DETERMINANTS OF INTER-REGIONAL MIGRATION IN THE BALTIC COUNTRIES

Mihails Hazans[♣, #]

University of Latvia and BICEPS

Abstract

We show that Estonia, Latvia and Lithuania despite small geographical size feature considerable and persistent regional disparities. Registered migration rates have declined dramatically since the last years of Soviet era, yet they are high by international standards. Evidence from regional inflows and outflows in Latvia and from Estonian labour force survey is used to show that regional unemployment and especially wage differentials, as well as demographic factors, have a significant impact both on gross and net migration flows. Age and education effects are consistent with predictions of the human capital model of migration. Non-employed persons, as well as commuters between regions, are significantly more likely to become migrants in Estonia.

Keywords: Migration, Regional Disparities, Regional Labour Markets.

JEL Categories: J61, J31, J15, R23, P52

1. Introduction

Expected EU enlargement has increased researchers' interest in mobility of population and especially labour force of the accession countries. How mobile are people in these countries and to what extent their geographic mobility has been driven by economic incentives, - these are particular questions addressed in the literature (we do not discuss here related literature dealing with post-accession migration plans and forecasting of East-West migration flows). Both intensity and patterns of internal inter-regional migration in Czech Republic, Slovakia, Poland, Hungary, Slovenia and Romania have been examined in Fidrmuc (2003), Fidrmuc and Huber (2002), Huber (2003), Kallai (2003). Current paper adds to this strand of literature by including the three Baltic countries: Estonia, Latvia and Lithuania (as far as previous research of internal migration in these countries is concerned, we know only a paper by Toomet (2001) which has looked at migration between Tallinn and the rest of Estonia in mid 1990s). While migration rates in the Baltic Countries are higher than in other CECs, net effect on regional distribution of

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E-mail: mihazan@lanet.lv. Mailing address: BICEPS, Alberta str. 13, Riga, LV1010, LATVIA.

labour is small, especially if compared to large effect of commuting (Hazans 2003). Gross and net migration flows in Latvia are increasingly influenced by regional unemployment and wage differentials, but the nature of these effects seems to be country-specific. In contrast with Fidrmuc's (2003) findings for Czech Republic, Slovakia, Hungary, and Poland, we find, after controlling for population density, positive and significant wage effect on net migration, as well as unemployment effect on outflows. On the other hand, negative unemployment effect on inflows is found in Czech R. and Slovakia, but not in Latvia and Poland.

This paper also contributes to the general migration literature (see seminal papers by Sjaastad (1962) for human capital model, Harris – Todaro (1970) for unemployment-adjusted income model, Burda (1995) for the option value model; see also Decressin and Fatas (1995) and Bentivogli and Pagano (1999) on efficiency of migration in Europe; Cameron and Muellbauer on the role of housing market and commuting; Pissarides and McMaster (1990), Burda (1993), Hunt (2000), Puhani (2001) for empirical studies; Ghatak and Levine (1998), Borjas (1999), Ederveen and Bardsley (2003) for recent surveys). First, we provide some evidence on possible magnitude of errors in migration registration data not adjusted to latest population Census. Next, we emphasize the role of demographic factors, which, as noticed by Fertig and Schmidt (2001), were "widely neglected". We introduce a hierarchy of regional variables, where population density (proxying for economic activity) explains unemployment; density and unemployment explain wages; and density, unemployment and wages explain mortality, marriage rate and divorce rate (see Table 11). When modelling aggregate migration flows in a country, where the above-mentioned variables are strongly inter-related, use of 'excessive', i.e. unexplained by 'more fundamental' factors, regional variables might be helpful in disentangling their effect on migration.

Using individual-level Estonian data leads to some findings similar to those of Hunt (2000) and Burda and Hunt (2001) for East-West migration in Germany.

2. Background information.

The three countries of interest are small both in terms of population (1.4, 2.4 and 3.5 million in Estonia, Latvia and Lithuania respectively[1]) and size (maximal distance between capital and any other city is less than 250 km in Estonia and Latvia and 341 km in Lithuania). Migration records account for permanent change of residence of the following types: (i) between cities (even

[1] Population figures hereafter refer to beginning of 2001 unless stated otherwise.

within the same e administrative unit, or district); (ii) from urban to rural municipalities or vice versa (again both within and between districts); (iii) between rural municipalities in different administrative units.

Evolution of gross internal migration rates in Estonia, Latvia and Lithuania based on these records since late 1980s is shown in Figure 1 (to be discussed later). To put these and other mobility measures in an international context one has to take into account size of the regions. Indeed, net internal migration rates (inflow less outflow as percent of population) by regions are obviously higher for smaller regions, other things equal (notice that net internal migration is zero when there is just one region including the whole country). Most of the available internal migration statistics from other European countries (see Huber (2003)) does not include moves of types (i) and (ii) within the same region, so reported gross migration rates also tend to be smaller for larger regions.

Regional migration rates used in this paper are based on the following administrative units[2]:

Estonia – 15 counties (largest with 525 thousand population, including 400 thousand in the capital city, Tallinn; smallest with 10 thousand and the rest between 27 and 179 thousand; average population 91 thousand);

Latvia – 33 NUTS4 regions, including capital city of Riga with about three quarter million population, 6 other main cities with population between 38 and 115 thousand, and 26 districts (the largest and the smallest have 145 and 15 thousand population, other range between 27 and 66 thousand); average population 71 thousand.

Lithuania – 60 municipalities, including capital city (542 thousand), 7 other main cities (from 18 to 377 thousand), and 52 districts with average size of population 36 thousand. Overall average population per municipality is 58 thousand. Lithuania has also larger territorial units: 10 counties, with average population 349 thousand.

One can conclude that Latvian and Lithuanian cities-and-districts-based data are well comparable with each other and more or less comparable with Estonian county-based data, as well as with Czech and Slovak district-based data (Czech and Slovak districts are somewhat more populated than Baltic ones but smaller in size, see Table 1). Latvian-Estonian comparison can be further facilitated by merging 7 main Latvian cities with adjacent districts thus reducing number of regions to 26. On the other hand, Lithuanian counties could be compared with Hungarian and Danish regions (see Table 1).

[2] Which also serve for accounting migration between rural areas.

3. Internal migration in the Baltic countries: patterns and outcomes

Several observations can be made from Figure 1 displaying evolution of gross internal migration rates in Estonia, Latvia and Lithuania. First, both before the transition and in 1998-2000 average registered mobility of population was at comparable levels in all three countries. Second, there was a dramatic decline in registered migration rates in the late 1980s, before substantial inter-regional disparities in economic conditions have been developed and without any significant recovery afterwards. To explain this phenomenon one has to accept that quality of registration declined even more dramatically. This implies that data considerations are of utmost importance when one studies migration in the transition context. Using the most reliable data source from each country even if the data are of different nature (e.g. registration and survey) might be a better strategy than using data of similar nature but unclear reliability.

Third, inherent mobility of population in the Baltic countries seems to be rather high by international standards. Indeed, Table 1 shows that even recent (lowest than ever) gross migration rates displayed in Figure 1 exceed 1.5 times (respectively, 2.5) times rates observed in Czech R. (respectively, Slovakia) based on the same methodology (i.e. including inter-city and urban-rural migration within regions; these rates are marked with a star in Table 1).

When only inter-regional migration is considered, Estonian and Latvian gross rates (0.81 and 0.75 or 1.13, depending on whether or not Latvian main cities are merged with nearby districts) are significantly higher than those observed for comparable regions in Czech R. (0.44) and Slovenia (0.30).

If migration stands to be an equilibrating tool which helps to smooth disparities and adjust to asymmetric shocks, *net migration rates* (gross rates less churning flows) are of special importance. Latvian net migration rates are higher than in any of comparison countries, but Estonian ones are relatively low. Lithuanian inter-municipality net migration rate is comparable with Czech inter-district rate, and Lithuanian inter-county rate is similar to Danish and Dutch rates, although lower than Hungarian rate for comparable regions. Notice that Danish NUTS3 regions have average population almost identical to Lithuanian counties but are smaller in size, so one could expect higher migration rates in Denmark; this is the case for gross rates, but not for the net ones, so migration in Lithuania is potentially more efficient.

Did high mobility of population in the Baltic countries significantly change its regional distribution during the last decade? Table 2 shows that the answer is no, as one should expect given that net migration rates are (as elsewhere) very low in absolute terms. Moreover, even

these small changes are to a large extent due to international rather than internal migration (emigration of Russian-speaking population took place mainly from cities). Despite high wages and modest unemployment in Riga, outflow abroad was not compensated by internal migration, which also had negative balance during the whole period. By contrast, in Lithuania both capital county and Vilnius city itself have seen big net internal inflows. This shows that migration patterns are to a large extent country-specific.

4. Evolution of labour market and regional disparities.

After a sharp decline in real incomes in 1991-1992 and explosive growth of unemployment in 1992 (see Figure 2) all three countries experienced steady growth of real wages (strongest in Estonia and interrupted in 2000 in Lithuania), while unemployment have featured increasing trend (with some fluctuations in Lithuania and no change between 1995 and 1998 in Estonia) for a prolonged time. In the middle of the transition period highest unemployment was found in Latvia (21% by ILO definition in 1996), but here it also started to decline earlier than in the other two countries, while in Estonia and Lithuania the trend has been reversed only in 2001 and 2002 respectively. By 2001, at the end of the period considered in this paper, unemployment rate still was very high in all three countries: 12.6% in Estonia, 13.6% in Latvia and 17% in Lithuania (ILO definition). See Table 3 for details.

Evolution of regional disparities is shown in Figure 3 and Tables 4-5. Notice that from migration perspective weighted measures (including Gini) are more relevant: high emigration rates from relatively small depressed regions will have little impact on national migration rates. We therefore discuss weighted measures, although non-weighted ones are also reported in the tables (and sometimes show different trends).

In all three countries, disparities in wages are significant (and larger than between comparable regions in Czech R., Slovakia and Hungary, see Fidrmuc, 2003) but smaller than unemployment disparities. After 1992 both kinds of disparities featured similar trends: Some increase in the beginning of the period was followed by signs of convergence in the mid 1990s and slight increase again at the end (after Russian financial crisis of 1998).

Overall level of wage disparities in 2000 was not too different from 1992. The main source of income disparities in Estonia and Latvia is high wage level in capital regions (no other region had wage above average level except Ventspils is Latvia). In Lithuania, by contrast, there are several high income agglomerations. Regions' earnings ranks are extremely persistent (for Lithuanian

counties even constant in most cases), and first order autocorrelation of wages across regions is above 0.95 in each country (in Lithuania both for counties and districts).

Unemployment disparities are severe in Latvia (latest coefficient of variation above 60%, and Gini index measuring inter-regional inequity of distribution of unemployed as high as 0.31), considerable in Lithuania and modest in Estonia. Regional unemployment patterns are quite persistent in Latvia (correlation with previous year's values is above 0.92 during last 8 years of observation, and correlation with values of 1993 is about 0.70) and Estonia (here autocorrelation is somewhat lower but 6 counties have had above average unemployment levels in at least 9 out of 12 years of observation)[3]. In Lithuania first order autocorrelation of unemployment rates across 46 districts has been between 0.87 and 0.94, but in the long run unemployment ranks are less stable than earnings ranks.

On average, high unemployment regions tend to have low wages – as in many other countries (see Blanchflower and Oswald (1994), Blanchflower (2001), Traistaru and Iara (2003) for discussion). Table 6 reports unemployment elasticities of pay (controlling for population density) -0.068 in Estonia and -0.114 in Latvia (highly significant in both cases).[4] The same table shows also that in both countries unemployment is lower in more urbanised regions (despite the fact that unemployment rates are lower in rural areas than in urban ones!).

Depressed regions with persistent high unemployment and low wages are easily identified in Latvia and Estonia but have relatively small population shares. In Latvia four districts have had lowest wages and registered unemployment rates above 20% for 9 years in a row, and another two districts unemployment rates between 18 and 20% and modest wages for the last 5 years. In Lithuania the three counties which had lowest wages in 1996-2001 (Taurage, Shauliai, and Marjampole) remained among the three with highest registered unemployment in 1993-2000, 1997-2001 and 1998-2001 respectively. In Estonia situation is less dramatic, but Ida Viru and Polva counties with high and stagnant unemployment recently have also gone down in the earnings ranking.

One can conclude that both pull and push factors for inter-county migration have been in place in all three countries. Figure 3 shows that in Estonia fluctuations of registered migration rates in

[3] Notice, however, that even in Latvia persistency indicators are not as strong a in Poland and Hungary (Traistaru and Iara, 2003).

[4] OECD (2003) confirm existence of wage curves in Estonia and Latvia (but not in Lithuania) using crosssectional microdata of 1999 and 2000. Estimated elasticities were -0.15 for Estonia -0.05 for Latvia in 2000, and -0.24 and -0.11 in 1999.

1989-2000 have been remarkably consistent with developments of regional disparities. In Lithuania it was to some extent true in 1993-1997, assuming one year lag in migration response to change in disparities. In Latvia migration rates have been almost constant at the national level since 1993, but regional rates, as we shall see later, did response to wage and unemployment differentials.

5. Determinants of migration: evidence from Latvian regional outflows and inflows.

Data. The aim of this and next section is to test whether inter-regional migration flows in the Baltic countries during the transition process were responsive to wage and unemployment differentials between regions. It has become common to refer to low quality of registration-based internal migration data both in EU and transition countries, but one can rarely find estimates of the size of errors. In this section we use Latvian registration data on internal immigration and emigration flows (1989- 2001) by main cities and districts with corrections based on population Census 2000. Comparison of revised and previously (with a lag of just couple of months) published data of net migration flows in 2001 reveals very sizable errors in most cases (Table 7), suggesting that results based on unrevised data for other transition countries have to be taken with great care.

Statistical Office of Estonia has stopped publishing migration data in 2000 due to their low quality and does not recommend to use previously released disaggregated data; therefore Estonian case will be treated in the next section using Labour Force Survey data which (in contrast with Latvian and Lithuanian ones) provides information on migration. Statistical Department of Lithuania has revised migration data of 2000-2001 (based on 2001 Census) but it is not clear whether and when the data for previous years (particularly disaggregated by counties) will be revised. Consequently, Lithuanian data will not be used for econometric analysis in this paper.

Discussion. Similarly to what was observed by Fidrmuc (2003) for Czech Republic, Slovakia, and Poland, our data reveal positive correlation between inflows and outflows (this indicator has been as high as 0.90 for Latvia, 1989-1999, varying from 0.76 to 0.94 by years, although dropped to 0.58 in 2001). Given degree and persistency of regional disparities (discussed in the previous section), this might suggest that the role of welfare differentials in shaping the migration flows either has not been significant or has been masked by other factors. Liquidity constraints, under-developed (especially in the early transition) housing market and higher housing prices in ‘good

places' (particularly in the capital city) are obvious obstacles to moving out from depressed regions. Segmentation of Latvian housing market (rent in the private sector is regulated for 'old' residents, but not for newcomers) also makes moving from poor to rich region less attractive; even more so because in many cases such a move means leaving behind free accommodation in a family house somewhere in the countryside or in a small town.

On the other hand, substantial flows from cities to the countryside were generated by the restitution process (returning land properties to descendants of the former owners); these flows were not driven by and most likely were directed against spatial welfare gradients. Apart from this, ongoing depopulation of rural areas (caused by out-migration and negative natural increase) together with low money income levels in the countryside resulted in rather low prices of land and housing in the countryside (especially in depressed regions). Many of those who lost their jobs during the restructuring process could therefore opt for subsistence farming (and some have later turned it into profitable farming); average cost of doing so was further reduced due to small country size and traditionally strong family links sustained between relatives living in different parts of the country. Such links make the typical 'travel-to-find-a-spouse-area' larger than one would otherwise expect, also contributing to inter-regional migration not necessarily related to wage and unemployment differentials in expected way.

Table 8 reveals that almost 50 percent of internal migrants in Latvia (1989-1999) mentioned family reasons as main purpose of moving, while job-related and housing related reasons account for 22 and 15 percent respectively. Job related-reasons were more frequent for movers into capital city, giving some hope to our econometric investigation. Notice, however, that one cannot exclude economic reasons behind family ones. Table 9 shows that in 2001 at least 40 percent of moves in year 2001 in Latvia were still reported as associated with family reasons; importance of job related reasons seems to decrease, while more than a quarter of migrant households have indicated housing related reasons[5]. Same table reports that in Estonia (1998) housing and family related reasons accounted for more than a quarter of migration cases each, while job related reasons were mentioned by less than 13 percent of migrants (like in Latvia, the latter proportion is higher – about 20 percent, for movers into capital city).

[5] Conclusions from comparison of the two tables have to be taken with caution because the first one is based on survey data, while the second is based on residence registration data and therefore is likely to under-report job-related moves.

Finally, as was pointed by Fidrmuc (2003), small (compared to Western Europe) size of the regions in question implies that our data contain considerable share of moves not associated with job changing. To give an example, many of the high-income earners prefer to move from sleeping districts in big cities to own houses in adjacent rural municipalities.

Table 10 reports that 30 to 50 percent of internal out-migration from 7 largest Latvian cities in 2001 was directed to adjacent districts (which are administratively different municipalities), thus supporting hypothesis drawn by Fidrmuc (2003) from the example of Pest in Hungary. These flows appear in our data as unexplained by regional differentials: Table 10 shows that in 2000 unemployment (both registered and LFS) was (with one exception) 2 to 7 percentage points lower and (reported) average gross wages 15 to 25 percent higher in the cities (in one case more than 100 percent). Opposite flows (the ones of the 'right' direction), however, are comparable in size and therefore in all but one cases exceed urban-suburban flows when measured as rate per 1000 population of the sending region, see columns (b) and (d) in Table 10; of course the result is reversed when rates are calculated with respect to receiving regions, suggesting that one can face more difficulties modelling inflows than outflows. To deal with this problem we control for population density[6].

Despite all above-mentioned problems, which have the potential to leave econometric analysis of migration flows with no decisive answer, our results for Latvia (to some extent in contrast with Fidrmuc's findings for other CECs) strongly support the hypothesis that wage and unemployment differentials are instrumental in shaping the migration flows.

Estimating strategy. Unfortunately revision of Latvian data has been made only for total flows (including international migration). Using these data for econometric purposes would not be correct because international migration flows, which dominated internal ones in the first half of the period, were not related to regional economic conditions. Therefore it was decided to calculate internal flows as difference between revised total and unrevised international flows. It can be justified by the fact that registration of international migration has been a lot more accurate at least in terms of net flows: for the whole country (in this case international migration has been revised) net outflow was underestimated by 10 to 20 percent in four cases, by 20 to 30

[6] One can draw one more interesting message from Table 10: although migration (together with other forces, including commuting, see Hazans (2003)) has reduced disparities between cities and nearby rural districts (wage differentials have gone down substantially since 1992), even in these cases, when informational frictions and direct cost of moving are minimal, reduction is at best going slow, while unemployment differentials have been persistent.

percent in another four cases, and by about 50 percent in three cases out of 11 years of observation. The fact that errors are all of one sign makes them less likely to bias the results.

Choice of the estimating method for the panel data was decided by the following considerations. First, as migration rates are in fact cell means, and cell sizes (population of regions at hand) vary very strongly in our cases, results are better interpretable if observations are weighted. Second, there is no reason to assume that disturbances in different regions have been of the same magnitude, so heteroskedasticity across panels should be allowed.

Third, as we are in fact interested in the effect of between-groups rather than within-groups variation of wages and unemployment, the fixed effects method (which has the advantage of removing effects of region-specific factors not included in the models) should not be overemphasized. Fourth, persistency of depressed and prosperous regions suggests that models allowing for autocorrelation within panels have to be tried, although this again can result in underestimating the effect of between variation. Finally, the choice is limited by the fact that our panels are short (number of time periods is smaller than number of regions). Based on all of these and following Beck and Katz (1995), we have used linear regression

$$y_{it} = (x_{i,\,t-1})'\beta + u_{it}\ ,$$

where y_{it} is migration (outflow, inflow or net inflow) per 1000 population in region i, year t, $x_{i,\,t-1}$ are explanatory variables (lagged one year to avoid endogeneity), and disturbance u_{it} is allowed to be heteroskedastic across panels (regions), but is not allowed, due to small number of time periods, to be contemporaneously correlated across panels. Observations are weighted by mid-period population. Models with (common) autocorrelation within panels ($u_{it} = \rho u_{it-1} + \varepsilon_{it}$) were also considered, in which case estimate of ρ was obtained by Prais – Winsten method (see Greene 2000, p. 582).

Similar results (not presented here) were obtained with feasible generalised least squares for panel data allowing for heteroskedasticity across panels.

Wage was measured in constant prices and expressed in logs rather than ratio to national average (the latter variable, used by some authors, see e.g. Fidrmuc (2003), does not give additive response to proportional wage increase). Unemployment, (log) wages and other explanatory variables were lagged one year with respect to migration rates. To avoid endogeneity problems caused by interconnections between main explanatory variables - population density, unemployment and wages, as well as additional variables, like marriage rate, divorce rate and mortality (see Table 11), we have used residuals from regressions reported in Table 11, i.e.

unemployment unexplained by density, log wages unexplained by density and unemployment etc.

Results reported in Table 12 show that high unemployment significantly encourages outflows[7]. Both size and significance of the effect increases if only the late transition (1997-2001) is considered. High wages, other things equal, discourage outmigration. Numerical value of the coefficient also somewhat increases in the late transition. When per capita GDP is used instead of wage, it is also negative and even more significant than wage (these results are not reported). When the whole period is considered, allowing for autocorrelation within regions gives results almost identical to the reported ones, with estimated autocorrelation 0.550.

Other things equal, people are less likely to move both from and to high density (more urbanised) regions. The size of these effects seems to be quite persistent over time: coefficients for 1993-2001 and 1997-2001 are nearly equal.

Mortality and divorce rates in excess of what is predicted by density, unemployment, and wages encourage outmigration. Mortality here proxies for quality of life, while interpretation of the coefficient of divorce rate is straightforward: two extra divorces force 3 people to leave the region.

High wages significantly encourage immigration, and the size of this effect (as well as wage effect on net migration) has more than doubled in the late transition compared to the whole period.

Positive wage effect on net migration is stronger than in case of inflows and outflows, in contrast with what was found for Czech R., Slovakia and Poland by Fidrmuc (2003) and for Romania by Kallai (2003).

Our model does not account for differences in cost of living. To what extent does it affect the results? While comprehensive data are not available, there is sufficient evidence that overall cost of living is higher in regions with higher wage levels. Main contributors to this are higher rent in the deregulated segment of the housing market and prices of services. On the other hand, prices of food and other consumption goods are sometimes lower in big high-wage cities due to competition. In sum, cost-adjusted wage differentials are likely to be of the same sign as non-adjusted ones but smaller in size. This means that if cost-adjusted wages are used in our models, the effects would of the same direction but even stronger than the ones dscussed above.

[7] This result holds true also when fixed effects estimates are used.

Unemployment has "wrong" positive sign both in gross and net inflow models. This could be attributed to non-labour related reasons for migration discussed above, particularly land ownership restitution and low housing prices in depressed regions. In the case of net migration, however, unemployment coefficient becomes negative (although not significant) when autocorrelation within regions is allowed; estimated rho is 0.445.

Excessively high marriage rates, as one could expect, and mortality rates (surprisingly) enhance immigration. The explanation for the role of mortality is that when old people die, their apartments or houses become free. In the late transition this effect disappears, while effect of excessive mortality on net inflows becomes significantly negative. People have started to care more about quality of life, and this effect overweighs the 'grandma's house is free!' positive impact of mortality on inflows.

Overall effect of density on net inflows is negative; its size has hardly changed in the late transition compared to the early one. Excessive marriage rate encourages net inflows, and influence of this factor has increased over time.

6. Determinants of individual migration decisions: evidence from Estonia.

Estonian Labour Force Survey in 1997-2000 has retrospective part including one year history of employment, unemployment, residence, and marital status. Here we use ELFS 1998-2000 data to analyse what has driven the migration decisions in 1997-1999. Results reported in Table 13 show that other things equal, people are much less likely to move from regions with high average wages; this effect, however, becomes not significant (although still has correct sign) when sample is restricted to employees.

Local unemployment rate did not have a significant impact on migration decision. However, similarly to what was found by Hunt (2000) for East – West migration in Germany, probability to change county of residence was significantly higher for inactive persons and jobseekers than for otherwise similar employed individuals; both marginal effects, 1.3 and 0.4 percentage points, are large, given overall migration rate 1.5% (the jobseeker dummy is not significant in Table 13, but it becomes significant when the model is estimated without population weights; the same is true for the ethnic dummy).

Respondents, who had job not in the same county where they lived in the beginning of the year, were significantly more likely to move across regions than those employed in the county of residence (and even than unemployed). This suggests that commuting between counties (in

contrast with commuting within counties, which did not have a significant impact) is for some employees a temporary substitute for migration, again similarly to Hunt's (2000) finding for Germany. However, migration rate was just 2.5% per year even for inter-county commuters. Given that almost 8% of all employees did commute between counties (and another 12.5% did commute between rural municipalities and cities within counties), one can conclude that commuting is a lot more efficient than migration as an adjustment mechanism (see Hazans (2003) on commuting in the Baltic countries).

Likelihood of migration goes down as the age of respondent increases, reaching minimum at the age of 55 when all respondents aged 15 to 59 are included in the analysis, and three years earlier when the sample is restricted to those was an employee in the beginning of the year.

Other things equal, highest propensity to move was found among persons with tertiary education, while lowest propensity was featured by those with basic or less education. Education effect on migration disappears when the sample is restricted to beginning of the period employees (see Brucker and Trubswetter (2003) for a similar observation), suggesting (together with above-mentioned age effect) that recent graduates were among the most active movers.

Importance of family reasons for migration is highlighted by the fact that single and especially divorced or widowed (in the beginning of the period) persons were significantly more likely to change regions than married.

Rural residents were significantly less likely, while residents of the capital county – more likely to move to another county.

Females and ethnic minorities were significantly less likely to change county of residence (gender effect becomes insignificant when only employees are considered).

Job changing rate amongst inter-county migrants was almost 5 times higher than amongst stayers. It is worth noticing, however, that change of residence from rural to urban or from urban to rural within the county was also associated with high job changing rate.

Analysis of Latvian sample of the NORBALT 2 project (not reported) leads to similar findings with respect to education, age and ethnicity effects on mobility; gender effect (of the same sign) is found only for urban – rural migration.

7. Conclusions.

Analysis of internal migration rates has shown that mobility of population in the three Baltic countries is at comparable levels and rather high by international standards. Even recent gross

migration rates (much lower than the ones registered in the late 1980s) are well above those found in Czech R., Slovakia and Slovenia for comparable regions. Net migration is also higher than in comparison countries in Latvia, but relatively low in Estonia; Lithuanian net migration rates are comparable to Czech R., Denmark and Netherlands but lower than in Hungary.

However, changes in distribution of population between regions in the Baltic countries during the last decade are so small, and current net migration rates so low in absolute terms, that migration can hardly play a substantial role as an inter-regional adjustment mechanism at macro level – in contrast with commuting (see Hazans 2003; 2004).

Despite small size of the Baltic countries, they feature considerable and persistent regional disparities. As in many other countries, high unemployment regions tend to have low wages. Both gross and net inter-regional migration flows in Latvia, as well as outflows in Estonia responded to regional wage differentials in the expected way, i.e. higher wages discouraged emigration and encouraged immigration thus enhancing net migration. In Latvia, impact of wage differentials on migration has increased in the late transition. In the case of net migration wage effect observed in Latvia is a lot stronger and more significant than found for Czech R., Slovakia and Poland (Fidrmuc, 2003), and for Romania (Kallai, 2003). High unemployment regions in Latvia are exposed to significantly larger outflows but also inflows, thus rendering unemployment effect on net migration insignificant (in contrast with Czech R. and Hungary).

High urbanisation (measured by population density) discouraged both emigration and immigration, and had significant negative effect on net migration in Latvia.

Evidence from Estonian and Latvian micro data shows that likelihood of inter-regional migration strongly decreases with age and increases with education, consistent with predictions of the human capital model. In Estonia, however, education effect seems to be due only to recent graduates - similarly to what is found for East – West migration in Germany by Hunt (2000), Burda and Hunt (2001). Ethnic minorities and females are much less inclined to move between regions. Importance of labour market related incentives for mobility is highlighted by the finding that inactive and unemployed persons, as well as commuters between regions, are significantly more likely to become migrants; this confirms Hunt's (2000) results for Germany. On the other hand, non-labour-related reasons, especially family ones, are also important determinants of inter-regional flows.

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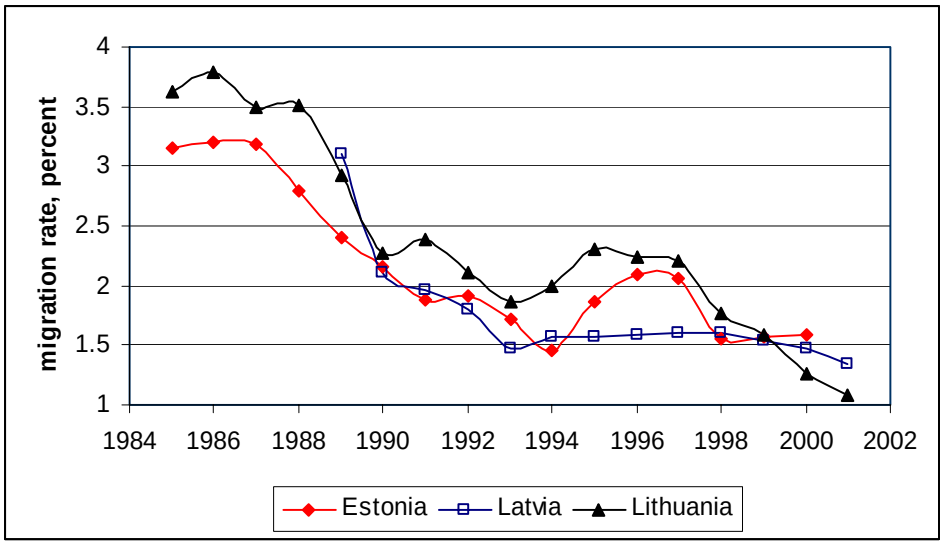
Figure 1. Internal migration rates (percent),

Estonia (1985-2000), Latvia (1990-2001), Lithuania (1989-2001)



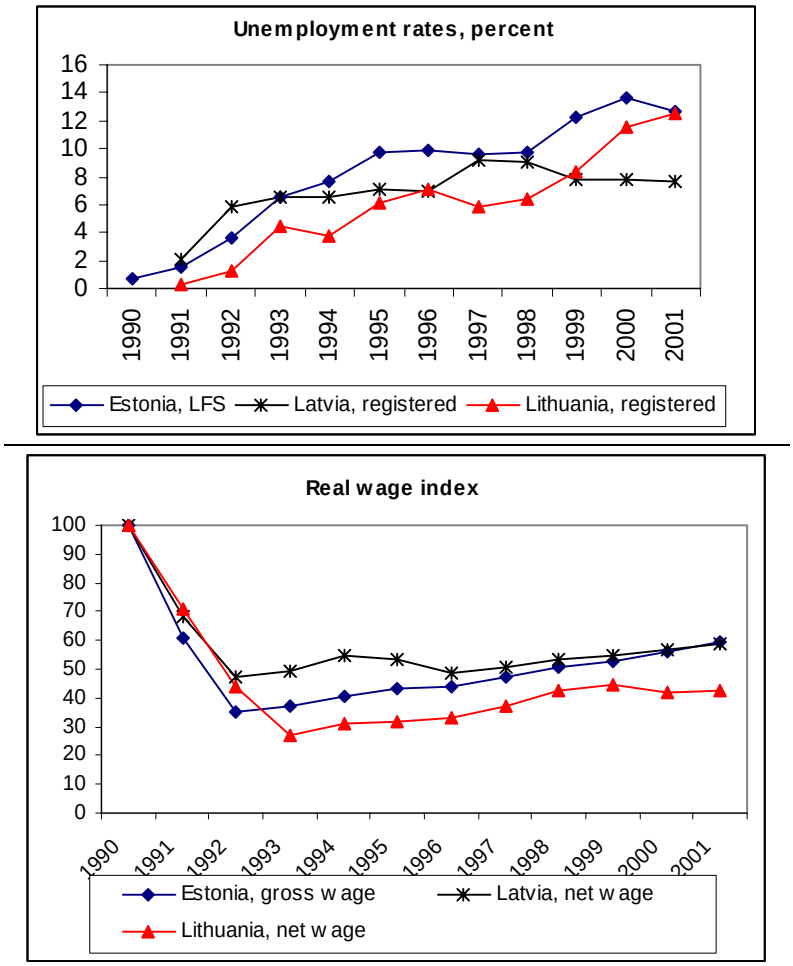
Notes. All rates are based on registration data. Population numbers in 1990-2001 have been updated using results of latest Population Census (2000 in Latvia and Estonia, 2001 in Lithuania). However, migration data as such have been recalculated (correcting to some extent under-registration errors) only in Latvia. *Sources*: Official publications of national Statistical Offices and own calculations.

Table 1. Gross and net inter-regional migration rates.
Baltic countries, Czech R., Slovakia, Slovenia, Hungary, Denmark and Netherlands.

	Regions			Gross migration, %			Net migration, %	
Country	Number	Average pop., 1000 [a]	Average area, 1000 sq. km	Average	Min	Max	Average	Share in gross migration
Estonia, 1989-2000	15	91	2.7	0.81				
Estonia, 1998	15	91	2.7	0.69	0.33	2.63	0.04	6.4
Estonia, 1998	15*	91	2.7	1.55*				
Latvia, 2001	33*	71	2.0	1.34*	0.73*	3.24*	0.22	16.4
Latvia, 2001	33	71	2.0	1.13	0.35	3.24	0.22	19.6
Latvia, 2001	26	84	2.5	0.75	0.35	1.82	0.19	25.8
Lithuania, 2001	60*	58	1.1	1.07*	0.44*	2.53*	0.11	
Lithuania, 2001	10	348	6.5	0.46	0.30	0.87	0.07	14.6
Czech R., 1998	74*	137	1.1	0.98*	0.59*	3.32*	0.10	10.2*
Czech R., 1998	74	137	1.1	0.44			0.10	22.0
Slovakia, 1996	38*	141	1.3	0.61*	0.28*	1.40*		
Slovenia, 1998	12	167	1.3	0.30			0.02	7.2
Hungary, 1998	20	512	4.6				0.17	
Denmark, 1999		355	2.9	3.4			0.09	2.8
Netherlands, 1995	12	1308	2.8	1.7			0.07	4.3

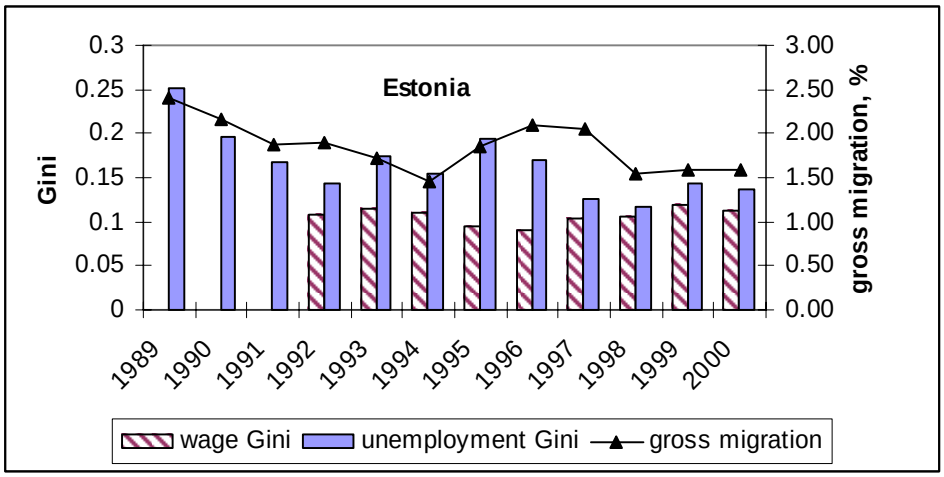
Notes: [a] Population figures refer to 2001 for the Baltic countries, for 2000 in other cases. * Rates including not only inter-regional migration but also inter-city, urban-rural and rural-urban migration within regions.
Source: Baltic countries - official publications of National Statistical offices and own calculation. Other countries: Huber (2003), except for rates marked with * for Czech R. and Slovakia, which are taken from Fidrmuc (2002).

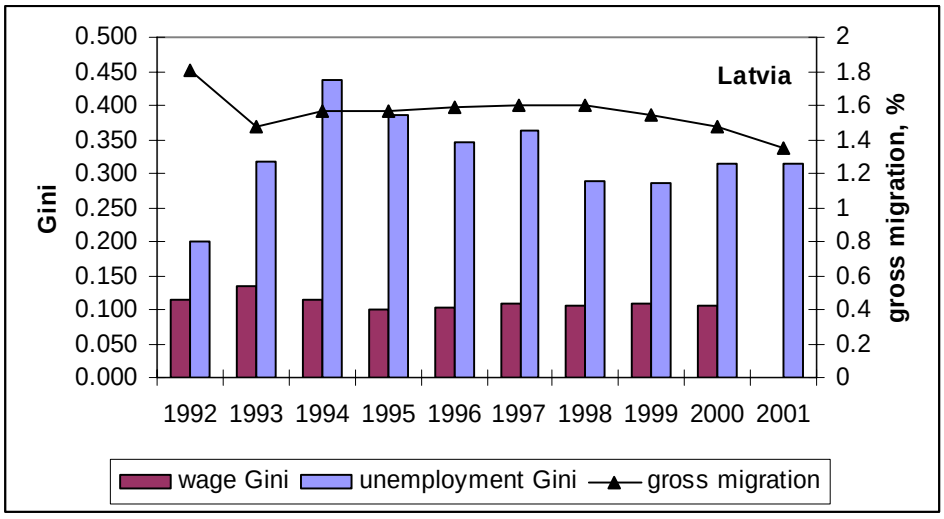
Figure 2. Unemployment and real wage trends in Baltic countries, 1990-2001.

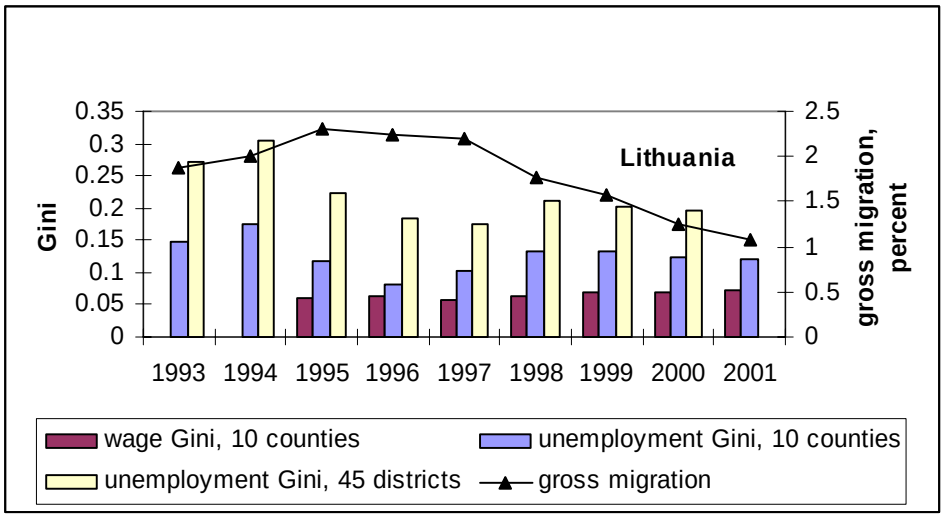


Notes: Unemployment rates are not comparable across countries. See Table 3 for comparable (LFS-based) rates, which, however, are not available for the whole period in Latvia and Lithuania.
Sources: Official publications and websites of national statistical offices. Source of wage index for 1991 (Estonia), 1991-1994 (Latvia), 1991-1995 (Lithuania) is OECD (2000).

Figure 3. Regional disparities and gross migration rates in the Baltic countries, 1989-2001







Notes: Wage and unemployment Gini coefficients are calculated in the usual way and measure inequity of distribution of labour income and and unemployed persons among employees and labour force respectively, ignoring inequity within the regions (15 counties + Tallinn in Estonia; 33 NUTS4 regions in Latvia; as shown in Lithuania). LFS unemployment is used for Estonia, registered unemployment for Latvia and Lithuania. Gross migration includes also inter-city, urban-rural and rural-urban moves within regions.

Table 2. Net effect of migration in the Baltic countries during the transition period

Estonia		
	1989	**2000**
Share of urban population [a]	68.9%	67.4%
Capital city [a]	30.5%	29.2%
Dissimilarity index [b] (15 counties + Tallinn)	2.6%	
Moved between municipalities, 1989-2000 [a]	17%	
Moved between counties, 1989-2000 [a]	8.8%	

Latvia		
	1989	**2001**
Share of urban population [a]	69%	68%
Capital city [a]	34%	32%
Dissimilarity index [b] (26 districts + 7 main cities)	2.9%	
Moved between municipalities, 1989-1999 [c]	9.5% (with basic education – 7.5%; Latvians – 13.4%; Russians – 4.6%; other ethnicity – 3.9%)	

Lithuania		
	1989	**2001**
Share of urban population [a]	67.7%	66.9%
Capital city [a]	15.7%	15.6%

Notes: [a] Based on latest Census data. [b] Minimal proportion of population which has to change residence in order to make the second distribution identical to the first one. [c] NORBALT 2 survey data.
Sources: Official publications of National Statistical offices and own calculation.

Table 3. Unemployment rates and real wage growth, Baltic countries, 1990-2001

Percent

	Unemployment, EE		Unemployment, LV		Unemployment, LT		Real wage growth		
	LFS [a]	Registered	LFS [a]	Registered	LFS [a]	Registered	EE [b]	LV [c]	LT [c]
1990	0.6								
1991	1.5		0.6	2.1		0.3	-39.0	-32.0	-29.0
1992	3.7		3.9	5.8		1.3	-42.8	-30.9	-38.0
1993	6.6	4.5	8.7	6.5		4.4	6.6	4.3	-38.6
1994	7.6	5.1	16.7	6.5		3.8	9.8	12.2	14.8
1995	9.7	5.1	18.1	7.1	17.1	6.1	6.3	-2.6	3.2
1996	9.9	5.5	20.6	6.9	16.4	7.1	1.4	-8.8	3.3
1997	9.6	5.1	15.1	9.2	14.1	5.9	7.6	3.6	13.4
1998	9.8	4.7	14.1	9.1	13.3	6.4	6.4	5.3	12.8
1999	12.2	6.7	14.3	7.8	14.1	8.4	4.2	2.9	4.9
2000	13.6	6.6	14.4	7.8	15.4	11.5	6.1	3.0	-5.1
2001	12.6	8.0	13.1	7.7	17.0	12.5	6.8	3.5	0.6

Notes: [a] ILO definition (for Latvia since 1995). [b] Gross wages. [c] Net wages.
Country abbreviations: EE – Estonia, LV – Latvia, LT – Lithuania.
Sources: Official publications and websites of national statistical offices.
Source of wage index for 1991 (Estonia), 1991-1994 (Latvia), 1991-1995 (Lithuania) is OECD (2000).

Table 4. Regional disparities in gross average wages.

A. Estonia, (15 counties and Tallinn, percent of national average[a])

	Standard deviation/average		Min and Max		
Year	weighted	non-weighted	Poorest district	Tallinn	Gini index[b]
1992	14.3	20.0	71.9	121.1	0.108
1993	14.6	20.8	71.5	125.7	0.113
1994	14.4	19.6	67.9	122.7	0.109
1995	12.4	17.1	73.4	120.0	0.094
1996	11.9	16.5	74.9	118.8	0.091
1997	12.6	18.9	73.1	122.9	0.103
1998	12.9	19.5	73.3	122.7	0.105
1999	14.2	21.7	72.4	125.1	0.117
2000	13.9	20.3	70.9	122.3	0.111

B. Latvia (7 main cities and 26 districts, percent of national average [a])

	Standard deviation/average		Min and Max		
Year	weighted	non-weighted	Poorest district	Riga	Gini index[b]
1992	22.3	21.6	60.4	118.5	0.115
1993	29.5	33.2	57.4	117.4	0.134
1994	23.5	25.2	59.5	114.8	0.113
1995	20.0	21.7	61.3	113.3	0.100
1996	21.1	22.0	61.6	114.1	0.102
1997	21.0	20.8	61.9	114.7	0.108
1998	20.3	18.3	60.0	115.5	0.107
1999	20.2	16.6	59.9	116.0	0.107
2000	20.1	16.1	61.3	115.8	0.107

C. Lithuania (10 counties [c], percent of national average [a])

	Standard deviation/average		Min and Max		
Year	weighted	non-weighted	Poorest district	Vilnius county [d]	Gini index[b]
1995	11.7	14.5	78.8	112.9	0.062
1996	11.9	13.8	76.9	112.5	0.062
1997	10.7	13.7	78.0	112.7	0.059
1998	10.7	13.9	77.8	114.1	0.063
1999	11.3	15.7	78.1	115.3	0.070
2000	11.1	15.0	78.9	115.1	0.070
2001	11.7	16.2	76.8	116.6	0.074

Notes: [a] Except for Gini. [b] Ignoring inequality within regions. [c] Disparities in Lithuania are of course more pronounced when 60 municipalities are considered. Poorest district is at about 70% of average, while Vilnius city went down from 192% to 173% between 1997 and 2000; weighted standard deviation in the same period declined from 20% to 16% of national average wage. [d] Utena county had higher wage index (114.3) in 1995.
Sources: Official publications of national statistical offices and own calculation.

Table 5. Disparities in unemployment rates.

A. Estonia (15 counties and Tallinn, LFS unemployment)

	Standard deviation				Unemployment rates by main cities and districts		
	(% of national average unemployment rate)		percentage points				
Year	weighted	non-weighted	weighted	non-weighted	Min	Max	Gini index
1989	74.4	50.6	0.3	0.4	0.4	1.4	0.253
1990	58.6	39.5	0.3	0.4	0.3	1.5	0.197
1991	56.0	35.3	0.5	0.8	0.1	2.8	0.167
1992	33.2	26.1	1.0	1.2	1.3	5.5	0.143
1993	38.8	33.0	2.2	2.6	3.5	12.5	0.174
1994	38.9	28.6	2.2	3.0	3.4	13.8	0.153
1995	47.6	37.5	3.7	4.6	4.3	19.4	0.194
1996	36.7	32.8	3.3	3.7	6.5	16.8	0.169
1997	26.7	23.4	2.3	2.6	4.7	14.6	0.125
1998	22.2	23.0	2.3	2.2	6.1	14.7	0.117
1999	28.6	30.1	3.7	3.5	9.1	21.1	0.144
2000	27.4	27.0	3.7	3.7	9.2	22.8	0.137

B. Latvia (7 main cities and 26 districts, registrered unemployment)

	Standard deviation				Unemployment rates by main cities and districts		
	(% of national average unemployment rate)		percentage points				
Year	weighted	non-weighted	weighted	non-weighted	Min	Max	Gini index
1992	44.4	56.5	0.9	1.2	0.7	6.5	0.200
1993	63.2	71.1	3.7	4.1	3.0	18.8	0.316
1994	89.7	100.1	5.8	6.5	2.1	25.3	0.437
1995	81.6	98.6	5.3	6.4	2.0	26.0	0.387
1996	73.7	87.6	5.3	6.3	2.9	27.8	0.345
1997	73.4	84.2	5.1	5.9	3.0	27.9	0.362
1998	56.2	59.7	5.2	5.5	4.8	28.2	0.288
1999	55.7	59.1	5.1	5.4	4.8	27.2	0.285
2000	62.6	67.8	4.9	5.3	3.7	25.6	0.314
2001	63.0	68.1	4.9	5.2	3.6	26.5	0.315

B. Lithuania (46 districts, registrered unemployment)

	Standard deviation				Unemployment rates by districts		
	(% of national average unemployment rate)		percentage points				
Year	weighted	non-weighted	weighted	non-weighted	Min	Max	Gini index
1993	54.9	52.0	2.4	2.3	1.9	12.7	0.271
1994	67.7	60.6	2.6	2.3	1.3	13.5	0.306
1995	49.4	45.0	3.1	2.8	3.0	18.1	0.225
1996	45.9	36.1	3.2	2.5	3.3	16.9	0.183
1997	39.6	32.5	2.3	1.9	2.7	12.0	0.176
1998	43.0	39.2	2.8	2.5	3.1	16.5	0.210
1999	39.2	37.8	3.2	3.1	4.2	18.4	0.202
2000	37.5	36.4	4.3	4.2	7.3	23.7	0.198

Sources: Official publications and websites of national statistical offices and own calculation.

Table 6 Relationships between unemployment, wage and population density across regions. Estonia[a] and Latvia[b]

Prais-Winsten regressions, heteroskedastic panels corrected standard errors[c]

	Estonia				Latvia			
Dependent var. →	unemployment		wage (log)		unemployment		wage (log)	
Regressors	coef.	*z*	coef.	*z*	coef.	*z*	coef.	*z*
unemployment rate (log) [a]			-0.068	-2.47**			-0.114	-11.73***
population density (log)	-0.201	-1.65*	0.082	32.83***	-0.915	-7.61***	0.061	23.49***
rho (AR1)	0.715		0.552		0.778		0.574	
other controls (not reported)	year dummies, constant				year dummies, constant			
time period	1989-2001		1992-2000		1992-2000		1992-200	
R-squared	0.508		0.988		0.300		0.985	
k	13		11		10		11	
Wald chi2(k-1)	408.0		11589.7		492.6		2676.0	
Number obs.	208		144		297		297	

Notes: [a] Tallinn and 15 counties. [b] 7 main cities and 26 districts.
[c] Observations weighted by mid-period population. *, **, *** - significant at 10%, 5%, 1% level respectively.
Sources: Official publications of national statistical offices and own calculation.

Table 7. Net migration flows by main cities and districts: Latvia, 2001. Deviation of previosly published data from the revisions based on Census 2000

Underestimated by:	25-50%	70-100%	100-200%	200-300%	max=633%
Number of regions	4	2	2	2	1
Overestimated by:	10-20%	22-30%	40-90%	125-150%	max=978%
Number of regions	4	4	10	3	1

Source: Central Statistical Bureau of Latvia and own calculation

Table 8. Internal migrants by purpose of migration. Latvia, 1989-1999

Percent

	Location of new residence				
Purpose	*Whole country*	*Riga*	*Big city*	*Small city*	*Rural*
Purchase or change of apartment	15.4	2.5	30.0	17.1	16.0
Change or find job	22.1	30.0	10.0	23.2	20.8
Studies	6.4	15.0	20.0	6.1	1.6
Family reasons	47.9	42.5	35.0	47.6	52
Other	8.2	10.0	5.0	6.1	9.6
Total	100	100	100	100	100

Source: NORBALT-2 project data (provided by Central Statistical Bureau of Latvia) and own calculations.

Table 9. Migrants by purpose of migration.

Latvia, 2001

Percent

Purpose of migration	Location of new residence				
	Whole country[a]	*Whole country*[b]	*Cities and towns*[b]	*Rural area*[b]	Riga[b]
Children moving to live with parents	31.4	31.1	28.7	35.3	21.2
Restitution of house ownership or acquisition of own house or flat	15.2	14.8	15.6	13.5	17.7
Studies	11.1	10.9	14.8	4.0	25.9
Intention to live together with spouse	7.2	7.9	7.6	8.5	6.3
Sub-tenants	7.7	7.8	8.3	6.7	11.9
Parents mowing to live with children	3.6	3.8	4.1	3.4	4.9
Change of job	3.3	3.4	3.2	3.6	2.0
Acquisition of municipal flat	2.1	2.0	2.3	1.5	2.1
Exchange of dwellings	1.5	1.5	1.2	1.9	0.9
Starting a job after graduation	0.04	0.04	0.02	0.07	0.0
Other	16.9	16.8	14.1	21.6	7.0
Total	100	100	100	100	100

Notes: [a] Internal migration. [b] Total immigration, including immigration from abroad.
Source: Central Statistical Bureau of Latvia, 2002a.

Estonia [a], 1998

Percent

Purpose of migration	Location of new residence			
	Whole country	Urban	Rural	Tallinn
Desire to change housing or living conditions	24.0	22.9	26.1	14.4
Starting or terminating studies	16.8	20.2	9.8	27.3
Moving out from or back in with parents or other relatives	13.7	11.7	17.8	8.4
Moving in with or out from partner	12.3	11.4	14.4	12.9
Change of job or job seeking	9.8	11.0	7.6	16.7
Starting or terminating military service	8.0	9.7	4.9	12.1
Restitution of real estate ownership to respondent or former owner of respondent's residence	3.1	3.6	2.3	0
Starting a job after graduation	1.9	2.3	1.1	2.3
Job or studies of other family members	1.1	0.9	1.5	0.8
Other	9.3	6.3	14.5	5.1
Total	100	100	100	100

Notes: [a] Internal migration.
Source: LFS 1999 data and own calculation.

Table 10. Wage and unemployment differentials and migration between largest Latvian cities and adjacent districts

	Population, end of 2000		Migration in 2001				Unemployment differential district – city, percentage points				Gross average wage differential city – district by job location, percent	
			City - district			District-city: outflow per 1000 pop.	Registered		LFS			
			% of total outflow from the city	Outflow per 1000 population								
				Total	Net							
City	City	Nearby district	(a)	(b)	(c)	(d)	1993	2000	1997	2000	1992	2000
Riga	756.6	144.9	28.8	2.5	1.9	5.9	2.9	2.9	1.5	2	24	15
Dau	114.5	42.5	39.8	4.8	1.1	10.1	3.0	6.7	7.2	7.3	45	13
Liep	88.5	46.5	39.6	3.6	-0.6	8.0	2.5	0.2	3.3	0.7	41	24
Jelg	64.5	37.3	35.1	5.7	0.5	8.9	-0.1	3.4	2.3	2.5	33	15
Vent	43.9	14.6	31.6	2.1	-2.7	14.5	0.9	2.4	4.1	4.5	115	108
Rez	38.7	43.2	49.9	12.0	5.3	6.0	8.7	14.2	16.4	16.9	33	22

Notes: Cities mentioned in the table are: Riga, Daugavpils, Liepaja, Jelgava, Ventspils, and Rezekne.
Source: Central Statistical Bureau of Latvia and own calculation.

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Table 11. Relationships between regional labour market and demographic indicators. Latvia, 1992-2000

Prais-Winsten regression with panel-corrected standard errors [a]

Dependent var. →	unemployment		wage (log)		mortality rate		marriage rate		divorce rate	
Regressors	coef.	*z*	coef.	*z*	coef.	*z*	coef.	*z*	coef.	*z*
unemployment rate [b]			-0.010	-9.48***	0.140	6.7***	0.031	5.29***	0.015	2.17**
wage [c] (log)					-2.256	-4.23***	0.861	4.00***	0.951	3.71***
population density (log)	-0.915	-7.61***	0.067	26.00***	0.010	0.22	0.175	8.95***	0.226	12.38***
rho (AR1)	0.778		0.665		0.594		0.375		0.209	
other controls (not reported)	year dummies, constant									
R-squared	0.300			0.989	0.825		0.925		0.886	
k	10			11	12		12		12	
Wald chi2(k-1)	492.6			2220.0	811.4		4038.6		3945.4	

Notes: [a] Observations weighted by mid-period population. *, **, *** - significant at 10%, 5%, 1% level respectively
[b] Registered unemployment by 7 main cities and 26 districts. [c] Gross monthly wages.
Source: Central Statistical Bureau of Latvia and own calculation.

Table 12 Determinants of inter-regional migration in Latvia, 1993-2001

Linear regressions with panel-corrected standard errors

	outflows				inflows				net inflows			
	coef.	*z*	coef.	*z*	coef.	*z*	coef.	*z*	coef.	*z*	coef.	*z*
unempl. rate [a]	0.111	2.71***	0.200	3.9***	0.098	1.59	0.265	3.61***	-0.014	-0.33	0.076	1.54
wage (log) [b]	-3.122	-2.87***	-3.953	-2.24**	3.102	2.07**	6.907	2.66***	5.912	4.72***	11.425	5.16***
density (log)	-1.605	-25.2***	-1.622	-20.0***	-2.190	-24.17***	-2.097	-17.70***	-0.597	-9.80***	-0.478	-5.75***
mortality [c]	0.313	2.98***	0.276	1.69*	0.325	2.15**	-0.311	-1.07	0.067	0.61	-0.608	-2.60**
marriage rate [c]					4.165	7.53***	5.586	6.35***	2.785	6.77***	4.175	6.44***
divorce rate [c]	1.563	4.28***	1.057	1.60								
year93	3.180	5.37***			1.671	1.89*			-1.509	-2.46***		
year94	4.010	6.73***			2.546	2.86***			-1.466	-2.37***		
year95	3.675	6.14***			2.514	2.81***			-1.163	-1.88***		
year96	3.759	6.25***			2.686	2.99***			-1.071	-1.72***		
year97	3.768	6.25***	3.767	6.76***	2.737	3.04***	2.738	3.08***	-1.028	-1.65***	-1.026	-1.59
year98	3.685	6.09***	3.684	6.59***	2.665	2.95***	2.666	2.99***	-1.019	-1.63***	-1.017	-1.57
year99	2.944	4.85***	2.944	5.25***	2.048	2.26**	2.049	2.29***	-0.899	-1.43***	-0.897	-1.38
_cons	21.897	39.98***	21.987	36.35***	24.940	30.68***	24.441	27.01***	3.108	5.56***	2.472	3.95***
Periods	1993-99,2001		1997-99,2001		1993-99,2001		1997-99,2001		1993-99, 2001		1997-99,2001	
R-squared	0.573		0.614		0.532		0.523		0.253		0.323	
k	13		9		13		9		13		9	
Wald chi2(k-1)	1302.7	(0.0000)	821.1	(0.0000)	998.5	(0.0000)	510.4	(0.0000)	240.3	0.0000	167.5	(0.0000)
Number obs.	264		132		264		132		264		132	

Notes: Dependent variables: outflow, inflow and net inflow (inflow less outflow) per 1000 population. Number of regions: 33.

[a] unexplained by density. [b] unexplained by density and unemployment. [c] unexplained by density, wage and unemployment

All regressors except year dummies are lagged one year and considered as predetermined variables. We use registered unemployment and gross monthly wages. Heteroskedasticity across panels is allowed. Observations weighted by population.

*, **, *** - significant at 10%, 5%, 1% level respectively.

Table 13. Determinants of individual migration decisions. Estonia, 1997-1999 (logit model [a])

	Population, aged 15-59				Employees, aged 15-59			
	Mean	**Coef.**	**t-value [b]**	**Marg. effect**	**Mean**	**Coef.**	**t-value [b]**	**Marg. effect**
Education (vs basic or less)								
higher	0.147	2.033	5.56***	0.030	0.187	0.168	0.36	0.002
postsecondary professional	0.099	1.867	5.16***	0.026	0.118	0.223	0.49	0.003
secondary comprehensive	0.304	1.353	5.54***	0.014	0.298	-0.632	-1.64	-0.005
secondary vocational	0.173	1.150	3.34***	0.011	0.196	-0.455	-1.06	-0.004
vocational after basic	0.087	1.809	5.54***	0.024	0.093	0.590	1.36	0.008
Female	0.510	-0.409	-2.61***	-0.006	0.499	-0.056	-0.21	-0.001
Ethnic minority	0.344	-0.304	-1.22	-0.004	0.352	-0.340	-0.78	-0.003
Age	36.60	-0.223	-4.11***	-0.002	39.2	-0.199	-2.38**	-0.001
Age squared (coef. ×100)	1497	0.190	2.77***		1651	0.159	1.49	
Marital status[a] (vs married)								
single	0.278	0.240	1.17	0.003	0.176	0.365	1.28	0.003
separated	0.119	0.778	2.53**	0.013	0.130	1.036	2.80***	0.012
Labour force status and job location [c]								
inactive	0.248	0.859	3.74***	0.013	0.000			
employed, commute to another county	0.052	1.745	5.81***	0.049	0.080	1.835	5.35***	0.032
employed, commute within county from rural to urban or from urban to rural	0.060	-0.064	-0.16	-0.001	0.092	0.117	0.28	0.001
jobseeker	0.085	0.284	0.89	0.004	0.000			
Residence [c]								
rural	0.316	-0.692	-3.96***	-0.002	0.279	-1.096	-3.6***	-0.004
Tallinn	0.294	-0.118	-0.21	-0.008	0.319	0.348	0.38	-0.007
Harju county (excl. Tallinn)	0.090	0.942	1.50	0.023	0.095	1.299	1.3	0.025
Labour market by residence [c]								
unemployment rate, lagged	0.099	-0.035	-1.17	0.000	0.099	-0.073	-1.32	-0.001
log average wage, lagged	0.082	-3.574	-2.22**	-0.050	0.082	-4.092	-1.49	-0.037
Year 1997	0.259	-0.830	-1.71*	-0.013	0.267	-1.139	-1.31	-0.012
Year 1998	0.259	-1.052	-3.62***	-0.015	0.263	-0.894	-1.74*	-0.010
Constant		28.940	2.16**			34.479	0.81	
# observations	25694 (393 migrants, Prob=0.015)				14727 (124 migrants, Prob = 0.0096)			

Notes. [a] Dependent variable: y = 1 if respondent has changed county of residence between during a year; otherwise y=0. [b] t- values are based on robust standard errors (possibly correlated within households). [c] In January of the corresponding year (1997, 1998 or 1999). *Source:* calculation based on LFS 1998-2000.