

CPB Discussion Paper

No 007

July 2002

Migration and regional adjustment to asymmetric shocks in transition economies

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The responsibility for the contents of this CPB Discussion Paper remains with the author(s)

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² This research was initiated while I was visiting CPB. I benefitted from comments and suggestions by Marco Bos, Nauro Campos, Jean-Louis Guérin, Peter Huber, Ruud de Mooij and Ashok Parikh. Dalia Grigonyte provided excellent research assistance. I am grateful to Peter Huber for help with obtaining data used in the analysis. This research was undertaken with support from the European Community's Phare ACE Program 1998.

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ISBN 90-5833-105-9

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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 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.

1 Introduction

Migration, or labour mobility³, is an important economic phenomenon. Migrants move from regions with high unemployment and/or low incomes to more prosperous regions, attracted by higher wages and better employment prospects. In this manner, migration helps facilitate regional adjustment to 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 labour mobility, regions would adjust to asymmetric shocks instantaneously.⁴ 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, such as inter-regional fiscal redistribution, to deal with them. A common comparison in this context is the difference between the US and continental Europe (see, for example, Eichengreen, 1993, 1998). In the US, labour mobility is high and plays an important role in reducing unemployment and wage differentials between regions (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 labour mobility contributes little in 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 associated with dramatic and largely asymmetric economic developments (for example, regions differed in their dependence on trade with the CMEA, see Repkine and Walsh, 1999). In turn, these developments lead to increasing regional disparities (see section 4 and the appendix for a more detailed discussion). The widening gap between prosperous and depressed regions increases the need for regional adjustment, with migration being a potentially important mechanism evening out inter-regional differentials in wages and unemployment rates. This paper analyses the efficacy of this mechanism in four Central European transition economies: the Czech Republic, Hungary, Poland, and 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, two additional considerations are important in the context of labour mobility in transition economies. First, the next round of EU enlargement is expected to bring a net inflow of migrants from the acceding countries to the

³ The terms migration and labour mobility are used interchangeably in the present paper.

⁴ In fact, 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 equalised across regions, and trade, capital mobility and labour mobility are substitutes in facilitating regional adjustment.

current EU members. While most experts estimate that the inflow will be relatively modest (see Fidrmuc et al., 2002, for a survey of migration forecasts and discussion of labour-market implications of immigration), this expectation is not generally shared by policy makers or the public at large in the EU, and especially in the *front-line* countries such as Austria and Germany. While the paper at hand does not present an alternative forecast of the migration potential, it sheds light on the patterns of migration in the countries that are likely to be included in the first wave of EU enlargement. The comparison with Southern European countries is particularly instructive in this context.

Second, 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 (compared to those affecting the EMU core countries), giving up autonomous monetary policy will increase the need for alternative adjustment mechanisms. As labour mobility is one of such mechanisms, its efficacy in facilitating regional adjustment will have important repercussions also for the question of optimality of the transition countries' accession to the EMU.

In general, 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. However, the effect is economically very small - sizeable wage and unemployment differentials only give rise to modest net migration flows. This is so because wages and unemployment affect gross inflows and outflows similarly. Thus, regions with high wages tend to experience high immigration as well as emigration (rather than high immigration and low emigration). This pattern appears quite universally across all transition economies included in the analysis. In some transition economies, the effect of unemployment on gross migration flows is similar - high unemployment discourages not only immigration to but also emigration from depressed regions. This pattern implies that regions with relatively favourable economic conditions display high migration - both inbound and outbound - whereas depressed regions show low mobility and thus remain locked in with low average wages and high unemployment. Moreover, migration flows have generally been declining since the onset of transition. The efficacy of labour mobility as a channel of regional adjustment to idiosyncratic shocks has been therefore rather low.

After briefly reviewing the theoretical and empirical literature on migration in the following section, the data and recent labour market developments in transition economies are discussed in sections 3 and 4, respectively. Results of the empirical analysis are presented in section 5. The implications for EU and EMU enlargement are then discussed in section 6. Finally, main conclusions of the present paper are summarised the last section.

2 Migration: Theories and Empirical Evidence

Theoretical foundations of modern migration literature⁵ were laid by Todaro (1969), and Harris and Todaro (1970). In their framework, migration is motivated by expected earnings differentials, i.e. wage differential between home and destination regions, adjusted for the probability of 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. Faini and Venturini (1994) argue, however, that 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 for migration. 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). Stark (1991) moves the focus away from wage differentials. In particular, he explores the role of migration as a means for intra-family risk sharing - by moving to regions with imperfectly correlated income shocks, members of a family can reduce the variance of family income. 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. 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 (migration from high to low wage regions). Decressin (1994) in his analysis of migration among West German Federal States finds results similar to those of Pissarides and McMaster.

⁵ See Borjas (1994), and Ghatak and Levine (1998) for recent surveys of literature.

An important aspect of migration is its capacity to facilitate regional adjustment to idiosyncratic shocks.⁶ When factors of production are mobile, labour and capital move in response to output shocks until marginal returns are equalised across regions. If, on the other hand, factor mobility is limited, asymmetric shocks lead to persistent inter-regional differentials in unemployment and wages.⁷ Blanchard and Katz (1992) assess regional adjustment using US state-level data and conclude that the bulk of adjustment occurs via labour 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, labour 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 labour-force participation rather than migration. Indeed, Bentivogli and Pagano (1999) argue that the responsiveness of migration to unemployment and wage differentials is much lower in the EU compared to the US. As a result, wage and unemployment differentials are generally greater and more persistent in Europe than in the US. This lack of labour 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 severely limited because of the loss of monetary autonomy and the constraints on fiscal policy imposed by the Maastricht criteria.

Migration in transition economies received little attention so far, in part perhaps because of lack of suitable data. The main exception is the former East Germany, where massive outflow of East Germans to West Germany was expected in the wake of the reunification but did not materialise (see Burda, 1999, and Hunt, 2000). On the contrary, by mid 1990s, the number of migrants moving to the East approximately equalised with that leaving for West Germany. The lack of massive migration is often attributed to rapid (partial) convergence of wages in the new Federal States to the West German level and the transfers from the West (see Sinn, 1999), or the expectation of such convergence (Burda, 1995). The empirical analysis of Burda (1999) and Hunt (2000) confirms the importance of wage and unemployment differentials, but also highlights the generally low labour mobility in Germany (East and West).

⁶ This role of migration is emphasised by the optimum currency area literature, as initiated by Mundell (1961) and McKinnon (1963).

⁷ Mobility of one of the factors of production is sufficient to facilitate regional adjustment - either labour moves to where wages are high and jobs available, or capital moves to regions where labour is cheap and plentiful.

The paper at hand analyses migration flows in the Czech Republic, Hungary, Poland, and Slovakia. The choice of these countries was motivated by several considerations. First, they all are candidates for EU membership and have very high probability to be included in the next wave of EU enlargement. Second, since the collapse of communism, they have undergone rigorous economic and political reforms and, by late 1990s, have, by and large, accomplished the transition from central planning to market economy. Finally, and rather importantly, the necessary regional data is available for these countries.

It is interesting to compare patterns of migration in transition economies with market economies. Therefore, the analysis is also performed for three Southern European countries - Italy, Spain, and Portugal. Comparison with the countries should be particularly instructive, as these countries share several common features with Eastern European transition economies: they are relatively similar with respect to the level of development, labour market rigidities and regional disparities. In addition, Spain and Portugal also have a history of being ruled by authoritarian regimes in recent past. Studies that analysed migration in Western European countries include Decressin (1994) for West Germany, and Pissarides and McMaster (1990), and Jackman and Savouri (1992) for the UK.

Comparisons across countries, however, are hindered by the different in the size of regions used in the analysis. In general, the transition economies have smaller regions, with the average population ranging from 136,000 in Czech Republic to 790,000 in Poland. In contrast, the average population of regions in the EU countries ranges between 1.4 million in Portugal and 4.3 million in Spain. Clearly, smaller regions offer better approximation of the local labour market conditions. On the other hand, data pertaining to smaller regions also capture greater fraction of migration flows that are not labour-market related, for example urban-to-suburban migration or moves between two adjacent districts without change of employment. Some types of non-labour migration - in particular urban-to-suburban migration - can be easily controlled for in the analysis. As far as the remaining non-labour migration is not correlated with labour market variables, it should not systematically bias the results.

The periods covered by the data differ somewhat. The data for the transition economies cover between four and seven years during 1990s. The data for the EU countries span from late 1980s to mid 1990s, covering between six and twelve years.

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. Obviously, the fact that the data report population migration rather than labour migration may cause problems when interpreting the results, because population migration does not distinguish between employment-related migration and non-labour 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 labour migration data for Germany and find that regressions that use population and labour migration yield similar results, as long as migration figures are normalised by population and labour force, respectively.

The transition from central planning to a market economy has had dramatic labour-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 we can observe from tables A1-A4 in the Appendix.

Regional distribution of unemployment and wages in transition economies is strongly persistent: correlation coefficients between regional unemployment rates (wages) in 1991 and 1996 are 0.52 (0.70) for the Czech Republic, 0.45 (0.80) for Slovakia, 0.92 (0.93) for Poland and 0.74 (0.85) for Hungary (between 1991 and 1997). Hence, regions that were stricken by high unemployment and low wages at the outset of transition in general remained economically depressed also five years later. Regions with high unemployment tend to have also low wages - in 1996, the correlation between unemployment rates and average wages was -0.10 for the Czech Republic, -0.68 for Slovakia, -0.62 for Hungary and -0.41 for Poland. Negative correlation between unemployment and wages suggests low efficacy of migration in smoothing regional unemployment and income differentials. In contrast, even with high and effective labour mobility, a zero net migration equilibrium is conceivable whereby high wages compensate for high unemployment (thus leading to positive correlation between unemployment and wages). In the presence of substantial 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 eventually smooth away the effects of asymmetric shocks. Nevertheless, despite sizeable and growing gap between prosperous and depressed regions, migration in transition economies in fact declined in the course of reforms (see the Appendix). There may be several reasons for the overall fall in migration - rising costs of out-of-district job search and moving, or worsening situation at the housing market. Rising unemployment nationwide may also discourage migration as it reflects a general deterioration of employment prospects (as argued by Decressin, 1994).

Because of the different size of regions, direct comparison of labour mobility in transition economies and Western European countries is not straightforward. In general, the smaller the regions, the greater is the extent of migration across regional boundaries. Hence, when considering the size of regions, labour mobility in transition countries appears very low in international comparison.

5 Migration as Adjustment to Shocks

Migration is one of the principal mechanisms (alongside capital mobility and price flexibility) for absorbing adverse effects of asymmetric shocks. Consider a region hit by a permanent negative demand shock. As a result of such a shock, unemployment rises and wages fall. The region can absorb, or smooth away, the effects of this shock in a number of ways. First, via migration -adverse labour-market conditions may induce the region's residents to leave and take up employment in regions with higher wages and better employment prospects. Second, via capital mobility - lower wages and plentiful labour may induce new firms to move into the region. And finally, the relative price level can adjust sufficiently (either by 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. This section investigates the efficacy of the first channel of regional adjustment, migration, and its responsiveness to regional economic characteristics, in particular unemployment rates and average wages.

The dependent variables are both gross and net migration normalised by population - so that they measure migration rates rather than flows. The data record the total number of migrants (inbound and outbound) per district, without identifying the regions of origin or destination. Gross inflow and outflow rates are strongly correlated, with correlation coefficients of 0.78 for the Czech Republic, 0.77 for Slovakia and 0.92 for Poland (the correlations are measured over the entire available period for each country, only net migration flows are available for Hungary). 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 flows also appear 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 for the Czech Republic, Slovakia and Poland.

The analysis covers between three and seven years for the transition countries and between seven and twelve years for the EU countries (the choice of periods is mandated primarily by data availability). All regressions include year dummies, with the first available year as the reference year. The results for the transition economies are reported in Tables A8 through A11. The focus of the analysis is on the impact of regional unemployment rates and average wages on inter-regional migration. Therefore, the most parsimonious regressions are estimated only with these two variables. These results are reported in the upper part of each table. The wage is normalised by the nation-wide average wage to eliminate the effects of wage inflation. Both unemployment and wages are lagged by one year because of their possible endogeneity in migration.

Clearly, many other factors besides unemployment and wages affect migration: the quality of infrastructure and amenities, the regions' social, cultural and demographic characteristics, and

the like. Therefore, regressions reported in the second part of each table contain additional demographic and socio-economic variables: the (logarithm of) population density (as a measure of urbanisation, as well as congestion), and a dummy variable for suburban districts (i.e. those immediately adjacent to city districts⁸). The third part then allows for a non-linear effect of wages on migration. In particular, fixed migration costs may discourage mobility at low levels of wage differentials, in which case average wages would have a U-shaped effect on migration. On the other hand, regions with substantially above average wages then should attract a disproportionate number of migrants (hence, a finding of a U-shaped effect of migration on wages would also have important implications for East-West migration in the wake of EU enlargement).

Finally, the regressions reported in the last part of each table contain further socio-economic and demographic variables: a measure of the size of the nascent private sector proxied by the number of small private unincorporated entrepreneurs (excluding farmers) as the percentage of population; employment in the industry and agriculture as the percentage of total employment; the share of persons with university education; the share of Roman Catholics (in the Czech Republic and Slovakia); the share of persons above retirement age; and the shares of main ethnic minorities - the Romany (Gypsies) in the Czech and Slovak Republics and the Hungarian minority in Slovakia.⁹

The results suggest that although unemployment rates and average wages indeed affect migration in transition economies, the pattern is only imperfectly consistent with the role of migration as a mechanism of regional adjustment to shocks. In order for migration to be effective as a channel of regional adjustment, gross (and net) immigration should be positively related to average wages and negatively to unemployment, while gross emigration should be positively related to unemployment and negatively to wages. However, this is not the pattern that obtains for migration in the transition economies. On the one hand, unemployment and average wages have the correct signs in the regressions with net migration and are usually at least marginally significant. Hence, it appears that high wages and low unemployment indeed encourage net immigration. On the other hand, unemployment apparently discourages overall migration (except in Poland), i.e. not only immigration but also emigration. Similarly, high wages tend to be associated with higher overall migration, inbound and outbound. Hence, the efficacy of migration in facilitating relocation of labour from depressed districts to the relatively prosperous ones appears rather limited. Instead, regions with favourable economic conditions

⁸ The city districts (along with the names of their respective suburban districts) are Prague (Prague East and Prague West), Brno (Brno-vicinity), Plzen (Plzen South, Plzen North and Rokycany) and Ostrava (Frydek Mystek, Karvina and Novy Jicin) in the Czech Republic; Bratislava (Bratislava-vicinity) and Kosice (Kosice-vicinity) in Slovakia; and Budapest (Pest) in Hungary.

⁹ For the sake of comparability, most of the discussion below, nevertheless, centers on the results obtained with unemployment rate and the average wage only.

tend to experience high immigration as well as emigration, whereas depressed regions display generally low labour mobility.

Allowing for a non-linear relationship between wages and migration should help capture the role of fixed migration costs. If the *ex ante* costs of job search and moving present a barrier to migration, the relationship should be U-shaped - migration pays only when the resulting wage gain is large enough. Thus, high wage regions should receive a disproportionate number of migrants (the effect on gross emigration is less clear-cut - a U-shaped relationship would indicate that migrants are liquidity constrained prior to moving and thus cannot move even if the post-migration gain sufficiently large). The regressions reveal a rather surprising pattern. The results for gross migration are mixed, the effect of wages appears hump-shaped in the Czech Republic and U-shaped for Poland and Slovakia (and, as before, wages affect gross immigration and emigration in the same way). The effect on net immigration, however, turns out hump-shaped - rather than U-shaped - in all four countries. In other words, high-wage regions tend to receive a disproportionately low number of migrants, despite their high wages. Moreover, wages beyond certain level (ranging between 4.7% and 27.5% above national average wage for Slovakia and Hungary, respectively), apparently lead to falling net immigration. The hump shaped effect may be driven by outliers, in particular the major city districts, which typically experienced net emigration despite high wages. However, with the exception of Hungary, the pattern remains robust also when re-estimating the regressions with dummies for the city districts or the districts that contain the capital city, or when the urban districts are completely omitted. For Hungary, the inclusion of a dummy for Budapest (the capital city and the only city district) changes the pattern into a U-shaped one, in line with expectations.¹⁰ The hump-shaped relationship between wages and net immigration in the Czech Republic, Slovakia and Poland may be due to tight housing markets in the high-wage regions. Thus, high rents and house prices may discourage potential migrants despite large and persistent wage differentials.¹¹

The additional socio-economic and demographic variables appear to exert important effect on migration as well. Urbanisation (measured by the log of population density) discourages net immigration (possibly because of congestion). Its effect on gross flows differs across the individual countries though. The dummy for suburbs turns out to be quite important in explaining migratory flows - suburban districts tend to have higher overall migration and receive a net inflow of migrants.

The number of entrepreneurs in the region, intended as a measure of the emerging private sector, is significantly and positively related to the inflow and outflow of migrants (except in Poland). It also appears to encourage net immigration. Hence, districts with a large and vibrant

¹⁰ The results for the Czech Republic, Slovakia and Poland are not substantially different from those obtained without urban or capital-city dummies, and are therefore not reported but can be obtain upon request.

¹¹ Unfortunately, reliable data on house prices are not available.

private sector tend to display higher labour mobility and attract a net migration inflow. This result is similar to that obtained for average wages, and may indeed reflect the same underlying pattern - the nascent private sector likely attracts the more productive and better skilled workers, and these workers are in turn more mobile relative to the rest of the population. As with wages, however, the bulk of migration flows again appears to be among districts with relatively favourable economic conditions. In order to better facilitate regional adjustment, entrepreneurial activity should encourage immigration and discourage rather than encourage emigration. The only transition economy where this appears to be the case (at least partially) is Poland, where the effect of entrepreneurial activity on immigration is insignificant and the effect on emigration is negative.

It is instructive to compare transition economies with market economies. Tables A12 through A14 present regression results obtained for Italy, Spain, and Portugal, where migration is related to regional unemployment rates, average wages as well as population density (because of the larger size of Western European regions, the dummy for suburban regions is irrelevant). The results are mixed. In contrast to the transition economies, the pattern of migration in Italy and Portugal is rather close to the optimal response of migration to regional unemployment and wages. In particular, immigration is positively related to average wages and negatively to unemployment, whereas emigration is positively related to unemployment (the effect of wages on gross emigration appears negative for Portugal and positive for Italy but the coefficients are insignificant for both countries). The effects of unemployment and wages on net migration are also consistent with migration facilitating regional adjustment to shocks and strongly significant.¹² The results for Spain are more disappointing. Unemployment seems to discourage gross migration flows in Spain, although its effect on net migration has the correct sign. The effect of average wages appears with incorrect sign for gross as well as net flows. As with the transition economies, when considering a non-linear effect of wages on migration, the relationship appears hump-shaped.

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 (although the hump-shaped relationship between wages and net migration does not appear consistent with this explanation). Second, employment prospects for high-skilled labour may be

¹² Italy is often brought up as an example of a country with very immobile labour force and persistent economic differences across regions. Nevertheless, these results suggest that even if labour mobility is generally low, it does respond to regional economic conditions in the correct manner.

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, population density and dummies for suburbs, a ten percentage-point increase in the unemployment rate should give rise to a marginal net outflow between 0.03 and 0.25 percentage point of a district's population annually. Similarly, an increase of average wages by 10 percentage points relative to the national average is associated with an increase in the annual net migrant inflow between 0.03 and 0.08 percentage point (recall that wages are expressed in ratios to national average rather than in levels or logs). Table A15 reports a simple index measuring the responsiveness of migration to regional unemployment rates and average wages. The calculation is based on the regressions with unemployment rates, average wages, population density and suburban dummy (where applicable). The index adds the coefficient obtained for the unemployment rate (multiplied by -10) and the coefficient obtained for the average wage (divided by 10). Hence, the index quantifies the combined effect of a ten percentage-point difference in unemployment rate and a ten percentage point difference in average wage on net immigration - the higher is the value of the index, the greater is the response of migration to regional economic conditions. As the Table reveals, the resulting population increase ranges between 0.08% in Poland and 0.33% in Hungary. With the pace of adjustment this slow, it is not at all surprising that regional differences in unemployment rates and wages in the transition economies have been highly persistent. In contrast, the index for Portugal is almost five times higher (so that the ten percentage-point differential in unemployment and wages leads to a net inflow of 1.5% of the regions population) than the Hungarian index. The Italian index comes close to the figure for Hungary and the Czech Republic whereas the Spanish index is almost zero (this is because of the wrong sign on the effect of wages obtained for Spain). Hence, there is substantial degree of variability in the efficacy of migration in facilitating regional adjustment within transition economies, as well as when comparing them with Southern European countries. Except for Portugal, the potential impact of migration on adverse effects of asymmetric shocks appears rather small.

6 Implications for EU and EMU Enlargement

Recently, mobility of Eastern European labour received considerable attention also for a different reason - accession to the European Union will eventually introduce the possibility for East Europeans to seek employment throughout the Union. Some current EU member countries, especially the frontline countries, Austria and Germany, are concerned about the prospects of a large influx of migrants from the East. Thus, it is feared that scores of migrants will be attracted by high Western European wages, increasing unemployment and driving down wages of the incumbent workers (see Bauer and Zimmermann, 1999, and Boeri and Bruecker, 2000, for assessment of potential post-enlargement migration).

While the empirical results presented in this paper do not directly enable a forecast of post-enlargement migration, several lessons can be drawn. First, labour mobility in the accession-candidate countries has been low and falling, despite large and increasing wage and unemployment disparities across regions. Second, migration appears to occur chiefly among relatively prosperous regions rather than from depressed ones to those with better economic conditions. As discussed above, this may reflect the fact that a large fraction of migrants are relatively high skilled high-wage earners. If this pattern continues after the candidate countries' entry to the EU, free mobility of labour may actually have adverse effects on the new entrants (and positive effects on the current members) in as much as it would involve mainly migration of highly skilled workers. Finally, the response of net migration to regional economic characteristics, while statistically significant, is not significant in the economic sense - sizeable differentials in average wages and unemployment rates give rise only to very modest net migration flows. This is illustrated in Table A15 - for example, Portuguese migrants appear much more responsive to regional economic conditions than their counterparts in transition economies. The Czech Republic and Hungary seem comparable to Italy in terms of migration responsiveness, whereas Slovakia and Poland show much weaker response of migration to economic incentives.

The present paper also yields implications with respect to the eventual participation of the transition economies in the EMU. It is envisaged that the new members will join the EMU in due course after becoming members of the EU. This, however, will be an important policy decision, with potentially far-reaching economic implications for the accession countries as well as the incumbent EMU members (in particular, premature admission of new members may undermine the stability of the union as a whole). In the course of intensifying integration, the accession countries should eventually become exposed to similar shocks as the core EMU countries. However, this process can be lengthy and in the meantime the accession countries are likely to continue experiencing shocks that are different from those affecting the EMU core (for example, the transition economies will be more prone to suffer due to adverse economic or political developments in the former Soviet Union countries). Indeed, Frenkel et al. (1999) and

Horvath (2001) find that the shocks affect the transition economies are largely uncorrelated with those prevailing in the major EMU economies.

Joining the EMU implies relinquishing autonomy over monetary policy as well as submitting to important restrictions on fiscal policy (due to the Maastricht criteria imposing ceilings on public deficits and debt). Hence, the set of tools available for dealing with asymmetric shocks will be severely reduced by EMU membership. If the accession countries are exposed to asymmetric shocks and their labour markets cannot adjust easily enough to such shocks, then early participation in the EMU may not be the optimal exchange-rate regime for these countries. By retaining their separate currencies, the accession countries will be better able to cope with idiosyncratic shocks. Indeed, given the low responsiveness of labour mobility to regional unemployment and wages, it appears that the candidate countries may not be well equipped to deal with adverse effects of asymmetric shocks. Transitional barriers to labour mobility in the wake of the enlargement would in fact only aggravate this problem. Hence, an early entry to the EMU could make the monetary union more fragile and be potentially costly both in economic and political terms.

Labour 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 several post-communist 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 labour mobility has been rather limited. While migration indeed responds to inter-regional wage differentials, its responsiveness to unemployment is weaker (and less robust to changes in regression specification). Moreover, the effect of wage differentials on migration is only partially consistent with regional adjustment occurring via migration. Although wages have a positive effect on net migration, they are positively correlated with overall mobility - both gross immigration and emigration. Hence, depressed regions experience low overall migration (inbound and outbound) rather than a net outflow of migrants. The effect of unemployment is, to some extent, similar (although as emphasised above it is less robust to changes in regression specifications) - unemployment tends to discourage not only immigration but also emigration. When comparing post-communist transition economies with Southern European countries, migration patterns in Italy and especially Portugal appear much more effective in facilitating regional adjustment than those in transition economies.

Yet, gross migration flows in transition countries are not negligible - in 1996, gross migration (as a percentage of population) ranged between 0.6% in Slovakia and 1.1% in Poland. However, gross immigration and emigration are strongly correlated and hence the resulting net migration is tiny. This pattern can also be traced in the regression results presented above - while several socio-economic and demographic factors significantly affect gross migration, they often have a similar effect on the inflow and the outflow of migrants. Even though net migration is found to respond to regional economic characteristics, the effects are economically small and large inter-regional differentials in unemployment and average wages only give rise to modest net migration flows.

The pattern of labour mobility prevailing in transition economies has several important implications. First, regional differentials in unemployment and wages will not get smoothed away by migration. Indeed, as Table A15 demonstrates, it would take decades rather than years for moderately large unemployment and wage differentials to be smoothed away solely by means of migration. An appropriate policy response aimed at increasing labour mobility may be needed in order to avert the creation of new *Mezzogiorni*. Second, given the low labour 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.

References

- Bauer, Thomas, and Zimmermann, Klaus F., "Modelling International Migration: Economic and Econometric Issues." In: Rob van der Erf and Liesbeth Heering, Eds., *Causes of International Migration. Proceedings of a workshop, Luxembourg, 14-16 December, 1994*, pp. 95-115. Luxembourg: Office for Official Publications of the European Communities, 1995.
- Bauer, Thomas, and Klaus F. Zimmermann, 1999, *Assessment of Possible Migration Pressure and its Labour Market Impact Following EU Enlargement to Central and Eastern Europe*, IZA, Bonn.
- Bentivogli, Chiara, and Patrizio Pagano, 1999, "Regional Disparities and Labor Mobility: The Euro-II versus the USA," *Labour* 13 (3), 737-760.
- Blanchard, Olivier Jean and Lawrence F. Katz, "Regional Evolutions," *Brookings Papers on Economic Activity* 1: 1992, 1-61.
- Boeri, Tito, and Herbert Bruecker, 2000, *The Impact of Eastern Enlargement on Employment and Labour Markets in the EU Member States*, European Integration Consortium: DIW, CEPR, FIEF, IAS, IGIER, Berlin and Milano.
- Borjas, George J. , 1987, "Self-Selection and the Earnings of Immigrants," *American Economic Review* 77 (4), 531-553.
- Borjas, George J. ,1994, "The Economics of Immigration," *Journal of Economic Literature*, XXXII (December), 1667-1717.
- Braunerhjelm, Pontus, Riccardo Faini, Victor Norman, Frances Ruane, and Paul Seabright, 2000, *Integration and the Regions of Europe: How the Right Policies can Prevent Polarization*, MONITORING EUROPEAN INTEGRATION 10, Centre for Economic Policy Research, London.
- Brücker, Herbert, Gil S. Epstein, Barry McCormick, Gilles Saint-Paul, Alessandra Venturini and Klaus Zimmermann, 2001, *Managing Mig in the European Welfare State*. Paper presented at Fondazione Rodolfo Debenedetti, June 2001, Trieste.
- Burda, Michael, 1995, "Migration and the Option Value of Waiting." *Economic and Social Review* 27, 1-19.

Decressin, Jörg W. , 1994, "Internal Migration in West Germany and Implications for East-West Salary Convergence," *Weltwirtschaftliches Archiv* 130 (2), 231-257.

Decressin, Jörg W., and Antonio Fatas, 1995, "Regional labor market dynamics in Europe." *European Economic Review* 39 (9), 1627-1655.

Eichengreen, Barry, "Labor Markets and European Monetary Unification." In: Paul R. Masson and Mark P. Taylor, Eds., *Policy Issues in the Operation of Currency Unions*. pp. 130-162. Cambridge, UK: Cambridge University Press, 1993.

Eichengreen, Barry, "European Monetary Unification: a *Tour d'Horizon*." *Oxford Review of Economic Policy* 14, 3:24-40, Autumn 1998.

Faini, Riccardo, and Alessandra Venturini, 1994, "*Migration and Growth: The Experience of Southern Europe*," CEPR Discussion Paper No. 964, Centre for Economic Policy Research, London, UK.

Fidrmuc, Jan, Susanne Mundschenk, Iulia Traistaru and Jürgen von Hagen, 2002, "EU Enlargement: Economic Consequences and Perspectives for the EU," forthcoming in *European Transition Report*, World Economic Forum, Davos.

Frenkel, Michael, Christiane Nickel, and Günther Schmidt, 1999, *Some Shocking Aspects of EMU Enlargement*, WHU Koblenz, mimeo.

Friedberg, Rachel M., and Jennifer Hunt, 1995, "The Impact of Immigrants of Host Country Wages, Employment and Growth," *Journal of Economic Perspectives* 9 (2), 23-44.

Gandal, Neil, Gordon H. Hanson, and Matthew J. Slaughter, 2000, *Technology, Trade and Adjustment to Immigration in Israel*, NBER Working Paper No. 7962, National Bureau of Economic Research, Cambridge, MA.

Ghatak, Subrata and Paul Levine, 1998, "Migration Theories and Evidence: An Assessment," *Journal of Economic Surveys* 10 (2), 159-198.

Harris, J.R. and M.P. Todaro, 1970, "Migration, Unemployment and Development: A Two Sector Analysis," *American Economic Review* 60 (1), 120-142.

- Horvath, Julius, 2001, *Supply and Demand Shocks in Europe: Large EU Members, Visegrad Countries and Baltic Countries*. ACE Phare Project P98 1061 R working paper, <http://econserv2.bess.tcd.ie/fidrmucj/ACE/Horvath4.pdf>.
- Hunt, Jennifer, 2000, *Why Do People Still Live in East Germany*, IZA Discussion Paper No. 123. Institute for the Study of Labor, Bonn.
- Jackman, Richard, and Savvas Savouri, 1992, "Regional Migration in Britain: An Analysis of Gross Flows Using NHS Central Register Data," *The Economic Journal* 102, (415), 1433-1450.
- McKinnon Ronald I., Optimum Currency Areas." *American Economic Review* 53, 717-725, September 1963.
- Mundell Robert A., "A Theory of Optimum Currency Areas." *American Economic Review* 51, 657-665, September 1961.
- Parikh, Ashok, and Michiel van Leuvenstijn, 2000, *How Different Are the Determinants of Population and Labor Migration in Germany?* Centraal Planbureau, The Hague, mimeo.
- Pissarides, Christopher A., and Ian McMaster, 1990, "Regional Migration, Wages and Unemployment: Empirical Evidence and Implications for Policy," *Oxford Economic Papers* 42, 812-831.
- Repkine, Alexandre, and Patrick Paul Walsh, 1999, "Evidence of European Trade and Investment U-Shaping Industrial Output in Bulgaria, Hungary, Poland, and Romania." *Journal of Comparative Economics* 27, 730-752.
- Sinn, Hans Werner, 1999, *EU Enlargement, Migration and Lessons from German Unification*. CEPR Discussion Paper No. 2174, Centre for Economic Policy Research, London.
- Stark, Oded, 1991, *The Migration of Labor*, Blackwell Publishers: Cambridge, MA.
- Todaro, Michael P. , 1969, "A Model of Labor Migration and Urban Unemployment in Less Developed Countries." *American Economic Review* 59 (1), 138-148.

Appendix: tables

Table A.1 Labour-market developments: Czech Republic

	1991	1992	1993	1994	1995	1996	1997	1998
Unemployment	4.62	2.90	3.89	3.38	3.08	3.79	5.63	7.81
Standard Deviation	1.88	1.41	1.94	1.73	1.70	1.91	2.53	3.06
Coefficient of Variation (%)	40.7	48.6	49.9	51.2	55.2	50.3	44.9	39.2
Wages (CZK)	3745	4571	5551	6411	7661	9056	9757	11239
Standard Deviation	234	361	446	575	656	786	958	1365
Coefficient of Variation (%)	6.2	7.9	8.0	9.0	8.6	8.7	9.8	12.1
Gross Migration (%)	n.a.	1.26	1.15	1.01	1.00	0.94	0.98	0.98
Standard Deviation		0.30	0.27	0.27	0.28	0.28	0.33	0.41
Maximum		2.43	2.31	2.29	2.33	2.33	2.57	3.32
Minimum		0.82	0.73	0.62	0.57	0.57	0.57	0.59

Table A.2 Labour-market developments: Slovakia

	1991	1992	1993	1994	1995	1996	1997	1998
Unemployment	12.89	11.82	16.57	17.7	14.56	14.56	n.a.	n.a.
Standard Deviation	3.23	3.65	4.91	5.89	4.79	5.06		
Coefficient of Variation (%)	25.1	30.9	29.6	33.3	32.9	34.8		
Wages (SKK)	3635	4185	5026	5747	6640	7267	n.a.	n.a.
Standard Deviation	163	323	408	529	664	862		
Coefficient of Variation (%)	4.5	7.7	8.1	9.2	10.0	11.9		
Gross Migration (%)	n.a.	0.85	0.82	0.73	0.62	0.61	n.a.	n.a.
Standard Deviation		0.21	0.21	0.20	0.18	0.23		
Maximum		1.51	1.41	1.39	1.23	1.40		
Minimum		0.42	0.44	0.34	0.29	0.28		

Table A.3 Labour-market developments: Poland

	1991	1992	1993	1994	1995	1996	1997	1998
Unemployment	12.7	14.9	18.2	n.a.	16.8	14.9	11.9	12.0
Standard Deviation	3.6	4.4	5.6	n.a.	5.1	4.8	4.2	4.1
Coefficient of Variation (%)	28.1	29.5	31.0	n.a.	30.3	32.4	35.3	34.5
Wages (PLZ)	167.73	269.15	358.39	479.2	632.6	797.5	965.7	1115.2
Standard Deviation	13.07	23.31	35.22	54.0	70.5	87.5	109.7	126.9
Coefficient of Variation (%)	7.8	8.7	9.8	11.3	11.1	11.0	11.4	11.4
Gross Migration (%)	n.a.	1.3	1.2	n.a.	n.a.	1.1	1.1	n.a.
Maximum	n.a.	1.7	1.6	n.a.	n.a.	1.5	1.6	n.a.
Minimum	n.a.	0.7	0.7	n.a.	n.a.	0.7	0.7	n.a.

Table A.4 Labour-market developments: Hungary

	1991	1992	1993	1994	1995	1996	1997	1998
Unemployment	9.7	9.2	13.1	11.4	11.3	11.6	11.5	10.1
Standard Deviation	3.5	3.2	3.8	3.4	3.4	4.0	4.2	3.9
Coefficient of Variation (%)	35.5	35.2	29.1	29.5	30.3	34.0	36.0	38.8
Wages (HUF)		20315.8	24753.8	30960.7	36200.9	43080.6	52458.3	61338.2
Standard Deviation		2180.3	2561.1	3275.4	4032.6	5046.9	6771.0	8619.4
Coefficient of Variation (%)		10.7	10.3	10.6	11.1	11.7	12.9	14.1
Net Migration (%)	n.a.							
Maximum				-0,5	-0,6	-0,4	-0,6	-0,5
Minimum				1.4	1.4	1.2	1.5	1.5

Table A.5 Labour-market developments: Italy

	1988	1989	1990	1991	1992	1993	1994	1995
Unemployment	11.31	10.40	9.35	9.13	8.75	10.49	11.54	12.26
Standard Deviation	6.34	6.44	6.16	5.80	4.68	5.48	6.20	6.95
Coefficient of Variation (%)	56.0	61.9	65.9	63.5	53.4	52.3	53.7	56.7
Wages (ECU)	1579.92	1747.42	1928.57	2088.01	2126.98	1913.33	1895.32	1785.86
Standard Deviation	139.21	164.17	178.69	190.60	196.74	169.94	173.72	158.35
Coefficient of Variation (%)	8.8	9.4	9.3	9.1	9.2	8.9	9.2	8.9
Gross Migration (%)	0.53	0.56	1.86	0.49	0.53	0.50	0.49	0.50
Maximum	1.30	1.36	3.06	1.14	1.24	1.12	1.20	1.22
Minimum	0.33	0.32	0.18	0.28	0.35	0.3	0.31	0.31

Table A.6 Labour-market developments: Spain

	1987	1988	1989	1990	1991	1992	1993	1994
Unemployment	19.08	18.63	16.39	15.39	15.16	16.96	20.90	22.95
Standard Deviation	5.27	4.84	5.24	5.45	5.28	5.21	5.49	5.21
Coefficient of Variation (%)	27.6	26.0	32.0	35.4	34.8	30.7	26.2	22.7
Wages (ECU)	956.92	1130.42	1396.54	1676.73	1956.65	2212.69	2098.76	2033.41
Standard Deviation	107.09	119.53	130.15	148.64	153.65	185.62	189.49	172.41
Coefficient of Variation (%)	11.2	10.6	9.3	8.9	7.9	8.4	9.0	8.5
Gross Migration (%)	0.45	0.57	0.65	0.64	0.38	0.53	0.55	0.60
Maximum	1.44	2.25	2.26	1.47	1.11	1.28	1.17	1.00
Minimum	0.19	0.27	0.32	0.41	0.21	0.28	0.29	0.34

Table A.7 Labour-market developments: Portugal

	1986	1987	1988	1989	1990	1991	1992	1993
Unemployment	8.30	6.70	6.17	5.06	4.57	4.16	3.87	5.36
Standard Deviation	3.93	3.30	4.26	3.32	2.66	2.30	1.76	1.82
Coefficient of Variation (%)	47.37	49.30	68.99	65.62	58.28	55.27	45.52	33.91
Wages (ECU)	402.92	435.47	471.27	518.11	601.05	721.68	859.86	851.72
Standard Deviation	58.37	48.49	64.86	75.12	56.60	69.16	87.61	89.79
Coefficient of Variation (%)	14.49	11.13	13.76	14.50	9.42	9.58	10.19	10.54
Gross Migration (%)	0.20	0.14	0.20	0.50	0.54	0.18	0.33	n.a.
Maximum	0.65	0.29	0.56	1.10	1.24	0.50	1.02	n.a.
Minimum	0.08	0.03	0.09	0.04	0.11	0.07	0.09	n.a.

Table A.8 Determinants of inter-regional migration in the Czech Republic 1992 - 1998

	Unem- ployment rate	Wage ratio	Wage ratio squared	Adj. R ²			
Basic regression							
Inflows	-0.039	-4.40	0.692	-3.75	-	-	0.170
Outflows	-0.016	-2.94	0.535	-4.94	-	-	0.311
Net inflows	-0.023	-3.65	0.156	-1.07	-	-	0.099
Including population density and suburb							
Inflows	-0.032	-4.32	1.390	-5.89	-	-	0.348
Outflows	-0.012	-2.36	1.016	-6.30	-	-	0.403
Net inflows	-0.020	-3.53	0.376	-2.26	-	-	0.182
Including wage ratio squared							
Inflows	-0.340	-4.49	8.888	-3.79	-3.778	-3.23	0.358
Outflows	-0.012	-1.77	3.449	-1.95	-1.226	-1.35	0.403
Net inflows	-0.021	-3.69	5.504	-3.02	-2.584	-2.85	0.194
Including socio-economic and demographic variables							
Inflows	-0.007	-0.44	0.840	-2.10	-	-	0.536
Outflows	-0.005	-1.02	0.458	-3.45	-	-	0.612
Net inflows	-0.002	-1.14	0.385	-3.76	-	-	0.262

Notes: Number of observations: 526 (76 districts, average population 135,900 in 1994). T-statistics (heteroscedasticity robust) 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, the wage ratio and population density are lagged by one year.

Table A.9 Determinants of inter-regional migration in Slovakia 1992 - 1996

	Unem- ployment rate	Wage ratio	Wage ratio squared	Adj. R ²			
Basic regression							
Inflows	-0.004	-1.13	0.878	-5.37	-	-	0.277
Outflows	-0.001	-0.27	0.428	-3.25	-	-	0.507
Net inflows	-0.003	-1.37	0.451	-2.74	-	-	0.157
Including population density and suburb							
Inflows	-0.004	-1.74	0.957	-5.08	-	-	0.571
Outflows	-0.001	-0.33	0.298	-20	-	-	0.734
Net inflows	-0.003	-1.60	0.664	-3.73	-	-	0.219
Including wage ratio squared							
Inflows	-0.004	-1.78	-0.307	-0.16	0.646	-0.66	0.570
Outflows	-0.001	-0.69	-3.116	-2.26	1.744	-2.46	0.742
Net inflows	-0.003	-1.43	2.860	-1.47	-1.122	-1.14	0.221
Including socio-economic and demographic variables							
Inflows	-0.006	-2.29	0.562	-3.20	-	-	0.737
Outflows	0.000	-0.15	0.263	-1.58	-	-	0.787
Net inflows	-0.006	-2.18	0.305	-1.92	-	-	0.436

Notes: Number of observations: 190 (38 districts, average population 141,300 in 1995). T-statistics (heteroscedasticity robust) 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 wage ratio are lagged by one year.

Table A.10 Determinants of inter-regional migration in Poland 1992 - 1993 and 1996 - 1997

	Unem- ployment rate	Wage ratio	Wage ratio squared	Adj. R ²			
Basic regression							
Inflows	0.018	-6.21	-0.221	-1.49	-	-	0.288
Outflows	0.022	-7.34	-0.503	-3.49	-	-	0.377
Net inflows	-0.009	-5.25	0.591	-6.13	-	-	0.372
Including population density and suburb							
Inflows	0.003	-1.36	0.714	-5.42	-	-	0.663
Outflows	0.005	-2.52	0.571	-5.29	-	-	0.781
Net inflows	-0.005	-2.52	0.301	-3.34	-	-	0.478
Including wage ratio squared							
Inflows	0.004	-1.75	-2.682	-1.72	1.558	-2.19	0.672
Outflows	0.006	-3.17	-4.104	-3.77	2.144	-4.51	0.797
Net inflows	-0.005	-2.84	2.945	-2.73	-1.212	-2.43	0.494
Including socio-economic and demographic variables							
Inflows	0.001	-0.48	0.690	-4.31	-	-	0.658
Outflows	0.005	-1.95	0.754	-6.17	-	-	0.807
Net inflows	-0.008	-6.09	-0.141	-2.38	-	-	0.812

Notes: Number of observations: (49 districts, average population 788,600 in 1996). T-statistics (heteroscedasticity robust) 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. The unemployment rate and wage ratio are lagged by one year. Data for 1994 and 1995 were not available. Results obtained with separate regressions over 1992-93 and 1996-97 were similar to those above and are therefore not reported.

Table A.11 Determinants of inter-regional migration in Hungary 1994 - 1998 (only net inflows)

	Unem- ployment rate	Wage ratio	Wage ratio	Wage ratio squared			Adj. R ²
Basic regression	-0.065	-5.11	-1.668	-3.95	-	-	0.210
Including population density	-0.025	-5.75	0.832	-2.62	-	-	0.888
Including wage ratio squared	-0.025	-2.39	5.827	-2.39	-2.782	-2.01	0.891
Including dummy for Budapest	-0.030	-7.78	-9.460	-2.21	5.589	-2.21	0.907
Including socio-economic and demographic variables	-0.040	-8.56	-0.680	-1.99	-	-	0.906

Number of observations: 100 (20 districts, average population 512,300 in 1995). T-statistics (heteroscedasticity robust) are reported in parentheses. The dependent variable is the net inflow rate as a percentage of the region's end-year population. The unemployment rate and wage ratio are lagged by one year.

Table A.12 Determinants of inter-regional migration in Italy 1984 - 1995

	Unem- ployment rate	Wage ratio	Wage ratio	Wage ratio			Adj. R ²
Including population density							
Inflows	-0.006	-2.28	0.785	-5.62	-	-	0.393
Outflows	0.018	-6.05	0.100	-0.56	-	-	0.231
Net inflows	-0.023	-13.28	0.684	-5.83	-	-	0.640
Including wage ratio squared							
Inflows	-0.011	-4.55	-12.287	-5.41	6.672	-5.64	0.457
Outflows	0.008	-3.63	-25.674	-8.50	13.156	-8.27	0.485
Net inflows	-0.019	-11.95	13.386	-6.70	-6.483	-6.29	0.696

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. T-statistics (heteroscedasticity robust) 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, wage ratio and population density are lagged by one year.

Table A.13 Determinants of inter-regional migration in Spain 1984 - 1994

	Unem- ployment rate	Wage ratio	Wage ratio squared	Adj. R ²			
Including population density							
Inflows	-0.011	-2.42	-0.313	-1.99	-	-	0.032
Outflows	-0.006	-1.36	-0.027	-0.16	-	-	0.047
Net inflows	-0.005	-1.64	-0.286	-2.21	-	-	0.029
Including wage ratio squared							
Inflows	-0.009	-2.08	5.937	-3.20	-3.040	-3.46	0.056
Outflows	-0.005	-1.29	1.158	-0.63	-0.576	-0.65	0.043
Net inflows	-0.004	-1.20	4.779	-2.81	-2.464	-3.01	0.058

Number of observations: 187 (17 regions, average population 2,293,650 in 1994). Observations for *Ceuta y Melilla* were dropped. T-statistics (heteroskedasticity robust) 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, wage ratio and population density are lagged by one year.

Table A.14 Determinants of inter-regional migration in Portugal 1987 - 1992

	Unem- ployment rate	Wage ratio	Wage ratio squared	Adj. R ²			
Including population density and suburb							
Inflows	-0.027	-2.38	2.698	-4.30	-	-	0.387
Outflows	0.080	-1.30	-1.474	-0.98	-	-	0.297
Net inflows	-0.107	-1.78	4.172	-2.57	-	-	0.329
Including wage ratio squared							
Inflows	-0.033	-2.15	-4.138	-0.35	3.437	-0.56	0.373
Outflows	0.030	-0.52	-56.122	-1.69	27.472	-1.68	0.335
Net inflows	-0.063	-1.09	51.984	-1.47	-24.036	-1.37	0.350

Number of observations: 32 (7 regions, average population 1,408,610 in 1992). Several observations pertaining to 1987 and 1988 were dropped because of missing wage or unemployment data. T-statistics (heteroscedasticity robust) 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, wage ratio and population density are lagged by one year.

Table A.15 Migration Effectiveness Index

Czech Rep.	Slovakia	Poland	Hungary	Italy	Spain	Portugal
0.238	0.096	0.080	0.333	0.298	0.021	1.487

Notes: The index is based on the regressions with unemployment rates, average wages, population density and suburban dummy (where applicable) as reported above. The index adds up the coefficient obtained for the unemployment rate (multiplied by -10) and the coefficient obtained for the average wage (divided by 10) estimated in regressions that also included population density and dummies for suburban districts (where applicable) as reported above.
