (*ERW*), and establishment-level excess worker turnover (*CHUR*). Industry-level data on job flows allows us to use the procedure introduced by Dunne et al. (1989) to calculate *ERB* and *ERW*. Finally, it is straightforward to calculate the establishment-level excess turnover because $ER = ERB + ERW + CHUR$.[20,21]

To provide some further intuition behind the variables *ERB*, *ERW* and *CHUR*, notice that every hire counted in the variable ER has a counterpart that is a separation of a worker. This separation can occur in the same establishment, in another establishment within the same industry, or in another industry. It feels natural to hypothesise that there are differences between these three situations. For example, if a contemporaneous separation only

19 To simplify the discussion at this point, I talk about absolute numbers of hires, separations etc. instead of scaled flows. In all analyses the flow variables are divided by population aged 15–74 years, as mentioned earlier. See the appendix for the formulas used to compute the variables.

20 The links between the measures in the earlier literature and my variables are straightforward: The sum of ERB and ERW multiplied by 2 is the excess job reallocation. Similarly, the two excess turnover measures in Dunne et al. (1989) are ERB and ERW multiplied by 2. CHUR is the excess worker turnover (or churning) divided by 2. For more discussion and interpretations of these measures, see Davis et al. (1996) and Dunne et al. (1989).

21 Compared with net changes in employment, job reallocation and churning constitute a considerable share of the labour market flows in our data. Similar observation is made in studies documenting labour market flows (e.g., Davis et al., 1996; Davis et al., 2006; Burgess et al., 2000).

occurs in some other industry, the skills of the newly separated worker may not be suitable for the new job opening. In this case, a job seeker from another region may be a good candidate for the job. In contrast, a situation with a contemporaneous separation in the same industry may involve less demand for the skills of other regions' candidates. The third category of excess reallocation is likely to be different from the other two, but it is not perfectly clear what kind of situations it may characterise. Simultaneous hiring and separation in the same establishment cannot involve hiring and separation of the same worker. Rather, these situations may reflect voluntary quits, lay-offs, retirements, or other such occasions and their replacements. The question of how, if in any way, this affects migration, is left as an empirical question to be answered by my results.

In the first two specifications of Table 2, I do not make a distinction between the three types of excess reallocation to be able to make a simple distinction between net employment change and simultaneous hiring and separations. In the first specification (d), my labour market variables are thus *NET* (net employment change) and *ER* (total excess reallocation). In the next specification (e), I calculate the net employment change and the excess reallocation variables separately for the flows with unemployment as the source/destination (*NETU*, *ERU*) and the flows with other labour market states as the source/destination (*NETOTH* and *EROTH*). Specification (f) serves as my most direct test for the effects of change in employment structure. I make a distinction between excess job reallocation and churning, as well as between job reallocation across industries and within industries. Thus, my explanatory variables in (f) include *ERB*, *ERW*, and *CHUR*.

Model (d) suffers from similar problems as model (a) earlier. I do not find any statistically significant results concerning my variables of interest. It can be noted, however, that the coefficients of net employment change variables (*NET*) have the expected signs for both the source and the destination province. Model (e), where net employment change and excess reallocation are included separately for flows concerning unemployment (*NETU*, *ERU*) and other labour market states (*NETOTH*, *EROTH*), works better. For out-migration, none of the labour market flow variables appears significant. However, net employment change variables (*NETU* and *NETOTH*) have negative coefficients (as expected), whereas excess reallocation variables (*ERU* and *EROTH*) have positive coefficients. As in model (b), net employment change in other sectors (*NETO*) has a negative effect, and unemployment rate has a positive effect on out-migration. The measures of net employment changes and excess reallocation do not separate between hires and separations. Therefore, the earlier result from model (b), which shows that hires from, but not separations into unemployment are important for out-migration, is not captured by model (e).

Table 2. Determinants of inter-regional migration

	(a)		(b)		(c)	
Source province (out-migration)						
NET	–2.47	(6.9)	–		–0.64	(2.49)
NETU	–		–1.40	(4.97)	–	
NETOTH	–		–1.03	(2.46)	–	
ER	9.30	(9.49)	–		–	
ERU	–		3.72	(10.87)	–	
EROTH	–		2.74	(2.68)	–	
ERB	–		–		6.74	(5.06)
ERW	–		–		–2.58	(3.86)
CHUR	–		–		4.18	(5.11)
NETO	–19.76	(13.6)	–7.03**	(3.35)	–9.57**	(4.61)
U	17.10	(11.5)	8.66***	(2.49)	5.19*	(2.77)
WINC	–0.01	(0.15)	0.00	(0.06)	–0.19**	(0.08)
JOB_{pri}	0.68	(9.27)	9.91*	(5.61)	6.22	(5.54)
JOB_{ind}	4.04	(5.68)	7.12**	(3.25)	3.80	(3.67)
JOB_{constr}	–4.41	(11.31)	8.31	(5.64)	6.76	(6.17)
Destination province (in-migration)						
NET	2.82	(2.96)	–		2.91*	(1.50)
NETU	–		14.10***	(3.1)	–	
NETOTH	–		3.29**	(1.54)	–	
ER	–1.57	(3.33)	–		–	
ERU	–		–15.00*	(8.1)	–	
EROTH	–		–4.99**	(2.00)	–	
ERB	–		–		–3.47	(4.72)
ERW	–		–		–2.80	(2.35)
CHUR	–		–		–0.70	(3.45)
NETO	–6.17	(4.35)	–1.65	(2.72)	–5.79**	(2.85)
U	4.18	(3.96)	–1.03	(1.92)	3.68	(2.38)
WINC	0.09	(0.09)	0.09**	(0.04)	0.05	(0.05)
JOB_{pri}	–1.68	(5.62)	–0.81	(2.67)	1.60	(3.02)
JOB_{ind}	0.02	(5.21)	0.12	(2.82)	2.02	(3.23)
JOB_{constr}	4.91	(6.35)	5.70	(4.22)	5.74	(4.71)
DIS	–13.58	(29.95)	–25.24	(15.36)	–1.48	(13.57)
lagdep	–0.25	(0.27)	–0.02	(0.13)	–0.09	(0.11)
No. of instruments	68		96		96	
Hansen	0.732		0.619		0.022	
AR(2)	0.480		0.813		0.271	

Notes: Two-step GMM with Windmeijer correction. Dep. var.: log migration rate (per 1,000 persons) to the destination province. N = 2,736. Additional controls (see Section 3) and year dummies included. Robust standard errors in parentheses. * denotes significance at 10% level, ** at 5% level and *** at 1% level.

With regard to in-migration, model (e) roughly reproduces the results of model (b). Net change in employment caused by hires from and separations into unemployment (*NETU*) enters positively and with a strong significance. However, contrary to the suggestion of model (b), excess reallocation (*ERU*) also matters. This variable has a negative coefficient with a significance level of 10%, which means that, ceteris paribus (e.g., with equal net change in employment), a simultaneous increase in both hiring from unemployment and separations into unemployment discourages in-migration. One interpretation for this is that one newly unemployed worker has a greater negative effect through increased competition for jobs than the positive effect that one hire of an unemployed worker has through increased job opportunities. For worker flows between employment and labour market states other than unemployment, I find similar results, but the coefficients are smaller in size. Net employment change due to hires from and separations into employment and outside the labour force (*NETOTH*) has a positive effect on in-migration. However, simultaneous hires and separations (*EROTH*) has a hindering effect. A large share of this reallocation is likely to be due to employed workers changing jobs. A possible interpretation would be that active on-the-job search and resulting job switching increases the competition for jobs, keeping the workers of other regions out of the local market.

Model (f), to some extent, supports my notion related to model (c) that structural change is not an important factor in determining inter-regional migration. Although some of the estimated coefficients are now significantly different from zero, the Hansen test indicates that the instruments are not valid. I, again, interpret this as a sign of insufficient explanatory power of the variables included. This may be, in part, because boundaries between different industries or between establishments do not significantly hinder recruitment. Indeed, Bjelland, Fallick, Haltiwanger and Mcentarfer (2008) have documented that a very large share of workers switching jobs is also changing industry. My finding is also in line with the result of Robson (2009), that although structural change does somewhat affect regional labour market performance, these effects are small. It is possible that the structural change causing problems in the matching of skills and jobs in the labour market is likely to be more about boundaries between different occupations. However, my data does not allow occupational disaggregation, so that my way of measuring structural change may be imperfect.

In none of the models (a)–(e) do I find a statistically significant effect for the lagged migration variable. The coefficient may be biased because, even if not true for the key variables of interest, lagged levels are poor predictors for differences of this variable. The explanatory power of my instruments is not markedly increased by including more lags or by explaining levels of the migration variable by lagged differences (i.e., by using the system GMM rather than difference GMM estimator). Increasing moment conditions makes the coefficient of past migration positive but not significant, and the conclusions regarding the labour market variables remain qualitatively similar. Since I am not mainly interested in the effect of past migration, I have conducted these additional analyses predominantly to assure myself of the robustness of the other results.

To assess how important different labour market characteristics have been in determining the migratory flows in my data, I can compare the coefficient estimates with the actual variation in the corresponding variables. I do this for all coefficients that appeared statistically significant in specification (b) or in specification (e). For out-migration, a change of one standard deviation in a province's unemployment rate has a larger effect than a standard deviation change in any other variable in both specifications. In specification (b), this effect is 4.6 times as large as the effect of one standard deviation change in the hires-from-unemployment variable (*HU*). The effect of the variation in net change in employment in other sectors (*NETO*) is considerably

smaller. I can therefore say that variation in the unemployment rate is the most important labour market determinant of out-migration. The rationale for this is easily given because unemployed individuals have a relatively high propensity to move, as discussed earlier. It is also conceivable that the unemployment rate, to some extent, captures a province's labour market possibilities. Related to the results from specification (e), it should also be noted that the effect of the variation in industry shares (JOB_k) appears large.

With regard to in-migration, labour market flows have relatively large significance as determinants. Even though the coefficients of the flows with unemployment as the source or destination (*HU* and *SU*) are markedly larger than the coefficients of the other flows (*HOTH* and *SOTH*), their economic significance is reduced by their relatively small variation. The effect of a one standard deviation change in an employment-to-unemployment flow or an unemployment-to-employment flow roughly corresponds with the effect of a one standard deviation change in the flow from employment to employment and outside the labour force. Therefore, each unemployment-to-employment and employment-to-unemployment transition has a larger effect on in-migration than any other transition, but due to the relatively small variation in the former flows, their economic significance remains limited. An interesting observation related to specification (e) is that excess reallocation of workers through employment and outside the labour force (*EROTH*) is the most important flow measure, while the net employment change from unemployment (*NETU*) is almost as important. Excess reallocation through unemployment (*ERU*) and net change in employment from other labour market states (*NETOTH*) contribute much less to in-migration. It should also be noted that variation in the average wage income contributes strongly to the variation in in-migration.

In addition to my results concerning the labour market variables of interest, I find some statistically significant results for the other control variables not included in the results tables. In reporting these results, I focus on those coefficients that appear significant in both models (b) and (e). Firstly, a higher share of owner-occupied housing in a province is associated with lower out-migration. This result is intuitive and in line with micro-level evidence of lower geographical mobility of home-owners (for Finnish results, see Nivalainen, 2004, and for a survey, see Dietz and Haurin, 2003). Secondly, the share of early retired inhabitants has a positive effect on out-migration, probably because retired individuals lack ties to the local labour market and are therefore freer to move to other locations. Again, in accordance with micro-evidence (Nivalainen 2004), I find that the more highly educated the population in a province is, the higher is out-migration. An exception to this is that a higher share of the population in the highest educational category (upper university degree or more) is associated with lower out-migration. Housing prices in the source province enter models (b) and (e) negatively and statistically significantly (at the 5% and 10% level, respectively). This result is in contrast with my expectation, but a rationale for it can be easily given. Since housing prices concern the actual transactions of houses and apartments, they are likely to be responsive to changes in housing demand. Thus, out-migration for other than housing market reasons may depress local housing prices. It is conceivable that I identify this reverse link because I may not have a proper instrument for housing prices in my set of instruments. It should be noted here that in specification (b), I find a negative and significant (at the 10 % level) effect on in-migration for the rental price variable, which is likely to better capture the variation in housing costs between provinces. The fact that my findings related to the control variables are in line with theoretical expectations and micro studies increases my confidence in the results.

5.3. Discussion

Studies using labour market flow variables to explain inter-regional migration flows are rare, but some comparisons to earlier research can still be made. Most importantly, my result that hires of unemployed workers decreases out-migration and increases in-migration is in line with the results of Carlsen et al. (2006). In that study, the authors find that the probability of a region's unemployed leaving unemployment is positively associated with net in-migration. However, other labour market flows are not included in their model, so my analysis is more comprehensive in this respect. The result that unemployment affects out-migration but does not affect in-migration may explain why Carlsen et al. (2006) find that unemployment does not have an effect on migration. Their dependent variable is net in-migration, and they, thus, estimate a combination of the effect of unemployment on in-migration and out-migration. I found that variables measuring job-to-job transitions of workers are not associated with inter-regional migration flows. This result is in line with the finding that residential changes are not linked to job changes by van Ommeren et al. (1999).

Interestingly, my results concerning the effects of excess reallocation deviates from the results obtained by Hämäläinen and Böckerman (2004), who use very similar data from almost the same time period. They find that excess job reallocation and churning have positive effects on net migration (mainly through reductions in out-migration), whereas I find that excess reallocation decreases in-migration. On the other hand, my model (b) suggests that hires from unemployment reduce out-migration while the impact of other hires, as well as separations, do not differ from zero. This indicates that the effect of any excess turnover is negative, a result in line with Hämäläinen and Böckerman (2004). There are several differences between their study and mine, so that the results are not directly comparable, and there are many possible interpretations of the discrepancy. Hämäläinen and Böckerman (2004) study migration between smaller regional units, they are unable to simultaneously control the characteristics of source and destination regions, their labour market flow variables are calculated as rates (absolute flows divided by employment), and they do not separate between flows from and into unemployment and flows from and to other sources/destinations.

My most important result is that worker flows from and into unemployment have significant effects that are differential from the effects of other labour market flows. This is in line with the notion from Davis et al. (2006) that the flows from and into unemployment are different from other flows and with the notion from Anderson and Burgess (2000) that the source of a new hire is of importance. Differential effects may be due to differences in search activity and migration propensities of workers or from employers' preference for employed workers. One way to interpret my result is related to social networks and information. Potential in-migrants may lack information on the labour market of the potential destination region. If unemployed workers are also weakly attached to the surrounding labour market, a large number of hires of unemployed workers in a region may indicate that jobs are available for in-migrants with weaker networks and less information as well. These ideas are in line with such theories of inter-regional job search that stress the role of geographical distance in inter-regional information flows.

A further point should be made about the functional form of my migration equation. Semilog function was chosen because it produced the most credible results and, more importantly, because the specification tests rejected both correlation between errors and instruments and second-order autocorrelation in residuals. The interpretation of the semilog models' coefficients is highly intuitive and in line with theoretical ideas. A coefficient of a semilog specification should be interpreted as the marginal effect of one unit change in the explanatory variable on relative change in the dependent variable. Therefore, for

instance, a one-unit increase in per capita hires from unemployment increases per capita in-migration by the same percentage for all provinces. This means that the effects of the explanatory variables on migration are stronger when the migration is, in the baseline, high between the two provinces. Theoretically, this may be due to a short geographical distance between the two provinces, a strong past migratory link between the provinces, or other factors, such as cultural similarity between the provinces. Factors of this kind are likely to facilitate information exchange between the two provinces and strengthen the role of the other province as the potential destination of moving. Thereby, changes in the labour market (and other) characteristics of the other region are more relevant for potential movers.

6. Concluding Remarks

To thoroughly explore the relationship between inter-regional migration and the state and dynamics of regional labour markets, I use data on bilateral migration flows and disaggregated labour market flows from Finnish provinces from 1988 to 1996. I focus on labour-market determinants of migration, and it should be noted that there are various motives unrelated to employment for long-distance migration as well. However, finding employment in the destination region may often be an important prerequisite for migration even if in the presence of another main motive. My results show that labour market conditions in the source region and the destination region are important determinants of migration. Analysing the data with the dynamic panel GMM method leads to clear conclusions on the labour market reasons for out-migration and in-migration. The general conclusion is that different types of labour market changes have differing effects on migration, so that the use of simple measures of labour market conditions as explanatory variables has the potential to produce misleading results. According to my results, the ability of a region to offer labour market possibilities to unemployed workers is an important factor in holding back out-migration and at- tracting in-migrants. My results indicate that the reasons for out-migration are to some extent different from the reasons for in-migration. For example, the rate of unemployment is the single most important push factor but does not significantly affect in-migration. Hiring from the pool of employed workers and those outside the labour force attracts in-migrants but to a much lesser extent than hires from unemployment do. However, when a region simultaneously experiences separations of workers from their jobs, this more than offsets the positive in-migration effect of hires. Therefore, simultaneous hires and separations hinder in-migration, whereas net increases in employment encourage it. I found an effect for the unemployment rate, a variable often used to explain migratory flows, but only on out-migration. My results show that high local unemployment rate leads to increased out-migration. I discuss that this effect may be due to the higher propensity of the unemployed to migrate, a result previously found in many micro-level studies.

I also tested the hypothesis that the extent of structural change in local labour markets affects inter-regional migration. However, I found no robust evidence on the effects of inter-industry or intra-industry inter-firm shifts in employment. Simultaneous hires and separations within firms did not gain statistical significance in my estimations. These findings are in line with a result from studies of job switching: workers who change jobs often cross industry boundaries.

One caveat of my study is that the regions are administrative areas rather than functional regions. Another caveat is that the period of study is not very recent. However, the period has the advantage of including different phases of the business cycle: economic boom in the late 1980's, downturn in the early 1990's and the recovery period in the second half of the 1990's. Further, some of the other recent studies investigate the same time period, which makes my results comparable to theirs. Now that I have documented that there are

significant differences between different labour market variables in their effect on migration, future studies should document whether my conclusions hold in later years and in other countries.

Appendix

Table A1. Variable definitions

Dep. var.	Log migration rate (per 1,000 persons; 15 to 74 year olds) to a destination province
H	Hires*
HU	Hires from unemployment*
HOTH	Hires from employment and outside the labour force*
H_k	Hires in industry *k**
S	Separations*
SU	Separations inti unemployment*
SOTH	Separations into employment and outside the labour force*
S_k	Separations in industry *k**
NET	$H - S$
NETU	$HU - SU$
NETOTH	$HOTH - SOTH$
ER	Min $(H, S) = 0.5 \times (H + S - \lvert NET \rvert)$
ERU	Min $(HU, SU) = 0.5 \times (HU + SU - \lvert NETU \rvert)$
EROTH	Min $(HOTH, SOTH) = 0.5 \times (HOTH + SOTH - \lvert NETOTH \rvert)$
ERB	$0.5 \times [\sum_{k \in K^+} NET_k - \sum_{k \in K^-} NET_k - \lvert NET \rvert]$
ERW	$0.5 \times \sum_k \left[\sum_{f \in F_k^+} NET_f - \sum_{f \in F_k^-} NET_f - \lvert NET \rvert\right]$
CHUR	$ER - ERB - ERW$
NETO	Net employment change in sectors excluded from job/worker flow data*
U	Unemployment rate
WINC	Total wage income divided by the number of wage earners
JOB_k	Share of jobs in industry *k*
DIS	$\sum_k (JOB_{ik} - JOB_{jk})^2$ (i = source province, j = destination province)

Notes: K^+ and K^- are the industries where employment is growing and falling, respectively.
F^+ and F^- are the establishments where employment is growing and falling, respectively.
* = divided by population aged 15–74 years in the province.

Table A2. Descriptive statistics, 19 provinces, 1988–1996

Variable	Mean	Std.Dev.	Min	Max
Dependent variable	1.787	0.514	0.144	3.098
H	0.080	0.032	0.033	0.204
HU	0.011	0.006	0.003	0.030
HOTH	0.069	0.033	0.019	0.198
H_{ind}	0.027	0.013	0.007	0.072
H_{constr}	0.012	0.005	0.005	0.031
H_{serv}	0.044	0.018	0.018	0.134
S	0.087	0.029	0.039	0.195
SU	0.016	0.007	0.005	0.036
SOTH	0.071	0.031	0.023	0.190
S_{ind}	0.029	0.013	0.008	0.066
S_{constr}	0.014	0.005	0.006	0.026
S_{serv}	0.046	0.016	0.026	0.127
NET	–0.007	0.021	–0.056	0.028
NETU	–0.005	0.009	–0.027	0.017
NETOTH	–0.002	0.015	–0.042	0.027
ER	0.075	0.030	0.033	0.195
ERU	0.010	0.004	0.003	0.019
EROTH	0.064	0.031	0.019	0.190
ERB	0.002	0.003	0.000	0.016
ERW	0.039	0.015	0.017	0.093
CHUR	0.036	0.014	0.015	0.099
NETO	–0.003	0.007	–0.025	0.011
U	0.138	0.076	0.013	0.285
WINC	19.514	2.286	13.120	24.877
JOB_{pri}	0.118	0.047	0.010	0.228
JOB_{ind}	0.229	0.053	0.150	0.346
JOB_{constr}	0.060	0.011	0.039	0.086
DIS	0.012	0.010	0.001	0.053

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