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Migration and Regional Adjustment to Asymmetric Shocks in Transition Economies[1]

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Migration and Regional Adjustment to Asymmetric Shocks in Transition Economies

Abstract:

Does migration facilitate regional adjustment to idiosyncratic shocks? The evidence from post-communist economies indicates that the efficacy of migration in reducing inter-regional unemployment and wage differentials is low. High wages appear to encourage and high unemployment tends to discourage overall migration, inbound and outbound, rather than induce a net flow from depressed regions to those with better economic conditions. Even when the impact of unemployment and wages on net migration is statistically significant, it is economically very small. Finally, migration flows declined during the transition, despite rising inter-regional disparities.

Keywords: Migration, Regional Adjustment, Regional Shocks, Optimum Currency Areas

JEL Categories: F22, J61, P23

1 Introduction

Migration, or labor mobility[2], is an important economic phenomenon. Migrants move from regions with high unemployment and low incomes to regions with higher wages and better employment prospects. In this manner, migration helps regions adjust to asymmetric shocks, e.g. an idiosyncratic fall in demand for the region's products or technological progress that renders productive facilities in the region obsolete. In a hypothetical economy with perfect labor mobility, regions would adjust to asymmetric shocks instantaneously.[3] If factor mobility is limited or prices and wages rigid, the effects of asymmetric shocks persist and regional economies must rely on other adjustment mechanisms. Often, these involve pressure to use fiscal redistribution to alleviate pervasive inter-regional disparities, which in turn may give rise to political tensions.

Eichengreen (1993, 1998) and Bentivogli and Pagano (1999) point out a sharp contrast between the effectiveness of migration in the U.S. and in continental Europe. In the former, labor mobility is high so that it plays an important role in reducing regional unemployment and wage differentials (Blanchard and Katz, 1992). In contrast, European countries often display persistent economic differences between regions, e.g. North and South of Italy and East and West Germany, while labor mobility contributes little to smoothing these differentials (Decressin and Fatas, 1995). The role of migration in facilitating regional adjustment is particularly important in countries undergoing fundamental structural changes.

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[2] The terms migration and labor mobility are used interchangeably in this paper.

[3] Of course, migration is only one of several possible channels of regional adjustment. According to the Heckscher-Ohlin model, with free trade, flexible prices and transferable technology, factor prices are equalized across regions, and trade, capital mobility and labor mobility are substitutes in facilitating regional adjustment.

The post-communist countries in Central and Eastern Europe initiated economic reforms with essentially no official unemployment and an egalitarian wage distribution. However, the subsequent transition from central planning to a market economy was accompanied by dramatic and largely asymmetric economic developments because, for example, regions differed in their dependence on trade with the CMEA (Repkine and Walsh, 1999). In turn, these developments lead to increasing regional disparities. The widening gaps between prosperous and depressed regions increase the need for regional adjustment, with migration being a potentially important mechanism for equalizing these disparities. This paper analyzes the effectiveness of this mechanism in four Central European transition economies, namely, the Czech Republic, Hungary, Poland and Slovakia. For comparison, results for three Southern European EU countries, namely, Italy, Spain, and Portugal, are presented.

The efficacy of migration as a shock-absorbing mechanism has important repercussions for the future membership of the transition countries in the Economic and Monetary Union (EMU). If the new entrants continue to be exposed to asymmetric shocks, i.e., asymmetric with respect to those prevailing in the core EMU countries, ceding autonomy over monetary policy will increase the need for alternative adjustment mechanisms. Since labor mobility is one such mechanism, its effectiveness in facilitating regional adjustment will have important implications for the optimality of this accession. However, the results are mixed. On the one hand, net migration does respond to regional economic conditions in the expected way in that net immigration is positively related to the average wage and negatively related to the unemployment rate prevailing in the destination region. However, this effect is economically small; sizeable wage and unemployment differentials give rise to only modest net migration flows. On the other hand, wages and unemployment tend to affect gross migration flows in a similar way. Thus, regions with high wages tend to experience high immigration as well as emigration, rather than high immigration and low emigration. Similarly, unemployment tends to discourage both inbound and outbound flows, although this effect is significant only in the

regressions for Poland. This pattern implies that regions with relatively favorable economic conditions display high migration, both inbound and outbound, whereas depressed regions show low mobility. Hence, the latter experience persistent low wages and high unemployment. Moreover, migration flows have been declining since the beginning of the transition. Therefore, the efficacy of labor mobility in facilitating regional adjustment to idiosyncratic shocks appears to be quite low.

After reviewing briefly the theoretical and empirical literature on migration in the following section, the data and recent labor market developments in transition economies are discussed in section 3. Results of the empirical analysis are presented in section 4. Finally, the main conclusions are summarized and policy implications are drawn in the last section.

2 Migration: Theories and Empirical Evidence

The theoretical foundations of modern migration literature are found in Todaro (1969) and Harris and Todaro (1970). In their framework, migration is motivated by expected earnings differentials, i.e. the wage differential between home and destination regions, adjusted for the probability of finding employment at destination. Accordingly, the higher the wage and the lower the unemployment rate in the region of destination, the greater will be immigration to that region. Nevertheless, as Faini and Venturini (1996) argue, the effect of wages in the region of origin need not be linear because migration from poor regions may be limited by liquidity constraints. With rising wages at home, emigration may in fact increase rather than decline as the liquidity constraint ceases to be binding. Only for relatively affluent regions do rising wages reduce the incentive to emigrate. Borjas (1987) points out that migration responds not only to average wages but also to their dispersion reflecting underlying inter-regional differences in rewards to skills. In particular, regions or countries with a relatively egalitarian wage distribution will attract primarily low-skilled workers, whereas high-skilled workers will choose to migrate to regions with a more uneven wage

distribution and higher returns to skills (Borjas, 1987). Finally, Burda (1995) compares migration to investment decisions under uncertainty and argues that potential migrants may postpone migration because of the option value of waiting, which he shows to be positive. Accordingly, the prospects of an improvement at home and the option to migrate later in case of further deterioration may induce potential migrants to remain at home.

Based on Harris and Todaro's insights, most of the empirical literature focuses on the role of wages and employment prospects, which is proxied typically by unemployment, in explaining migration patterns. Social and demographic variables, as well as measures of various amenities or quality of life, are often included. Pissarides and McMaster (1990) find that relative unemployment and wages, both expressed as ratios to national mean values, affect significantly inter-regional migration in Great Britain, but the resulting regional adjustment to shocks is very slow. In his analysis of migration among West German Federal States, Decressin (1994) obtains similar results. Jackman and Savouri (1992), who also study British migration, obtain a similar finding for unemployment and vacancy rates but obtain the opposite result for wages, which suggests that migrants move from high to low wage regions.

The capacity of migration to facilitate adjustment of regions to idiosyncratic shocks is central to the literature on optimality of currency areas, as emphasized by Mundell (1961).[4] When factors of production are mobile, labor and capital move in response to output shocks until marginal returns are equalized across regions. On the other hand, if factor mobility is limited, asymmetric shocks lead to persistent inter-regional differentials in unemployment and

[4] Mundell defines optimum currency areas as areas within which there is factor mobility, but between which there is factor immobility.

wages.[5] Blanchard and Katz (1992) assess regional adjustment using state-level data from the U.S. and conclude that the bulk of adjustment occurs through labor mobility, after an initial increase in unemployment, rather than through capital mobility or price and wage adjustment. Moreover, they find that the adjustment is relatively fast, with the effect of a shock disappearing completely after five to seven years. Hence, labor in the U.S. is highly mobile and responds readily to idiosyncratic economic shocks. In contrast, Decressin and Fatas (1995) conclude that the effects of such shocks are absorbed mainly by changes in labor-force participation rather than through migration in Western Europe. Similarly, Bentivogli and Pagano (1999) find that the responsiveness of migration to unemployment and wage differentials is much lower in the EU than in the U.S. As a result, wage and unemployment differentials are generally greater and more persistent in the former than in the latter. This lack of labor mobility is often seen as a potential threat to the stability of the EMU (Eichengreen, 1993 and 1998, Braunerhjelm *et al.*, 2000). If idiosyncratic shocks have permanent or highly persistent effects, pressure for accommodating policy measures in affected regions or countries intensifies. However, the ability of individual countries in Europe to implement such measures is limited because of the loss of monetary autonomy and also because of the constraints on fiscal policy imposed by the Growth and Stability Pact, which mandates that public deficit and indebtedness must stay below 3 and 60% of GDP, respectively.

While the capacity of the current members of the EU to absorb the adverse effects of asymmetric shocks has attracted considerable attention in the literature, the implications of the prospective participation of the new members in the Eurozone has remained largely

[5] Mobility of only one of the factors of production is sufficient to facilitate regional adjustment. Either labor may move to where wages are high and jobs available or capital may move to regions where labor is cheap and plentiful.

unexplored. In the remainder of the paper, we analyze the ability of the new members' labor markets to adjust to asymmetric shocks by looking at the responsiveness of inter-regional migration flows to regional labor-market conditions.

3 Data

We analyze migration flows in the Czech Republic, Hungary, Poland and Slovakia; these four countries are among the most advanced transition economies. In addition, they are also prime candidates for membership in the EU and scheduled for accession by 2004. Depending on data availability, the analysis covers five to seven years between 1992 and 1998. To facilitate comparison with market economies, we present analogous analytical results for three Southern European countries, namely Italy, Spain and Portugal. These three countries were chosen because their level of development, their labor market rigidities, and the extent of their regional disparities make them relatively similar to the transition economies. Furthermore, Spain and Portugal also have had a history of authoritarian regimes and subsequent economic liberalizations in the recent past. The data for these three countries begin in the late 1980s and go through the mid 1990s, covering between six and twelve years.

The analysis is carried out at the regional level, although the size of regions differs considerably. The transition economies have relatively small regions, with the average population ranging from 136,000 in Czech Republic to 790,000 in Poland. In contrast, the average size of regions in the three EU countries ranges between 1.4 million in Portugal and 4.3 million in Spain. Clearly, smaller regions offer a better approximation of local labor market conditions. Furthermore, as migratory moves often do not involve great distances, data based on a finer structure capture a larger fraction of actual migrations. However, data pertaining to smaller regions also capture a larger fraction of migratory flows that are not related to labor-market developments, e.g., urban-to-suburban migration or moves between two adjacent districts without a change of employment. Some types of non-labor migration, in

particular urban-to-suburban migration, can be controlled for easily in the analysis. If the remaining non-labor migration is not correlated with labor-market variables, e.g., student migration to regions with important university towns, it will be captured by regional fixed effects and should not bias systematically the results.

The data report overall immigration and emigration per region, without distinguishing between the regions of origin or destination of the migrants. These data are based on records from municipal population registers. Except for Hungary, gross migration, both immigration and emigration, and net immigration are included in the analysis. For Hungary, only net immigration data are available. Obviously, the fact that the data report population migration rather than labor migration may cause problems with the interpretation of the results because population migration does not distinguish between employment-related migration and non-labor migration, e.g. migration due to marriage or divorce, education and retirement. However, most migration studies face this problem because only population-migration data are typically available. Leuvensteijn and Parikh (2002) compare population and labor migration data for Germany and find that the regressions using population and labor migration yield similar results so long as migration figures are normalized by population and labor force, respectively.

Our sources of the data are the national statistical offices, various issues of regional statistical yearbooks, for the transition countries and the Eurostat Cronos database for the three EU countries. The country coverage is as follows: Czech Republic: 1992-98 and 74 districts; Hungary: 1994-98 and 20 counties; Slovakia: 1992-96 and 38 districts; Poland: 1992-97 and 49 voivodships; Italy: 1984-95 and 20 regions; Spain: 1984-94 and 17 regions;

and Portugal: 1987-92 and 7 regions. Except for Slovakia, the data cover only internal migration.[6]

The transition from central planning to a market economy had dramatic labor-market repercussions. At the beginning of the transition, the formerly socialist countries had essentially no official unemployment and very egalitarian distribution of wages. During the first few reform years, unemployment rose while regional disparities in unemployment and especially wages increased dramatically, as Figures 1 and 2 show.[7] In the presence of large regional disparities, workers in depressed regions would gain by moving to regions with higher wages and better employment opportunities. If this mechanism is effective, migration will gradually absorb the effects of the shocks. Nevertheless, despite the sizeable and growing gaps between prosperous and depressed regions, migration in the transition economies declined during this period, as is shown in Figure 3.

Insert Figures 1 through 3 about here.

Regional disparities in unemployment and wages in transition economies are strongly persistent (Huber, 2003): Hence, regions that experienced high unemployment and low wages at the beginning of the transition remained depressed still five years later. This observation alone may be interpreted as evidence of a low responsiveness of migration to region-specific

[6] We used both overall and internal migration for the Czech Republic but only the latter are reported. The results obtained with overall migration are similar to those with internal migration but the overall quality of statistical fit is lower, suggesting that foreign migration contains more noise, in that it is not related as strongly to economic fundamentals.

[7] Additional descriptive statistics are summarized in an appendix that is available from the author upon request.

shocks. In the following section, we examine this question more closely, using regression analysis of determinants of inter-regional migration flows.

4 Adjustment to Shocks via Migration

Migration can serve a crucial role by facilitating regional adjustment in the wake of asymmetric shocks. Consider a region hit by a permanent negative demand shock. As output falls due to the shock, unemployment rises and wages fall. The region can absorb the effects of this shock in several ways. First, the adverse labor-market conditions may induce the region's residents to leave for regions with higher wages and better employment prospects. Second, lower wages and plentiful labor may induce new firms to move into the region so that newly created jobs eventually eliminate excess unemployment and bid up earnings. Third, disillusioned unemployed workers may stop searching for work and withdraw from the labor force altogether. Finally, the relative price level can adjust sufficiently, either through falling wages and prices or by currency depreciation, if the region has its own currency, so that demand for the region's products increases.

This section investigates the effectiveness of regional adjustment through migration by analyzing the responsiveness of migration flows to regional unemployment rates and average wages. Both gross and net migration flows are used as dependent variables. The various migration variables are expressed as migration rates, i.e. the flow of migrants divided by the region's population. Gross immigration and emigration rates are strongly correlated, with correlation coefficients between 0.77 and 0.92 when measured over the entire available period for each country. Hence, if some variables affect both inflows and outflows in the same direction, the coefficients estimated for the net immigration rate may be biased (Bauer and Zimmerman, 1995). Therefore, it is important to consider both gross and net migration. Gross migration also appears strongly persistent, much more so than net migration; the correlation coefficients for gross migration rates in 1992 and 1996 are between 0.6 and 0.8.

The analysis covers between five and seven years for the transition countries and between seven and twelve years for the EU countries. The regressions are estimated either as a pooled cross section or as a fixed-effects or random-effects panel regression, depending on the outcome of specification tests. The results are reported in Tables 1 through 4. Regional labor market conditions and thus, at least indirectly, consequences of asymmetric shocks, are measured by unemployment rates and average wages. The wage is divided by the nation-wide average wage to eliminate the effects of wage growth. Both unemployment and wages may be endogenous to migration; therefore, both are lagged by one year. The first panel of each table contains regressions estimated with unemployment and wages only, and with regional fixed or random effects, if applicable. The second panel adds the log of the population density as an explanatory variable to account for the degree of urbanization.

Insert Tables 1 through 4 about here.

Although unemployment rates and average indeed affect migration in transition economies, the pattern is only imperfectly consistent with migration facilitating regional adjustment to shocks. In order for migration to be effective in eliminating the consequences of asymmetric shocks, gross and net immigration should be positively correlated with average wages and negatively correlated with unemployment, while gross emigration should be positively correlated with unemployment and negatively correlated with wages. However, this pattern is not obtained for migration in the transition economies. Unemployment tends to have the correct sign in the regressions with net migration but it is significant only in the regressions for the Czech Republic and Slovakia. Moreover, average wages do not significantly affect net migration at all or the coefficient has the wrong sign in Poland, with the negative effect being significant in one of the two the regressions.

The response of gross migration to regional labor-market conditions is also disappointing. Unemployment discourages immigration but does not affect emigration significantly in the Czech Republic and Slovakia, although the coefficient does have the correct sign. For Poland, unemployment discourages not only immigration but also emigration. Likewise, wages are positively correlated with immigration and emigration in the Czech Republic and Poland, although they do not affect gross migration significantly in Slovakia. The result that wages, and in case of Poland also unemployment, have similar effects on immigration and emigration is worrisome; it suggests that regions with favorable economic conditions tend to experience high flows of migrants, both inbound and outbound, whereas depressed regions display low labor mobility. Therefore, the efficacy of migration in facilitating relocation of labor from depressed districts to the prosperous ones appears to be limited. Rather, the transition countries exhibit segmentation into two types of regions: those with high wages, low unemployment, and relatively high migration flows; and those with low wages, high unemployment, and a highly immobile population.

Tables 5 through 7 present the results obtained with the same regression specifications for the three market economies, namely Italy, Spain, and Portugal. In contrast to the transition economies, the pattern of migration in Italy is close to the optimal response of migration to regional unemployment and wages. Analyzing gross flows, unemployment discourages immigration and encourages emigration; both coefficients are strongly significant. The coefficient for wages is also correctly signed in that it is positive for immigration and negative for emigration although neither is significant. Regarding net immigration, the coefficients for both unemployment and wages have the expected signs and are significant. hence, the response of migration to local economic conditions is consistent with migration facilitating regional adjustment to shocks in that labor relocates from depressed regions to more prosperous ones. These results may appear surprising because Italy is often considered to be a country with an immobile labor force and persistent economic differences across regions.

Nevertheless, they suggest that even if labor mobility is low, it does respond to regional economic conditions in the economically expected manner.

The evidence for Spain and Portugal is more mixed and less consistent with migration facilitating regional adjustment. Unemployment has no significant effect on migration flows except for the incorrectly signed coefficient for gross immigration in Portugal. Wages affect both immigration and emigration positively in Spain; moreover, the impact of wages on net immigration is significantly negative. In Portugal, wages increase both gross and net immigration while the coefficient for emigration switches signs between the two regression specifications; however, only the effect on net immigration is significant.

Insert Tables 5 through 7 about here.

Hence, the evidence for transition economies suggests that migration does respond to regional differences in unemployment rates and wages, but in a manner that is only partially consistent with it serving as a channel of regional adjustment to idiosyncratic shocks. The low mobility observed for depressed regions may be attributed to several factors. First, fixed costs of migration, e.g., search and information costs and the costs of moving, may be sufficiently high to deter low-wage earners and the unemployed from migrating. Second, employment prospects for high-skilled labor may be better in general so that the pool of potential migrants may consist mainly of high-skilled workers earning relatively high wages. Finally, low mobility in depressed regions may be due to structural factors. For example, if a worker's human capital is not transferable across industries, an unemployed worker in a region that is dominated by traditional communist-era industries may have few alternative options.

More importantly, the potential effect of migration on regional differences in unemployment and wages is economically small. According to the regressions containing population density, a ten percentage-point increase in the unemployment rate leads to a net

outflow of between 0.03 and 0.22 percentage points of the district's population annually. Interestingly, the potential impact of migration on regional disparities is not much stronger in the three EU countries, except perhaps in Italy where both unemployment and wages affect net migration significantly. Therefore, substantial variability in the efficacy of migration in facilitating regional adjustment is found, both within transition economies, and in comparison with Southern European countries. In most countries, the potential of migration to cushion the adverse effects of asymmetric shocks is very small; sizeable differentials in unemployment rates give rise to only modest net migration flows and wages have little effect on net migration. In addition, migration rates have fallen throughout the transition period. Hence, it is not surprising that regional differences in unemployment rates and wages have been highly persistent in the transition countries.

5 Conclusions

Labor mobility has the potential to serve as an important channel of regional adjustment to idiosyncratic shocks because emigration from depressed regions to more prosperous ones reduces inter-regional differentials in unemployment rates and earnings. This paper assesses the efficacy of migration in facilitating regional adjustment in four transition countries. Economic reforms had asymmetric repercussions in these countries, resulting in large and persistent unemployment and wage differentials that make effective regional adjustment particularly important. However, our results indicate that labor mobility can play a limited role at best. Rather than finding evidence that labor relocates from regions with high unemployment and low wages to those with more favorable labor-market conditions, we discover that prosperous regions tend to have relatively large inflows and outflows whereas depressed regions have largely immobile populations. Even when the impact of unemployment on net immigration is statistically significant, the effect is economically small

so that relatively large unemployment differentials generate only very small net migration flows.

This low responsiveness of migration to regional labor-market conditions has several important policy implications. First, regional differentials in unemployment and wages will not be quickly attenuated by migration. Hence, policies aimed at increasing labor mobility may be necessary to avert the creation of new *Mezziogiorni*. Second, given the low labor mobility and its low responsiveness to economic incentives in the accession countries, a massive East-West migration in the wake of the next EU enlargement seems unlikely. East Europeans do not move readily even within their own countries in spite of sizeable wage and unemployment differentials. Although wage differentials with respect to the current EU members are larger, so are migration costs and informal barriers to migration, e.g., linguistic and cultural differences. Third, because of the low efficacy of migration in eliminating inter-regional differentials in unemployment and wages, early membership in the EMU is not necessarily the optimal policy choice for the accession countries. EMU membership involves the loss of autonomous monetary policy and imposes important limitations on counter-cyclical fiscal policy. Since the transition countries continue to face different shocks than the EMU core countries, they may benefit from retaining the option to adjust their exchange rates at least in medium term.

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Table 1 Determinants of Inter-regional Migration: Czech Republic 1992 to 1998, Internal Migration

	Inflows		Outflows		Net Inflows		Inflows		Outflows		Net Inflows	
	(1)		(2)		(3)		(4)		(5)		(6)	
Unempl. Rate (lagged)	-0.022	(3.77)	0.002	(0.51)	-0.025	(4.18)	-0.017	(2.90)	0.002	(0.52)	-0.022	(2.97)
Wage Ratio (lagged)	0.502	(3.07)	0.410	(3.73)	0.002	(0.01)	0.462	(2.71)	0.469	(4.16)	0.069	(0.32)
Population Density (log)							-3.864	(5.43)	-0.061	(2.18)	-4.096	(4.65)
Dummy 1993	-0.199	(9.41)	-0.134	(9.51)	-0.067	(2.68)	-0.188	(9.05)	-0.134	(9.45)	-0.058	(2.25)
Dummy 1994	-0.274	(13.73)	-0.257	(19.33)	-0.021	(0.87)	-0.267	(13.69)	-0.255	(19.04)	-0.011	(0.46)
Dummy 1995	-0.297	(13.45)	-0.284	(19.28)	-0.019	(0.75)	-0.288	(13.23)	-0.281	(18.87)	-0.006	(0.23)
Dummy 1996	-0.351	(15.65)	-0.350	(23.41)	-0.007	(0.26)	-0.343	(15.53)	-0.347	(23.01)	0.004	(0.14)
Dummy 1997	-0.307	(14.49)	-0.346	(24.47)	0.033	(1.33)	-0.305	(14.66)	-0.343	(24.03)	0.039	(1.50)
Dummy 1998	-0.218	(9.66)	-0.325	(21.59)	0.101	(3.90)	-0.227	(10.18)	-0.320	(21.10)	0.101	(3.65)
Constant	0.852	(5.02)	0.813	(7.10)	0.132	(0.83)	19.482	(5.67)	1.047	(6.68)	19.781	(4.64)
District Fixed Effects	No		No		No		Yes		Yes		Yes	
District Random Effects	Yes		Yes		Yes		No		No		No	
R^2 (within)	0.538		0.780		0.080		0.567		0.780		0.124	
R^2 (between)	0.110		0.036		0.099		0.047		0.125		0.056	
R^2 (overall)	0.190		0.283		0.090		0.042		0.325		0.031	
Breusch-Pagan test (p-value)	1095.49	(0.00)	1141.08	(0.00)	314.72	(0.00)	1022.09	(0.00)	1071.07	(0.00)	290.12	(0.00)
Hausman test stat. (p-value)	5.36	(0.72)	14.50	(0.07)			48.82	(0.00)	15.90	(0.07)	21.36	(0.01)

Notes:

(i) The number of observations is 518. These consist of 74 districts with an average population of 135,900 in 1994. The districts of Bruntal, Jesenik and Sumperk are excluded because of changes in their territorial structure as of 1996.

(ii) T-statistics are reported in parentheses.

(iii) The dependent variables are the gross inflow and outflow rates and net inflow rate as a percentage of the region's end-year population, respectively.

(iv) The unemployment rate and the wage ratio are lagged by one year.

Table 2 Determinants of Inter-regional Migration: Slovakia 1992 to 1996, Overall Migration

	Inflows		Outflows		Net Inflows		Inflows		Outflows		Net Inflows	
	(1)		(2)		(3)		(4)		(5)		(6)	
Unempl. Rate (lagged)	-0.007	(2.25)	0.003	(1.31)	-0.008	(2.76)	-0.006	(2.08)	0.003	(1.56)	-0.008	(2.75)
Wage Ratio (lagged)	0.151	(0.78)	0.142	(1.02)	0.147	(0.80)	0.076	(0.37)	0.054	(0.37)	0.173	(0.82)
Population Density (log)							0.057	(1.14)	0.057	(1.70)	-0.008	(0.23)
Dummy 1993	-0.036	(1.71)	-0.112	(7.31)	0.083	(3.66)	-0.039	(1.85)	-0.115	(7.53)	0.084	(3.64)
Dummy 1994	-0.102	(4.82)	-0.270	(17.46)	0.165	(7.21)	-0.106	(4.93)	-0.274	(17.67)	0.165	(7.13)
Dummy 1995	-0.198	(8.63)	-0.335	(20.03)	0.133	(5.50)	-0.203	(8.71)	-0.341	(20.16)	0.135	(5.40)
Dummy 1996	-0.221	(11.20)	-0.337	(23.44)	0.118	(5.51)	-0.225	(11.25)	-0.342	(23.55)	0.119	(5.42)
Constant	0.764	(3.75)	0.718	(4.89)	-0.106	(0.54)	0.567	(2.12)	0.530	(2.88)	-0.095	(0.46)
District Fixed Effects	No		No		No		No		No		No	
District Random Effects	Yes		Yes		Yes		Yes		Yes		Yes	
R^2 (within)	0.662		0.864		0.271		0.663		0.865		0.270	
R^2 (between)	0.125		0.002		0.095		0.115		0.051		0.098	
R^2 (overall)	0.259		0.494		0.165		0.271		0.514		0.167	
Breusch-Pagan test (p-value)	247.22	(0.00)	229.580	0.00	105.65	(0.00)	244.52	(0.00)	233.28	(0.00)	98.67	(0.00)
Hausman test stat. (p-value)	4.90	(0.56)	5.43	(0.49)	4.03	(0.67)	4.32	(0.74)	3.21	(0.87)	8.22	(0.31)

Notes:
(i) Number of observations is 190. These consist of 38 districts with an average population of 141,300 in 1995.
(ii) T-statistics are reported in parentheses.
(iii) The dependent variables are the gross inflow and outflow rates and net inflow rate as a percentage of the region's end-year population, respectively.
(iv) The unemployment rate and the wage ratio are lagged by one year.

Table 3 Determinants of Inter-regional Migration: Hungary 1994 to 1998, Internal Migration

	Net Inflow		Net Inflow	
	(1)		(2)	
Unempl. Rate (lagged)	-0.019	(1.48)	0.001	(0.06)
Wage Ratio (lagged)	-0.420	(0.80)	-0.351	(0.57)
Population Density [log]			3.970	(3.09)
Dummy 1995	-0.008	(0.21)	0.020	(0.51)
Dummy 1996	-0.034	(0.86)	0.007	(0.18)
Dummy 1997	0.007	(0.18)	0.056	(1.49)
Dummy 1998	-0.019	(0.48)	0.046	(1.14)
Constant	0.629	(1.11)	-18.226	(3.04)
District Fixed Effects	No		Yes	
District Random Effects	Yes		No	
R^2 (within)	0.020		0.140	
R^2 (between)	0.281		0.037	
R^2 (overall)	0.246		0.034	
Breusch-Pagan test (p-value)	157.61	(0.00)	18.65	0.00
Hausman test stat. (p-value)	6.02	(0.42)	16.78	(0.02)

Notes:
(i) Number of observations is 100. These consist of 20 districts with an average population of 512,300 in 1995.
(ii) T-statistics are reported in parentheses.
(iii) The dependent variables are the gross inflow and outflow rates and net inflow rate as a percentage of the region's end-year population, respectively.
(iv) The unemployment rate and the wage ratio are lagged by one year.

Table 4 Determinants of Inter-regional Migration: Poland 1992 to 1997, Internal Migration

	Inflows		Outflows		Net Inflows		Inflows		Outflows		Net Inflows	
	(1)		(2)		(3)		(4)		(5)		(6)	
Unempl. Rate (lagged)	-0.023	(5.78)	-0.016	(4.96)	-0.002	(1.05)	-0.021	(5.37)	-0.019	(5.68)	-0.003	(1.56)
Wage Ratio (lagged)	0.590	(2.52)	0.615	(3.28)	-0.235	(2.44)	0.443	(1.80)	0.587	(2.87)	-0.144	(1.43)
Population Density (log)							-2.257	(1.87)	-3.659	(3.63)	1.402	(2.83)
Dummy 1993	-0.057	(3.10)	-0.040	(2.31)	0.001	(0.15)	-0.049	(2.61)	-0.045	(2.88)	-0.004	(0.50)
Dummy 1996	-0.092	(4.27)	-0.105	(5.44)	0.022	(2.45)	-0.073	(3.03)	-0.082	(4.11)	0.010	(0.98)
Dummy 1997	-0.159	(8.60)	-0.165	(9.51)	0.024	(3.17)	-0.135	(6.00)	-0.144	(7.69)	0.009	(1.01)
Constant	1.030	(3.80)	0.957	(4.39)	0.190	(1.70)	11.801	(2.04)	18.300	(3.80)	-6.499	(2.75)
District Fixed Effects	Yes		No		Yes		Yes		Yes		Yes	
District Random Effects	No		Yes		No		No		No		No	
R^2 (within)	0.446		0.559		0.559		0.454		0.592		0.097	
R^2 (between)	0.100		0.336		0.336		0.496		0.788		0.491	
R^2 (overall)	0.001		0.064		0.064		0.342		0.646		0.454	
Breusch-Pagan test (p-value)	230.51	(0.00)	271.48	(0.00)	399.69	(0.00)	122.22	(0.00)	163.44	(0.00)	453.54	(0.00)
Hausman test stat. (p-value)	165.82	(0.00)	10.01	(0.07)	17.24	(0.00)	24.57	(0.00)	101.18	(0.00)	26.91	(0.00)

Notes:

(i) Number of observations is 294. These consist of 49 districts with an average population of 788,600 in 1996.

(ii) T-statistics are reported in parentheses.

(iii) The dependent variables are the gross inflow and outflow rates and net inflow rate as a percentage of the region's end-year population, respectively.

(iv) The unemployment rate and the wage ratio are lagged by one year.

Table 5 Determinants of Inter-regional Migration: Italy 1984 to 1995, Internal Migration

	Inflows		Outflows		Net Inflows		Inflows		Outflows		Net Inflows	
	(1)		(2)		(3)		(4)		(5)		(6)	
Unempl. Rate (lagged)	-0.010	(4.83)	0.008	(4.38)	-0.020	(7.65)	-0.010	(4.83)	0.008	(4.36)	-0.020	(7.55)
Wage Ratio (lagged)	0.021	(0.09)	-0.241	(1.11)	0.412	(1.72)	0.211	(0.93)	-0.222	(0.99)	0.581	(2.39)
Population Density (log)							-0.155	(3.62)	-0.024	(0.41)	-0.099	(2.65)
Constant	0.747	(3.34)	0.799	(3.79)	-0.177	(0.75)	1.332	(4.92)	0.900	(2.69)	0.150	(0.57)
Year Dummies	Yes		Yes		Yes		Yes		Yes		Yes	
District Fixed Effects	No		No		No		No		No		No	
District Random Effects	Yes		Yes		Yes		Yes		Yes		Yes	
R^2 (within)	0.404		0.480		0.172		0.401		0.479		0.173	
R^2 (between)	0.119		0.188		0.669		0.406		0.231		0.752	
R^2 (overall)	0.146		0.215		0.587		0.391		0.245		0.657	
Breusch-Pagan test (p-value)	811.97	(0.00)	887.24	(0.00)	429.98	(0.00)	751.66	(0.00)	873.80	(0.00)	359.01	(0.00)
Hausman test stat. (p-value)	1.57	(1.00)	2.62	(1.00)	5.42	(0.94)	8.70	(0.80)	18.15	(0.15)	12.03	(0.53)

Notes:

(i) Number of observations is 219. These consist of 20 regions with an average population of 2,863,400 in 1995. The observation for *Valle d'Aosta* in 1994 was dropped because of missing data; all observations pertaining to 1990 were dropped because of data problems.

(ii) T-statistics are reported in parentheses.

(iii) The dependent variables are the gross inflow and outflow rates and the net inflow rate, as percentages of the region's end-year population.

(iv) The unemployment rate and wage ratio are lagged by one year. Coefficients on year dummies are not reported.

Table 6 Determinants of Inter-regional Migration: Spain 1984 to 1994, Internal Migration

	Inflows		Outflows		Net Inflows		Inflows		Outflows		Net Inflows	
	(1)		(2)		(3)		(4)		(5)		(6)	
Unempl. Rate (lagged)	-0.010	(1.54)	0.001	(0.16)	-0.005	(1.19)	-0.009	(1.44)	-0.002	(0.34)	-0.006	(1.56)
Wage Ratio (lagged)	0.242	(1.11)	0.612	(4.00)	-0.157	(1.07)	0.277	(1.25)	0.355	(1.91)	-0.329	(2.31)
Population Density (log)							-0.039	(0.62)	3.797	(3.61)	0.053	(2.94)
Constant	0.337	(1.26)	-0.241	(1.27)	0.273	(1.57)	0.469	(1.33)	-16.870	(3.70)	0.237	(1.33)
Year Dummies	Yes		Yes		Yes		Yes		Yes		Yes	
District Fixed Effects	No		No		No		No		Yes		No	
District Random Effects	Yes		Yes		No		Yes		No		No	
R^2 (within)	0.432		0.665		0.035		0.432		0.692		0.072	
R^2 (between)	0.019		0.041				0.031		0.112			
R^2 (overall)	0.222		0.268				0.229		0.039			
Breusch-Pagan test (p-value)	287.13	(0.00)	365.64	(0.00)	3.08	(0.08)	288.90	(0.00)	364.86	(0.00)	0.45	(0.50)
Hausman test stat. (p-value)	2.05	(1.00)	7.62	(0.81)	0.92	(1.00)	4.32	(0.99)	7796.84	(0.00)	11.10	(0.60)

Notes:

(i) Number of observations is 187. These consist of 17 regions with an average population of 2,293,650 in 1994. Observations for *Ceuta y Melilla* were dropped because of their extraterritorial nature.

(ii) T-statistics are reported in parentheses; these are heteroskedasticity robust in the regressions estimated without district effects.

(iii) The dependent variables are the gross inflow and outflow rates and the net inflow rate, as percentages of the region's end-year population.

(iv) The unemployment rate and wage ratio are lagged by one year. Coefficients on year dummies are not reported.

Table 7 Determinants of Inter-regional Migration: Portugal 1987 to 1992, Internal Migration

	Inflows		Outflows		Net Inflows		Inflows		Outflows		Net Inflows	
	(1)		(2)		(3)		(4)		(5)		(6)	
Unempl. Rate (lagged)	0.046	(2.75)	0.017	(0.61)	0.019	(1.38)	-0.008	(0.46)	-0.028	(1.41)	0.020	(0.72)
Wage Ratio (lagged)	0.743	(1.33)	-1.169	(1.57)	1.669	(2.17)	2.435	(3.55)	0.773	(1.37)	1.661	(1.80)
Population Density (log)							-0.247	(4.02)	-0.248	(3.28)	0.001	(0.01)
Constant	-0.995	(1.88)	1.156	(1.63)	-1.812	(2.43)	-0.944	(1.82)	0.868	(2.81)	-1.813	(2.37)
Year Dummies	Yes		Yes		Yes		Yes		Yes		Yes	
District Fixed Effects	No		No		No		No		No		No	
District Random Effects	No		Yes		No		No		No		No	
R^2 (within)	0.514		0.367		0.366		0.639		0.513		0.366	
R^2 (between)			0.365									
R^2 (overall)			0.301									
Breusch-Pagan test (p-value)	0.00	(0.99)	14.54	(0.00)	0.69	(0.41)	2.61	(0.11)	0.21	(0.65)	0.70	(0.40)
Hausman test stat. (p-value)	4.76	(0.69)	1.56	(0.98)	14.54	(0.04)						

Notes:

(i) Number of observations is 30. These consist of 7 regions with an average population of 1,408,610 in 1992. Several observations were dropped because of missing wage or unemployment data or other data problems.

(ii) T-statistics are reported in parentheses; these are heteroskedasticity robust in the regressions estimated without district effects.

(iii) The dependent variables are the gross inflow and outflow rates and the net inflow rate, as percentages of the region's end-year population.

(iv) The unemployment rate and wage ratio are lagged by one year.

Figure 1 Coefficient of Variation of Average Wages

Note: The figure depicts the coefficient of variation of average wages across districts in the Czech Republic (CZ), Hungary (HU), Poland (PL) and Slovakia (SK).

Source: National Statistical Offices, Austrian Institute for Economic Research (WIFO) Regional Database.

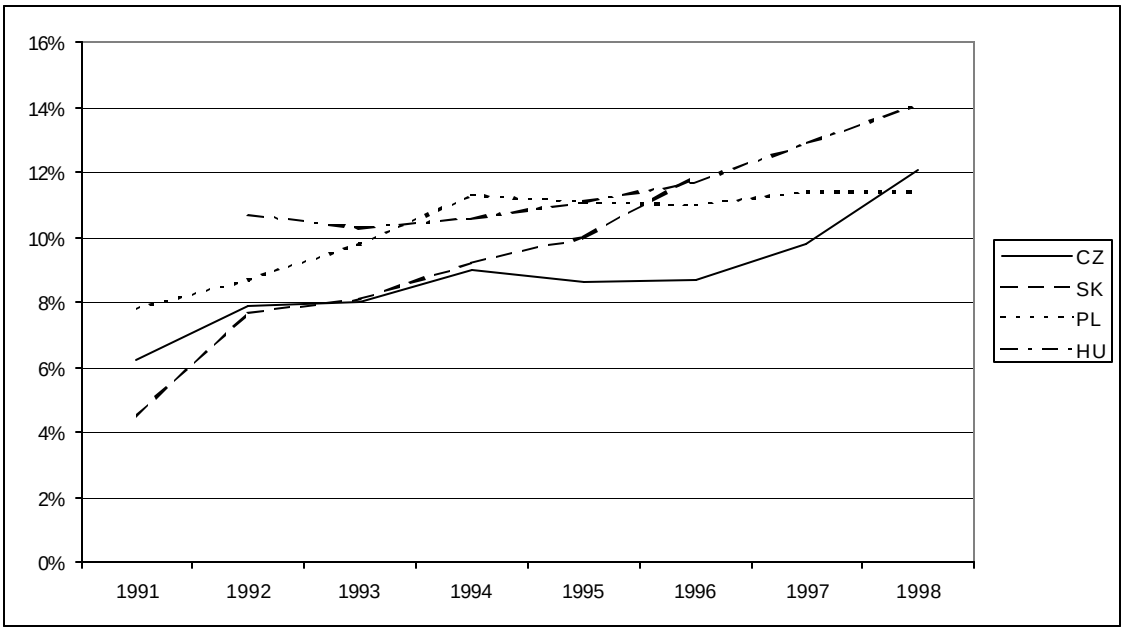

Figure 2 Coefficient of Variation of Unemployment Rate

Note: The figure depicts the coefficient of variation of unemployment rates across districts in the Czech Republic (CZ), Hungary (HU), Pola nd (PL) and Slovakia (SK).

Source: National Statistical Offices, Austrian Institute for Economic Research (WIFO) Regional Database.

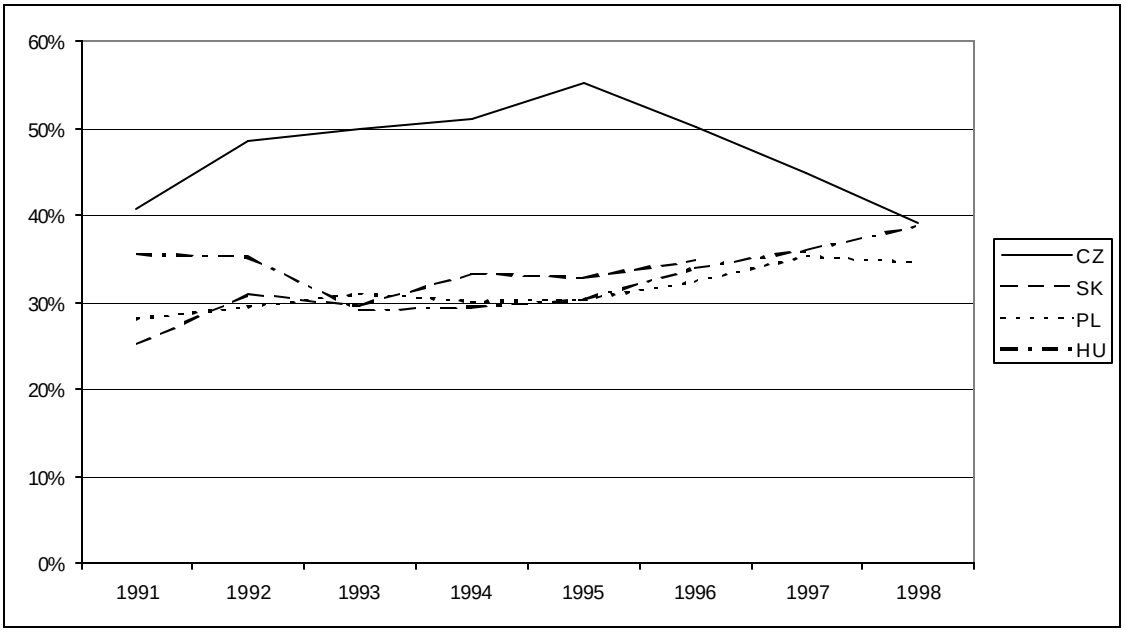

Figure 3 Gross Immigration Rate

Note: The figure depicts the gross immigration rate computed as the total number of migrants, measured on the immigration side, divided by the population of the country for the Czech Republic (CZ), Poland (PL) and Slovakia (SK).

Source: National Statistical Offices, Austrian Institute for Economic Research (WIFO) Regional Database.