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ADJUSTMENT TO ASYMMETRIC
SHOCKS IN TRANSITION ECONOMIES**

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ABSTRACT

Migration and Regional Adjustment to Asymmetric Shocks in Transition Economies*

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 has in fact been rather low. High wages appear to encourage – and, similarly, 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 have actually been declining in the course of transition, even as inter-regional disparities have been rising.

JEL Classification: F22, J61 and P23

Keywords: migration, optimum currency areas, regional adjustment and regional shocks

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1 Introduction

Migration, or labor mobility¹, is an important economic phenomenon. Migrants move from regions with high unemployment and/or low incomes to regions with higher wages and better employment prospects. In this manner, migration helps regions adjust in the wake of asymmetric shocks – such as 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.² When factor mobility is limited and/or prices and wages rigid, however, the effects of asymmetric shocks persist and regional economies have to rely on other mechanisms to deal with them. Often, this leads to pressure to use fiscal redistribution to alleviate pervasive inter-regional disparities, which in turn may give rise to political tensions.

As is frequently pointed out, there is a sharp contrast between the effectiveness of migration in the US and in continental Europe (see, for example, Eichengreen, 1993, and 1998, and Bentivogli and Pagano, 1999). In the former, labor mobility is high and 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 such as North and South of Italy, or East and West Germany, and labor mobility contributes little to smoothing those differentials away (Decressin and Fatas, 1995). The role of migration in facilitating regional adjustment is particularly important in countries undergoing fundamental structural changes. The post-communist countries in Central and Eastern Europe initiated economic reforms with essentially no (official) unemployment and very egalitarian wage distribution. The subsequent transition from central planning to a market economy, however, was accompanied by dramatic and largely asymmetric economic developments (for example, because regions differed in their dependence on trade with the CMEA, see 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 evening out the disparities. This paper therefore analyzes the effectiveness of this mechanism in four Central European transition economies: the Czech Republic, Hungary, Poland and

¹ The terms migration and labor mobility are used interchangeably in this paper.

² 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.

Slovakia. For comparison, results for three Southern European EU countries – Italy, Spain, and Portugal – are also presented.

Although studying migration is interesting in its own right, the efficacy of migration as a shock-absorbing mechanism will have important repercussions for the transition economies' future membership in the Economic and Monetary Union (EMU). If the new entrants continue to be exposed to asymmetric shocks (that is, asymmetric with respect to those prevailing in the core EMU countries), giving up autonomous monetary policy will increase the need for alternative adjustment mechanisms. As labor mobility is one of such mechanisms, its effectiveness in facilitating regional adjustment will have important repercussions for the question of optimality of the transition countries' accession to the EMU.

The results are mixed, however. On the one hand, net migration does respond to regional economic conditions in the expected way – net immigration is positively related to the average wage and negatively to the unemployment rate prevailing in the destination region. Yet, the effect is economically very small – sizeable wage and unemployment differentials only give rise to 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). Unemployment similarly tends to discourage both inbound and outbound flows, although this effect is only significant 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 and thus remain locked in with low wages and high unemployment. Moreover, migration flows have been declining since the onset of transition. The efficacy of labor mobility as a channel of regional adjustment to idiosyncratic shocks therefore appears very low.

After briefly reviewing 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 the last section.

2 Migration: Theories and Empirical Evidence

Theoretical foundations of modern migration literature³ were laid by Todaro (1969), and Harris and Todaro (1970). In their framework, migration is motivated by expected earnings

³ See Borjas (1994), and Ghatak and Levine (1998) for recent surveys of literature.

differentials, i.e. the wage differential between home and destination regions, adjusted for probability of finding employment at destination. Accordingly, the higher the wage (the lower the unemployment rate) in the region of destination, the greater will be immigration to that region. Nevertheless, as Faini and Venturini (1994) 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 (countries) with relatively egalitarian wage distribution will attract primarily low-skilled workers, whereas high-skilled workers will choose to migrate to regions with more uneven wage distribution, where the returns to skills are higher (Borjas, 1987). Finally, Burda (1995) likens migration to investment decisions under uncertainty and argues that potential migrants may postpone migration because of option value of waiting, which he shows is positive. Accordingly, the prospects of an improvement at home and the option to migrate later in case of a further deterioration may in fact induce potential migrants to stay put.

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

An important aspect of migration is its capacity to facilitate adjustment of regions to idiosyncratic shocks. This aspect of labor mobility is central to the literature on optimality of currency areas, as emphasized already 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. If, on the other hand, factor mobility is limited, asymmetric shocks

lead to persistent inter-regional differentials in unemployment and wages.⁵ Blanchard and Katz (1992) assess regional adjustment using US state-level data and conclude that the bulk of adjustment occurs via labor mobility (after an initial increase in unemployment) rather than capital mobility or price and wage adjustment. Moreover, the adjustment is relatively fast, with the effect of a shock disappearing completely after five to seven years. Hence, labor in the US is highly mobile and responds readily to idiosyncratic economic shocks. In contrast, Decressin and Fatas (1995) find that in Western Europe, the effects of such shocks are absorbed mainly by changes in labor-force participation rather than migration. 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 US. 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 (see Eichengreen, 1993, 1998; Braunerhjelm et al., 2000). When idiosyncratic shocks have permanent or highly persistent effects, pressure for accommodating policy measures in affected regions or countries intensifies. The ability of individual countries in Europe to implement such measures, however, 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).

3 Data

I analyze migration flows in the Czech Republic, Hungary, Poland and Slovakia. These four countries are among the most advanced transition economies and have largely accomplished the transition from central planning to market economy. In addition, they are also prime candidates for membership in the EU, poised for accession by 2004. The analysis covers, depending on data availability, five to seven years between 1992 and 1998. To facilitate comparison with market economies, I present analogous analytical results also for three Southern European countries: Italy, Spain and Portugal. These three countries were chosen because their level of development, labor market rigidities and the extent of regional disparities make them relatively similar to the transition economies. Furthermore, Spain and

⁴ Mundell defines optimum currency areas as “areas within which there is factor mobility, but between which there is factor immobility” (footnote 6 on p. 658).

Portugal also have had a history of authoritarian regimes and subsequent economic liberalization in recent past, just as the post-communist countries.⁶ The data for these three countries span from late 1980s to mid 1990s, covering between six and twelve years.

The analysis is carried out at the regional level. The size of regions differs considerably, however. 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 better approximation of the local labor market conditions. Furthermore, as migratory moves often do not involve great distances, data based on a finer structure capture greater fraction of actual migrations. Yet, data pertaining to smaller regions also capture greater fraction of migratory flows that are not labor-market related, for example urban-to-suburban migration or moves between two adjacent districts without change of employment. Some types of non-labor migration – in particular urban-to-suburban migration – can be easily controlled for 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 systematically bias the results.

The data report overall immigration and emigration per region, without distinguishing the regions of origin or destination of migrants, and are based on records from municipal population registers. Except for Hungary, both migration (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 when interpreting the results, because population migration does not distinguish between employment-related migration and non-labor migration (because of marriage or divorce, education, retirement, and the like). This, however, is a general problem of most migration studies, as typically only population-migration data are available. Parikh and van Leuvensteijn (2000) compare population and labor migration data for Germany and find that regressions that use population and labor migration yield similar results, as long as migration figures are normalized by population and labor force, respectively.

⁵ Mobility of one of the factors of production is sufficient to facilitate regional adjustment – either labor moves to where wages are high and jobs available, or capital moves to regions where labor is cheap and plentiful.

⁶ Other studies that analyzed migration in Western European countries include Decressin (1994) for West Germany, and Pissarides and McMaster (1990) and Jackman and Savouri (1992) for the UK.

The 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.⁷ The coverage is as follows⁸: Czech Republic: 1992-98, 74 districts; Hungary: 1994-98, 20 counties; Slovakia: 1992-96, 38 districts; Poland: 1992-97, 49 voivodships; Italy: 1984-95, 20 regions; Spain: 1984-94, 17 regions; and Portugal: 1987-92, 7 regions. Except for Slovakia, the data only cover internal migration.⁹

The transition from central planning to a market economy has had dramatic labor-market repercussions. The formerly socialist countries set out to reform their economies with essentially no (official) unemployment and very egalitarian distribution of wages. In the course of transition, overall unemployment as well as regional disparities in unemployment and especially wages increased rapidly, as Figures 1 through 4 clearly demonstrate. Regional disparities in unemployment and wages in transition economies are also strongly persistent (see Huber, 2003): Hence, regions that were stricken by high unemployment and low wages at the outset of transition remained depressed still five years later.

Insert Figures 1 through 4 about here.

From the labor-market developments depicted in Figures 1-4, it is obvious that the post-communist reforms brought about substantial asymmetric shocks to individual regions. In the presence of large regional disparities, workers in depressed regions stand to gain by moving to regions with higher wages and/or 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 transition economies in fact has declined in the course of reforms, as is shown in Figure 5.

Insert Figure 5 about here.

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 in the wake of the shock, unemployment rises and wages fall. The region can absorb, or

⁷ I am grateful to Peter Huber and WIFO for help with obtaining the data.

⁸ As indicated in notes accompanying the individual Tables below, several observations were dropped due to various irregularities or missing data.

⁹ I used both overall and internal migration for the Czech Republic but only the latter are reported below. 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*, i.e. migration that is not related to economic fundamentals.

smooth away, the effects of this shock in a number of ways. The adverse labor-market conditions may induce the region's residents to leave and take up jobs where wages are higher and employment prospects better. 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 cease searching for work and withdraw from the labor force altogether. And, 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 rises again.¹⁰

This section investigates the effectiveness of regional adjustment via 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). This implies that if some variables affect both inflows and outflows in the same direction, the coefficients estimated for the net immigration rate may be biased (see 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 length being determined by data availability). The regressions were estimated either as pooled cross section or with fixed effects or with random effects, depending on the outcome of specification tests (the test statistics are reported at the bottom of each Table). 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 rate and average wages. The wage is divided by the nation-wide average wage to eliminate the effects of wage growth. Both unemployment and wages can be potentially endogenous with respect to migration; therefore, both are lagged by one year. The first panel of each Table contains regressions estimated only with unemployment and wages (and regional fixed or random effects, as applicable). The

¹⁰ Huber (2003) studies the response of participation and wage flexibility to shocks in transition countries.

second panel then adds population density (in log) to the list of explanatory variables, so as to account for the degree of urbanization.

Insert Tables 1 through 4 about here.

The results suggest that although unemployment rates and average wages 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 consequences of asymmetric shocks, gross (and net) immigration should be positively correlated with average wages and negatively with unemployment, while gross emigration should be positively correlated with unemployment and negatively with wages. However, this is not the pattern that obtains for migration in the transition economies. Unemployment tends to have the correct sign in the regressions with net migration but it is only significant in the regressions estimated for the Czech Republic and Slovakia. Moreover, average wages do not seem to affect net migration at all or even appear with the wrong sign (in the case of 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 it does have the correct sign). For Poland, unemployment discourages not only immigration but also emigration.¹¹ Likewise, wages are positively correlated with immigration and emigration in the Czech Republic and Poland while they do not affect gross migration at all in Slovakia. The fact that wages, and in case of Poland also unemployment, tend to have similar effect 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 rather limited. Instead, it appears that the transition brings about segmentation of regions into those with high wages, low unemployment and relatively high migration flows, and those with low wages and high unemployment and highly immobile population.

It is instructive to compare transition economies with market economies. Tables 5 through 7 present results obtained with the same regression specifications for Italy, Spain, and Portugal. The results are mixed. In contrast to the transition economies, the pattern of migration in Italy is rather close to the optimal response of migration to regional

¹¹ Note that no gross migration data are available for Hungary.

unemployment and wages. In particular, unemployment does discourage gross immigration and encourage emigration and both coefficients are strongly significant. The effect of wages is also correctly signed – positive for gross immigration and negative for emigration but it is not significant. Both unemployment and wages appear with the expected signs and are significant for net immigration. The pattern of the response of migration to local economic conditions is thus consistent with migration facilitating regional adjustment to shocks – labor relocates from depressed regions to more prosperous ones. This may appear surprising, as Italy is often brought up as an example of a country with very immobile labor force and persistent economic differences across regions. Nevertheless, these results suggest that even if labor mobility is generally low, it does respond to regional economic conditions in the correct manner. The evidence for Spain and Portugal is more disappointing. Unemployment does not affect migration flows at all while average wages again appear to cause greater immigration as well as emigration. Moreover, the impact of earnings on net immigration in Spain is in fact significantly negative.

Insert Tables 5 through 7 about here.

Hence, the evidence on the pattern of migration in 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 migration serving as a channel of regional adjustment to idiosyncratic shocks. Low mobility in depressed regions may be attributed to several factors. First, fixed costs of migration (for example, search and information costs, costs of moving, etc.) may be sufficiently high to deter low-wage earners and the unemployed from migrating. Second, employment prospects for high-skilled labor may be generally better so that the pool of potential migrants may consist largely of high-skilled workers earning relatively high wages. Finally, the low mobility in depressed regions may be due to structural factors. For example, if workers' human capital is not transferable across industries, then the unemployed workers in regions that were traditionally dominated by communist-era industries may have little options other than staying put.

Even more importantly, the potential effect of migration on regional differences in unemployment and wages is economically small. According to the regressions estimated with unemployment, wages and population density, a ten percentage-point increase in the unemployment rate should give rise to a net outflow of between 0.03 and 0.22 percentage point of the district's population annually. Yet, the potential impact of migration on regional disparities is not much stronger in the three EU countries – except perhaps Italy (where both unemployment and wages significantly affect net migration). In general, therefore, there is a

substantial degree of variability in the efficacy of migration in facilitating regional adjustment, both within transition economies, as well as when comparing them with Southern European countries. In most countries, nevertheless, the potential impact of migration on adverse effects of asymmetric shocks appears very small; sizeable differentials in unemployment rates give rise only to very modest net migration flows and wages do not affect net migration at all. In addition, migration rates have fallen continuously since the outset of transition. It is thus not surprising that regional differences in unemployment rates and wages have been highly persistent.

5 Conclusions

Labor mobility has the potential to serve as an important channel of regional adjustment to idiosyncratic shocks, as emigration from depressed regions to the more prosperous ones helps reduce inter-regional differentials in unemployment rates and earnings. This paper assesses the efficacy of migration in facilitating regional adjustment in four countries in transition. Economic reforms have had largely asymmetric repercussions in these countries, resulting in large and persistent unemployment and wage differentials, thus making the need for effective regional adjustment particularly acute. However, the results of the present paper indicate that the role played by labor mobility is limited. Instead of finding evidence that labor relocates from regions with high unemployment and low wages to those with more favorable labor-market conditions, I find that the prosperous regions tend to have relatively large migration inflows and outflows whereas the depressed regions have largely immobile population. Moreover, even when the impact of unemployment on net immigration is statistically significant, the effect is economically small – relatively large unemployment differentials bring about only very small net migration flows.

This low responsiveness of migration to regional labor-market conditions has several important implications. First, regional differentials in unemployment and wages will not be quickly smoothed away by migration. An appropriate policy response aimed at increasing labor mobility may be needed in order to avert the creation of new *Mezzogiorni*. Second, given the low labor mobility – and its low responsiveness to economic incentives – in the accession countries, it seems unlikely that there will be a massive East-West migration in the wake of the next EU enlargement. East Europeans do not move readily even within their own countries, despite sizeable wage and unemployment differentials. Although wage differentials with respect to the current EU members are larger, so are migration costs and informal (e.g. linguistic and cultural) barriers to migration. Third, because of the low efficacy of migration

in smoothing away inter-regional differentials in unemployment and wages, an early membership in the EMU is not necessarily the optimal policy choice for the accession countries. EMU membership stipulates loss of autonomous monetary policy and imposes important limitations on counter-cyclical fiscal policy. As the transition countries continue to face different shocks than the EMU core, at least in medium term, they may indeed benefit from retaining the option to adjust their exchange rates.

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

	Inflows		Outflows		Net Inflows		Inflows		Outflows		Net Inflows	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
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: Number of observations: 518 (74 districts, average population 135,900 in 1994; the districts of Bruntal, Jeseník and Šumperk are excluded because of changes in their territorial structure as of 1996). F-statistics are reported in parentheses. 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. The unemployment rate and the wage ratio are lagged by one year.

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

	Inflows		Outflows		Net Inflows		Inflows		Outflows		Net Inflows	
	(1)	(2)	(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: Number of observations: 190 (38 districts, average population 141,300 in 1995). T-statistics are reported in parentheses. 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. The unemployment rate and the wage ratio are lagged by one year.

Table 3 Determinants of Inter-regional Migration: Hungary 1994–1998, 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: Number of observations: 100 (20 districts, average population 512,300 in 1995). T-statistics are reported in parentheses. 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. The unemployment rate and the wage ratio are lagged by one year.

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

	Inflows		Outflows		Net Inflows		Inflows		Outflows		Net Inflows	
	(1)	(2)	(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: Number of observations: 196 (49 districts, average population 788,600 in 1996). T-statistics are reported in parentheses. 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. The unemployment rate and the wage ratio are lagged by one year.

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

	Inflows			Outflows			Net Inflows			Inflows			Outflows			Net Inflows		
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	
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)						

Number of observations: 219 (20 regions, average population 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. Tstatistics are reported in parentheses. The dependent variables are the gross inflow and outflow rates and the net inflow rate, as percentages of the region's end-year population. 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 1984-1994, Internal Migration

	Inflows		Outflows		Net Inflows		Inflows		Outflows		Net Inflows	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
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)

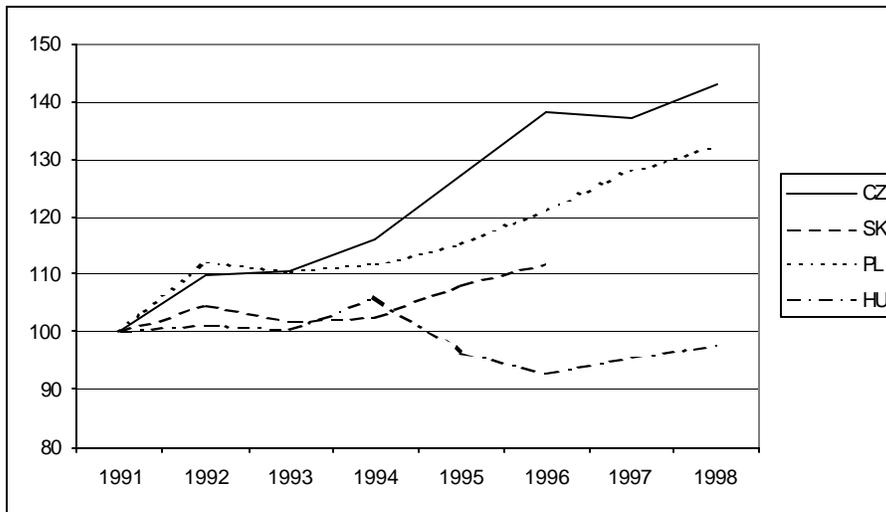
Number of observations: 187 (17 regions, average population 2,293,650 in 1994). Observations for *Ceuta y Melilla* were dropped. T-statistics are reported in parentheses (heteroskedasticity robust in regressions estimated without district effects). The dependent variables are the gross inflow and outflow rates and the net inflow rate, as percentages of the region's end-year population. 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 1987-1992, Internal Migration

	Inflows		Outflows		Net Inflows		Inflows		Outflows		Net Inflows	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
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)						

Number of observations: 30 (7 regions, average population 1,408,610 in 1992). Several observations were dropped because of missing wage or unemployment data or other data problems. T-statistics are reported in parentheses (heteroskedasticity robust in regressions estimated without district effects). The dependent variables are the gross inflow and outflow rates and the net inflow rate, as percentages of the region's end-year population. The unemployment rate and wage ratio are lagged by one year.

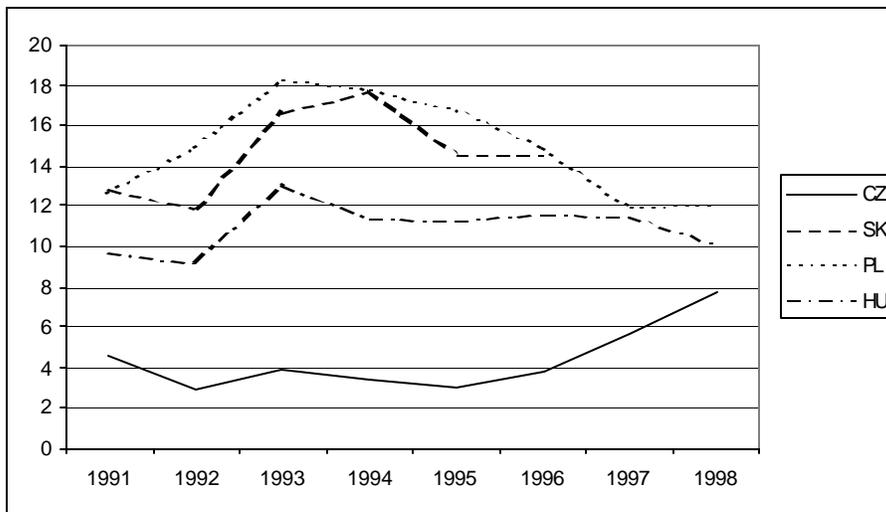
Figure 1 Index of Real Average Wages [1991=100]



Notes: The index is computed with average nominal wage growth scaled by consumer price inflation.

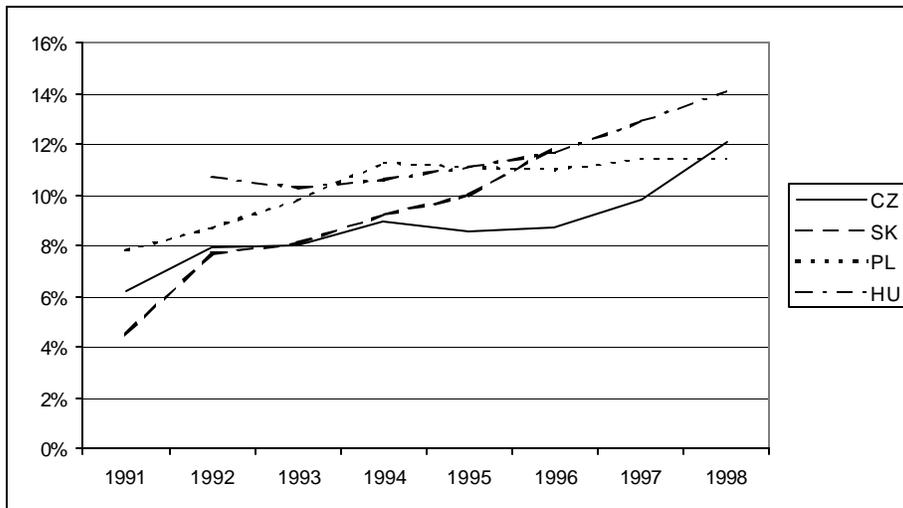
Sources: National statistical offices (wages) and EBRD Transition Reports (inflation).

Figure 2 Average Unemployment Rate



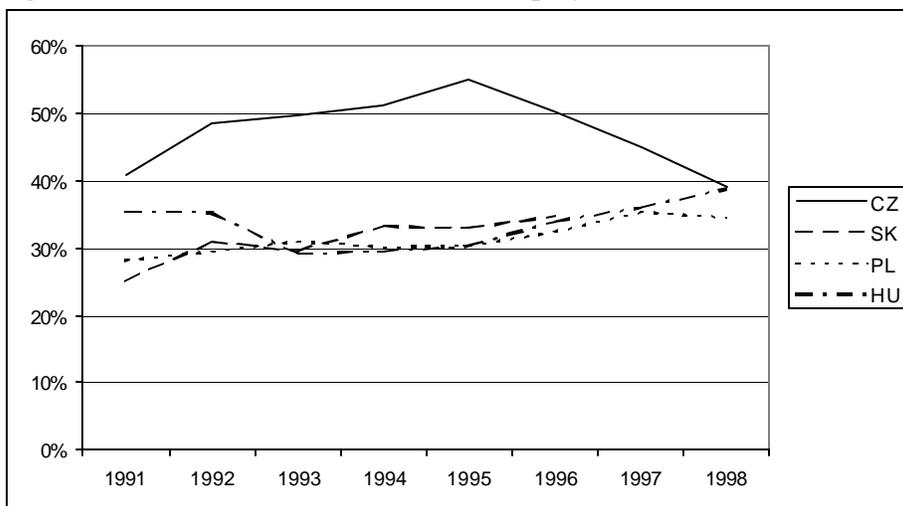
Sources: National statistical offices, WIFO/ACCESSLAB regional data base.

Figure 3 Coefficient of Variation of Average Wages



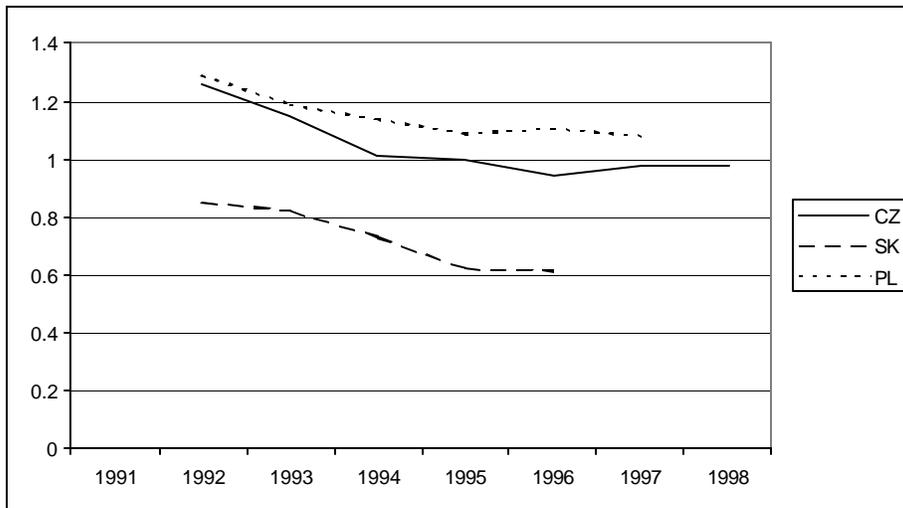
Sources: National statistical offices, WIFO/ACCESSLAB regional data base.

Figure 4 Coefficient of Variation of Unemployment Rate



Sources: National statistical offices, WIFO/ACCESSLAB regional data base.

Figure 5 Gross Immigration Rate



Sources: National statistical offices, WIFO/ACCESSLAB regional data base.