

## 2. Labor Mobility in the Enlarged EU: Who Wins, Who Loses?

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*The EU's Eastern enlargement has triggered a substantial labor migration from the new into the old member states of the EU. In this chapter, we analyze the impact of this change in labor supply on macroeconomic aggregates and the distribution of earnings and employment opportunities. For this purpose, we employ two general equilibrium models which analyze the migration impact in a setting with imperfect labor markets. The first model is based on a nested production function, which enables us to examine the migration effects on wages and unemployment in the different cells of the labor market. The second model is based on CGE framework, which allows considering the restructuring of sectors and the interaction of migration with trade and capital movements. Both models assume that capital stocks adjust to labor supply shocks. Based on scenarios of labor migration from the EU8 into the EU15 from 2004 to 2007, we find substantial gains of migration for the enlarged EU: the aggregate GDP of the integrated area increases by about 0.2%, which corresponds to a sum of 24 billion euros. The total factor income of the native population increases slightly in the receiving countries. The labor market effects are surprisingly small: in the short-run, wages decline by about 0.1% in the EU15, and the unemployment rate increases by about 0.1 percentage points. Conversely, wages may increase by 0.3% in the new member states, and the unemployment rate may decline by 0.4 percentage points. In the long-run, after the adjustment of capital stocks, migration is by and large neutral for wages and unemployment. Since the skill structure of the migrant workforce does not differ largely from the native workforce in the sending and the receiving countries, we observe only moderate distributional effects across the different groups in the labor markets. Less-skilled workers in the receiving countries lose more proportionally, while high-skilled workers tend to benefit. The converse holds for the sending countries.*

## 1 Introduction

In this chapter, we analyze the impact of labor migration which has been triggered by the EU's Eastern enlargement on the distribution of factor income and employment opportunities in the sending and receiving countries of the enlarged EU. The EU Eastern enlargement has been accompanied by substantial migration movements. The migrant population from the eight new member states (EU8) who joined the European Union (EU) in 2004<sup>1</sup> has increased from about 0.9 million by the end of 2003 to 1.9 million by the end of 2007. At the same time, the number of migrants from Bulgaria and Romania has increased from 0.7 million to 1.9 million, although they acceded after 2007 (see Brücker et al., 2009 and Chapter 1 of this book). Moreover, the selective application of transitional arrangements for the free movement of workers by the incumbent EU member states is associated with a substantial diversion of migration flows away from Austria and Germany towards Ireland and the United Kingdom. As a consequence, the EU Eastern enlargement has seen significant labor supply changes at least in the most affected sending and receiving countries.

The economic rationale behind the free movement of workers is to increase the productive use of human resources, and hence, output in the integrated area. Many simulation models support this view and suggest that the benefits from opening labor markets to international migration can easily dwarf potential gains from a further liberalization of international goods and capital markets (Hamilton and Whalley, 1984). This has been also demonstrated for labor migration within the enlarged EU (Boeri and Brücker, 2005).

While it is not disputed that an enlarged EU benefits from the free movement of workers in terms of aggregate output and earnings, the distributional consequences are not. Concerns that immigration from the new member states might depress wages and increase native unemployment are particularly widespread in the receiving countries. Hence, many potential destinations for migrants from the new member states, such as Austria and Germany, are reluctant to open their labor markets before the end of the transitional periods.

International migration does not only create winners. The standard textbook model of migration predicts that international labor mobility generates aggregate gains for natives in the receiving countries, while natives left behind in the sending countries tend to lose (e.g. Wong, 1995). Moreover, production factors in receiving countries which are net complements to migrant labor tend to win, while those which are net substitutes tend to lose.

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<sup>1</sup> Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia, Slovenia.

These predictions of the standard model are based on a set of strong assumptions. In our view it is important to relax three assumptions of the standard model for assessing the effects of migration in an empirically meaningful way. First, the standard model relies on the assumption that labor markets clear, which is particularly unrealistic in the European context. If we consider, however, wage rigidities and unemployment, we find ambiguous effects of migration on the receiving and sending countries. The aggregate income of natives in the receiving countries can decline if migration involves an increase in unemployment there, whereas the aggregate income of natives in the sending countries can increase (Boeri and Brücker, 2005). The impact of migration on unemployment depends however on the flexibility of wages in the different cells of the labor market: immigration can even reduce unemployment in the receiving countries if migrants move into labor market segments which are characterized by a high wage flexibility (Brücker and Jahn, 2008).

Second, the standard model relies on the assumption that capital stock is fixed. However, it is likely that at least in the long-run domestic and international investment adjusts to changes in labor supply. It is indeed one of the few robust empirical findings in economics that the capital-output ratio, and hence, the productivity weighted labor intensity of production, remains constant over time (Kaldor, 1961). This implies that aggregate wages are not affected by labor supply shocks in the long-run (Ottaviano and Peri, 2006).

Third, the standard one-sector framework ignores that economies adjust to migration by restructuring industries and changing the commodity composition of trade. labor mobility is crucial to the optimal allocation of resources among sectors. If we allow for geographical as well as sectoral labor mobility, the additional labor supply is transferred to the most productive use. In receiving countries, migration reduces wages in the most affected industries, and therefore, tends to push natives to other industries; while in the sending countries, emigration leads to a restructuring of industries due to higher wages in certain sectors. The standard models of trade theory predict that changes in factor endowments involve changes in the trade vector and the sectoral structure of employment in small open economies, but leaves factor prices unchanged if labor and other factors move swiftly across sectors.

Against this background, we address the impact of labor mobility on the distribution of earnings and employment opportunities in a framework which considers wage rigidities and unemployment, the adjustment of capital stocks, and the restructuring of industries and trade. To this end, we employ two models. The first model analyses the changes in the different cells of the labor market on the basis of a wage curve approach, which considers that wages adjust only imperfectly to labor supply changes. Adjustments in other markets are only considered in this model as long as they affect the capital-output-ratio, which may be the most important channel of adjustment.

The second model goes beyond this in considering the adjustment of the sectoral structure of the economy via international trade and shifts in the structure of demand and production. Since the adjustment of the trade vector and of the sectoral structure of the economy mitigates the migration impact, we expect to find smaller wage and employment effects of migration in simulations based on this second model. Whilst we apply the first model for all EU15 and EU8 countries, the second model will be used only for the two most affected sending and receiving countries: Poland and the United Kingdom.

The remainder of this chapter is organized as follows. The next section describes the structure of the labor supply shock and the migration scenarios (Section 2). We then outline the two models which will be used for the empirical analysis (Section 3). Section 4 presents the simulation results. Section 5 concludes and discusses the possible implications of the financial crisis on the future effects of the free movement of workers in the enlarged EU.

## **2 The Scale and Structure of Migration and Migration Scenarios**

### **2.1 The Scale of Migration**

The income gap between the incumbent and the new member states is in the case of the EU Eastern enlargement larger than in previous accession rounds. The GDP per capita and wage levels in the new member states have converged rapidly since EU Eastern enlargement, but the gap in output and earnings is still substantial. Measured in purchasing power parities, the GDP per capita in the EU8 in 2007 amounted to 55% of that in the EU15. At current exchange rates, the GDP per capita in the EU8 was about one-third of the EU15, and hourly labor costs were about 24%. Note that nominal earnings differences affect migration incentives, since a considerable part of the income earned in the receiving countries is consumed in the home countries. Finally, the unemployment rates have converged in the EU8 to the average level in the EU15 (see Brücker et al. 2009, for details).

The income gap between old and new EU member states has triggered substantial migration flows since Eastern enlargement. As has been outlined in the previous chapter, the stock of foreign residents from the EU8 increased by about one million in the first four years following EU Eastern enlargement. This corresponds to 250,000 migrants per year, compared to 50,000 before enlargement. Recent figures from the UK and Ireland suggest that net inflows started to decline in 2008

and are likely to decrease even further in main receiving countries in 2009 following the course of the financial crisis.

Furthermore, the number of foreign residents from Bulgaria and Romania increased from about 700,000 to almost 1.9 million from the end of 2003 to the end of 2007. However, we cannot directly attribute this increase to enlargement, since Bulgaria and Romania were not members of the EU before 2007. Moreover, all EU countries, with the exception of Finland and Sweden, have maintained their immigration restrictions vis-à-vis Bulgaria and Romania since 2007.

The labor supply shock affected EU member states in different ways. We observe a distinct shift in the geographical structure of migration after enlargement. In 2003 about two-thirds of the EU8 migrants resided in Germany and Austria. Since Eastern enlargement, about 70% of the net inflows from the EU8 have been absorbed by Ireland and the United Kingdom. Similarly, Spain and Italy have received the overwhelming share of migrants from Bulgaria and Romania since the beginning of this decade; whereas Austria and Germany were the main destinations of migrants from these countries in the beginning of the 1990s. As a result, we find the highest share of migrants from the new member states in the following receiving countries: Ireland (4.7%), Spain (2.1%), Austria (1.5%), Luxembourg (1.3%), and the UK (1.1%) in 2007.

From the perspective of the sending countries, 2.6% of the population from the EU8 and 6.4% of the population from the EU2 have already moved to the EU15 in 2007. Most affected are Romania (7.1%), Lithuania (3.8%), Bulgaria (4.1%) and Poland (3.4%). In contrast, the Czech Republic, Hungary and Slovenia have been proportionately less affected by emigration to the EU15.

The migration potential from the new member states is not yet exhausted, although we observe that net flows from the new member states into the EU15 have started to decline. Based on a partial adjustment model, Brücker et al. (2009) estimate the long-run migration stock for the EU8 at about 6% of the population in the sending countries, and for the EU2 at about 10 to 12% of the population in the sending countries. Thus, the present migration stocks from the new member states amount to about 50% of their long-run potential.

We cannot assess the implications of the financial crisis and the global recession on potential migration flows from the new member states yet. According to EU forecasts, the Baltic countries and Hungary will be more than proportionally affected by the economic downturn in 2009, while important sending countries, such as Poland and Romania, are forecasted to be proportionately less affected. Furthermore, migration depends heavily on employment opportunities in the receiving countries. Hence, the economic downturn is likely to reduce migration flow even if unemployment rates increase in the sending countries by the same amount as in the

receiving countries. Therefore, it is very likely that net migration rates from the new member states into the EU15 will contract over the course of the economic downturn, but it is an open question when and to what extent they will recover over the following years.

## 2.2 The Structure of Migration

The migrant population from the new member states is younger than the native population in the receiving and sending countries, participates to a higher extent in the labor force and is favorably self-selected on observable skills. Consequently, the share of migrants from the new member states in the labor force is higher relative to the population.

The skill level of migrants from the new member states is heavily concentrated in the group with medium educational attainment, according to the Eurostat Labour Force Survey: 22% of the migrant population from the EU8 have a university degree (EU15: 27%), 61% a completed vocational training qualification or a similar level of schooling (EU15: 46%), and only 17% are without a completed vocational training qualification (EU15: 27%) (Eurostat, 2008). Thus, migrants from the new member states are proportionately less represented at the higher and the lower ends of the skill spectrum compared to natives in the EU15. Relative to the population in the sending countries, the skill level of migrants from the new member states is higher than that of natives who stay behind, even when controlling for cohort effects (Brücker and Damelang, 2009).

Overall, the skill structure of the migrant population is relatively similar to that of the native population in the receiving and sending countries, so the skill composition of the workforce in the sending and the receiving countries remains by and large unaffected by migration from the new member states into the EU15.

However, the occupational structure of employment suggests that migrants from the new member states are employed below their educational levels: a large share of migrants is employed in occupations which need only elementary skills. As a consequence, the wage level of migrants from the new member states in Ireland and the UK is well below natives with similar education and work experience (Barret and Duffy, 2008; Upward, 2009). Moreover, the returns to education do not increase significantly with the time spend in the receiving countries, although it is too early for a final assessment on the labor market assimilation of migrants from the new member states (Upward, 2009). Overall, migrants from the new member states compete to a large extent with natives and other foreigners in the less-skilled segments of the labor market in the EU15, although migrant education levels are relatively high.

## 2.3 Migration Scenarios

Our simulations focus on the impact of the labor supply shock triggered by EU Eastern enlargement in the first four years of accession, i.e. on migration from the EU8 into the EU15 during the period from 2004 to 2007.<sup>2</sup> This labor supply shock is derived from the difference of two scenarios: the first scenario assumes counterfactually that the pre-enlargement conditions for migration between the EU8 and the EU15 prevail. Note that this counterfactual scenario does not assume that no migration takes place, but that labor mobility continues at the pre-enlargement levels. This implies that the stock of foreign residents from the EU8 increases moderately from 870,000 by the end of 2003 to 1.07 million by the end of 2007.

Table 1  
Migration scenarios

	Foreign residents from EU8 in persons				Foreign residents from EU8 in per cent of population			
	Benchmark	Counterfactual	Enlargement	Enlargement	Benchmark	Counterfactual	Enlargement	Enlargement
	2003	2007	2007	effect	2003	2007	2007	effect
AT	60255	64596	89940	25344	0.75	0.81	1.12	0.32
BE	16151	23242	42918	19676	0.16	0.22	0.41	0.19
DE	427958	492123	554372	62249	0.52	0.60	0.68	0.08
DK	9807	11220	22146	10926	0.18	0.21	0.41	0.20
ES	46710	82863	131118	48255	0.11	0.20	0.31	0.12
FI	15825	19154	23957	4803	0.30	0.37	0.46	0.09
FR	33858	29690	36971	7281	0.06	0.05	0.06	0.01
GR	16413	21582	20257	-1325	0.16	0.20	0.19	-0.01
IE	34246	60657	178504	117847	0.86	1.52	4.47	2.95
IT	54665	74909	117042	42133	0.10	0.13	0.20	0.07
LU	1574	2568	5101	2533	0.36	0.58	1.15	0.57
NL	13048	16861	36317	19456	0.08	0.11	0.23	0.12
SE	21147	19301	42312	23011	0.24	0.22	0.47	0.26
UK	122465	154198	609415	455217	0.21	0.27	1.05	0.78
CZ	71019	95954	104442	8488	0.70	0.94	1.03	0.08
EE	26070	33922	36735	2813	1.93	2.51	2.72	0.21
HU	87680	88285	132582	44297	0.88	0.88	1.33	0.44
LT	53557	88922	128361	39439	1.55	2.58	3.73	1.14
LV	23863	32559	42547	9987	1.02	1.40	1.83	0.43
PL	532942	632111	1297647	665536	1.42	1.68	3.45	1.77
SI	35051	40958	35848	-5110	1.76	2.05	1.80	-0.26
SK	43938	60252	132207	71955	0.82	1.12	2.45	1.34
<b>EU15<sup>1)</sup></b>	<b>874122</b>	<b>1072964</b>	<b>1910370</b>	<b>837406</b>	<b>0.24</b>	<b>0.29</b>	<b>0.52</b>	<b>0.23</b>
<b>EU8</b>	<b>874122</b>	<b>1072964</b>	<b>1910370</b>	<b>837406</b>	<b>1.21</b>	<b>1.48</b>	<b>2.64</b>	<b>1.16</b>

Source: Own estimates and simulation, see text.

Notes: 1) Without Portugal.

The stock of foreign residents in 2003 is used as a benchmark. The counterfactual scenario assumes that immigration flows continue at their pre-enlargement levels, while the enlargement scenario refers to the actual figures observed in 2007. Therefore, the difference of the enlargement- and the counterfactual scenario is treated as the "enlargement effect".

<sup>2</sup> For a simulation of the impact of the labour supply shock from the EU2 during the same period of time and of the potential labour supply shocks during the 2008-2014 period see Brücker et al. (2009).

The second scenario captures the current institutional conditions for migration under the transitional arrangements. Therefore, it is based on the actual migration movements. This involves the stock of migrants from the EU8 increasing from 870,000 by the end of 2003 to 1.91 million by the end of 2007. Thus, the EU Eastern enlargement triggered an additional migration of 840,000 people according to our scenarios during the 2004-2007 period (Table 1). Note that these two scenarios consider, however, the diversion of migration flows, since the counterfactual scenario captures the pre-enlargement regional structure of migration, while the Eastern enlargement scenario is based the post-enlargement structure.

We also apply a number of assumptions regarding the structure of the labor supply shock in our simulations. First, we use the actual participation rates of migrants and natives in the labor force during the 2004-2007 period, which implies that the migration share in the labor force is higher than the migration share in the population. Second, we calculate the work experience based on the age information in the LFS by using the average time of schooling for the different levels of educational attainment. Third, and most importantly, we classify the skill structure of the immigrants from the EU8 which arrived from 2004 onwards by their occupational status and not by the information on their education in the LFS. This procedure addresses the problem of ‘brain waste’, i.e. the employment of migrants from the new member states below their education levels. Using the LFS information on education levels would clearly overstate the skill level of the employed labor force from the new member states in the receiving countries.<sup>3</sup>

### 3 Outline of the Models

Our analysis of the impact of migration from the EU8 into the EU15 is based on two models. The first model analyses the impact of migration on wages and employment opportunities in different segments of the labor market. This model is based on a structural general equilibrium framework which considers imperfect labor markets. Whereas this model uses an aggregate production function with one sector, the second model is based on a computable general equilibrium framework, which also enables us to address the impact of migration on sectoral change. This model relies on an open-economy framework which also allows us to consider the interaction between labor migration and the trade in goods and capital mobility.

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<sup>3</sup> See Baas et al. (2009) for details of the assumptions on the labour supply shock.



### 3.1 A Structural Model with Wage Rigidities

The first model we employ here builds on Brücker and Jahn (2008) and analyses the wage and employment effects of labor migration simultaneously. Following Boeri and Brücker (2005) and Levine (1999), it is assumed that wages respond to changes in the unemployment rate, albeit imperfectly. As a consequence, additional labor supply through immigration can both reduce wages and increase unemployment in the native labor force depending on the elasticities of substitutability and complementarity in the different segments of the labor market.

The supply side of the labor market is modeled on an aggregate wage-setting curve, which can be based on different theoretical foundations (see Blanchflower and Oswald 1994, Layard et al. 2005, for a discussion). In our context, two modeling traditions are particularly important. First, the wage curve can be derived from bargaining models (see e.g. Lindbeck 1993, Layard and Nickell 1986), which assume that trade unions are concerned about both their employed and unemployed members. Consider the case where wages are fixed in a bilateral bargaining monopoly between trade unions and employer federations. Once wages are fixed, firms hire workers until the marginal product of labor equals the wage. Both parties that participate in the wage bargain are aware of this. Higher unemployment means that more union members are without work, and employed members who are dismissed will have a lower probability of finding new employment. Consequently, the negotiated wage is lower when unemployment is higher, and vice versa.

Second, in a completely non-unionized environment, a wage curve can be explained by efficiency wage or shirking considerations (Shapiro and Stiglitz, 1984), where the productivity of workers is linked to the wage level. Unemployment works here as a disciplining device since it determines the difficulties of finding a new job. As a result, firms will reduce the remuneration of workers if the unemployment rate is increasing, since they can achieve the same level of productivity at a lower wage if unemployment is higher.

What both approaches have in common is that they replace the conventional labor supply curve with a wage fixing function and they rely on standard assumptions about labor demand. However, different conclusions regarding the shape of the wage curve can emerge from these different theoretical foundations. While the bargaining models predict a flatter wage curve in labor segments with a high share of unionized workers (e.g. workers with vocational training), the efficiency wage models expect a flatter wage curve in labor market segments with a high level of human capital (e.g. workers with a university degree). Nevertheless, in the empirical application of the model, we estimate the elasticities of the wage curves without applying a priori restrictions on their curvature.

In contrast to labor supply, our framework relies on conventional assumptions on labor demand. Once wages are fixed, firms hire workers until the marginal product of labor equals the wage rate. This enables us to derive labor demand from a standard production function framework. More specifically, we follow Borjas (2003), Ottaviano and Peri (2006) and others in applying a nested CES production function, which groups the labor force by education, work experience and national origin.

This approach allows us to derive the employment and wage response to an exogenous labor supply shock in a general equilibrium framework. The production function and the wage curves determine a system of simultaneous equations, which can be solved analytically and enable us to derive the employment and wage response to migration at the same time. The model considers also the (partial) adjustment of physical capital to labor supply shocks (for a detailed description of the model see Brücker and Jahn, 2008, Baas et al. 2009).

The simulation of the effects of migration requires the estimation of (i) the elasticities of the wage-setting curves; (ii) the relevant parameters of the production function; and (iii) the adjustment of the capital stock to exogenous labor supply shocks.

The wage-setting curves have been estimated at the national level depending on data availability for different education and experience groups or the economy as a whole. We found an overall elasticity of the wage-setting curve of -0.13 at the level of the EU15, which is slightly higher than the average elasticities of the wage-curves found in regional level studies (see Nijkamp and Poot, 2005).

The elasticities of the production function have been estimated in the EU15 countries based on data from the European Community Household Panel (ECHP). The ECHP has a limited number of observations, which may affect a precise estimation of the relevant parameters. As a robustness check, we carried out a sensitivity analysis based on parameter values taken from various studies in the literature. Our findings, however, turned out to be robust irrespective of the parameter values we use. In the case of Germany and the UK, we also used detailed data from an administrative source (IABS in Germany) and the national LFS (UK), which yielded once more very similar simulation results.<sup>4</sup> For the sending countries in the new member states, we do not have as yet comparable data at hand. We therefore used the average of our parameter estimates for the EU15 in our simulations for the new member states, assuming that the economies there will behave similarly to the EU15 countries.<sup>5</sup>

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<sup>4</sup> The results of the sensitivity analysis are available from the authors upon request.

<sup>5</sup> Note that in the sending countries, we treated the native and the foreign labour force as perfect substitutes.

Similar to Ottaviano and Peri (2006), we estimated the adjustment of the capital stock to labor supply shocks at the national level. We find that changes in labor supply do not have a long-run impact on the capital-output ratio and that labor productivity adjusts to an exogenous labor supply shock by more than 10% in one year in most countries.

The estimation results for the elasticities of the wage-setting curves, the elasticities of the production function and the adjustment of the capital-labor ratio are presented in Annex Table A1. For detailed discussion, see Baas et al. (2009).

### **3.2 Sketch of the CGE Model**

The model outlined in the previous section enable us to analyze the labor market impacts of migration in detail, but it considers only a part of the potential adjustment processes of economies to labor supply shocks. In particular, the adjustments via trade in goods and services and the sectoral structure of the economy cannot be considered, since the model relies on a one-sector framework. Therefore, we complement this model by an analysis in a computable general equilibrium (CGE) framework, which allows these adjustment mechanisms to be considered as well.

The CGE model employed here can be classified as a comparative static model and follows the neoclassic-structuralist modeling tradition which has inspired most of the CGE literature (Dervis and Robinson, 1982). More specifically, the equations of the model are derived from standard microeconomic assumptions about the behavior of price taking agents. Consumers maximize utility subject to their budget constraints. Producers choose inputs so as to minimize production costs. Production technologies are characterized by a CES or Leontief function whereby resources are limited and distributed by market forces.

The model consists of sixteen commodities, sixteen domestic industries and two types of households: migrants and natives. In total, there are two agricultural industries, four manufacturing industries and ten service industries. Each commodity corresponds to an industry. Considering two types of households allows us to capture differences in the consumption behavior of natives and migrants. For the empirical application of the model, we use the current input-output matrices from Eurostat. This enables us to cover the recent developments in production, trade, factor movements and the linkages between them.

In order to capture the effects of the European integration process, we applied a three country model, which reflects one country and two regions: the EU and the rest of the world (see Baas et al., 2007). The national economies considered are linked to the EU and to the rest of the world via trade in goods and services, capital flows and the migration of labor. Transaction costs within the EU are lower.

We thus consider different trade patterns which emerge from European integration and distinguish between intra- and extra EU trade.

Similar to the first model, we allow for labor market imperfections by applying a wage-setting framework, which is new in the CGE literature, on the effects of the EU Eastern enlargement (see Baas and Brücker, 2008). We apply the same elasticities of the wage-setting curves as in the first model outlined in the previous section. Moreover, we consider the adjustment of capital stocks based on the same parameter values used in the first model.

The technical features of the model and the data sources used for the calibration of the model are described in detail in Baas et al. (2009).

## 4 Presentation of the Simulation Results

The presentation of our simulation results starts with the first model, which enables us to analyze the impact of the 2004-2007 labor supply shock triggered by emigration from the EU8 into the EU15 on macroeconomic aggregates, and also on the distribution of earnings and employment opportunities for the different groups of the labor force. These simulations cover the EU15 countries and the EU8. We then continue by presenting the simulation results from the CGE model, which also enable us to analyze beyond the macroeconomic aggregates the sectoral shifts in output and employment. This analysis covers a selection of important sending and receiving countries, i.e. Poland and the UK.

In each scenario, we calculate the labor supply shock for the sending and receiving countries as outlined in Section 2.3. Throughout the analysis, we distinguish between the short-run impact of migration, i.e. the impact under consideration of the incomplete adjustment of the physical capital stock, and the long-run impact, when capital stocks have completely adjusted.

### 4.1 The Structural Impact on Labor Markets and Income Distribution

Table 2 presents the simulation results of the migration impact on GDP, wages and unemployment. The first column presents the size of the labor supply shock triggered by EU enlargement: migration from the EU8 increased the labor force in the EU15 by 0.4%, and reduced it in the EU8 by 1.16%. Particularly affected are Ireland (+4.9%), the UK (+1.3%), Luxembourg (+1%) and Austria (+0.4%) in the EU15, and Poland (-1.8%), Slovakia (-1.3%) and Lithuania (-1.1%) in the EU8). Note that

migration is associated with an increase in labor market participation; consequently, the total labor supply in the enlarged EU has increased by 0.1%.

Table 2

**The impact of EU8 migration on GDP, wages and unemployment**

	Change of labour	GDP		GDP per capita		Factor income per native		Unemployment		Wages	
		Short-run	Long-run	Short-run	Long-run	Short-run	Long-run	Short-run	Long-run	Short-run	Long-run
<i>Changes in % (unemployment rate: changes in percentage points)</i>											
AT	0.42	0.31	0.34	0.00	0.02	0.12	0.15	0.02	0.02	-0.02	0.00
BE	0.22	0.11	0.17	-0.08	-0.02	0.01	0.07	0.07	0.05	-0.04	0.00
DE	0.10	0.04	0.10	-0.03	0.02	-0.01	0.04	0.03	0.01	-0.03	0.00
DK	0.23	0.13	0.20	-0.08	-0.01	0.00	0.07	0.02	0.00	-0.05	0.00
ES	0.19	0.03	0.11	-0.08	-0.01	-0.04	0.04	0.05	0.02	-0.04	0.00
FI	0.09	0.03	0.08	-0.06	-0.01	-0.02	0.04	0.03	0.01	-0.03	0.00
FR	0.01	0.01	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GR	-0.01	0.00	-0.01	0.01	0.00	0.00	-0.01	0.00	0.00	0.00	0.00
IE	4.87	0.80	2.93	-2.07	-0.02	-0.77	1.31	0.87	0.37	-1.61	0.00
IT	0.11	0.04	0.08	-0.03	0.01	0.00	0.04	0.02	0.01	-0.03	0.00
LU	1.00	0.81	1.13	0.23	0.55	0.34	0.65	0.12	0.05	-0.25	0.00
NL	0.14	0.09	0.12	-0.03	-0.01	0.02	0.04	0.02	0.01	-0.02	0.00
SE	0.38	0.25	0.33	-0.01	0.07	0.05	0.12	0.05	0.03	-0.06	0.00
UK	1.28	0.50	0.89	-0.28	0.10	-0.05	0.34	0.21	0.11	-0.29	0.00
CZ	-0.08	-0.07	-0.11	0.01	-0.03	0.01	-0.03	-0.02	0.00	0.03	0.00
EE	-0.21	-0.09	-0.19	0.12	0.02	0.12	0.02	-0.04	0.00	0.06	0.00
HU	-0.44	-0.34	-0.49	0.10	-0.04	0.10	-0.04	-0.04	0.00	0.11	0.00
LT	-1.14	-0.55	-1.15	0.61	-0.01	0.61	-0.01	-0.32	-0.01	0.31	0.00
LV	-0.43	-0.26	-0.46	0.17	-0.03	0.17	-0.03	-0.09	0.00	0.12	0.00
PL	-1.77	-0.88	-1.94	0.90	-0.18	0.90	-0.18	-0.59	0.03	0.43	0.00
SI	0.26	0.15	0.21	-0.10	-0.05	-0.10	-0.05	0.02	0.00	-0.04	0.00
SK	-1.34	-0.53	-1.51	0.82	-0.18	0.82	-0.18	-0.55	0.00	0.43	0.00
EU15 <sup>b)</sup>	0.36	0.13	0.26	-0.09	0.03	-0.02	0.10	0.06	0.02	-0.09	0.00
EU8	-1.16	-0.52	-1.10	0.65	0.05	0.65	0.05	-0.42	-0.02	0.25	0.00
<b>Total</b>	<b>0.11</b>	<b>0.11</b>	<b>0.20</b>	<b>0.11</b>	<b>0.20</b>	<b>0.16</b>	<b>0.25</b>	<b>-0.03</b>	<b>0.00</b>	<b>-0.07</b>	<b>0.00</b>

Source: Own estimates and simulation, see text.

Notes: 1) Without Portugal

This labor supply shock results in an increase in the GDP in the EU15 of 0.13% in the short-run and by 0.26% in the long-run, while the GDP in the enlarged EU increases by 0.11% in the short-run and by 0.20% in the long-run. This is a substantial income gain, which increases the overall GDP in the enlarged EU by about 24 billion euros. In the sending countries, however, the loss of production factors results in a decline in the GDP of 0.52% in the short-run and by 1.1% in the long-run.

The GDP per capita increases in the sending countries due to a higher capital endowment per worker in the short-run; while the long-run effects are by and large neutral. In the receiving countries of the EU15, the effects are ambiguous: on the one hand, migrants bring no capital by assumption, so the GDP per capita declines; on the other hand, the higher labor market participation of migrants from the new member states exerts a positive impact on the GDP per capita. Overall, the GDP per capita in the EU15 declines slightly in the short-run by 0.09%; whereas it increases slightly in the long-run by 0.03%.

For welfare considerations, the impact of migration on factor income is more relevant than the GDP per capita. We find that the migration from the new member states is neutral on the total factor income of natives in the EU15 in the short-run; while it increases in the long-run by 0.1%. In the sending-countries, the total factor income per native increases by 0.65% in the short-run, a effect which almost completely disappears in the long-run, when the capital stock has adjusted. In the entire region, the total factor income, however, increases substantially (+0.25% in the long-run) since the income gain of migrants is considered here.

The aggregate labor market effects of migration are surprisingly small. The unemployment tends to increase in the receiving countries of the EU15 by a mere 0.06 percentage points in the short-run and by almost zero in the long-run; while it falls in the sending countries by 0.42 percentage points in the short-run. This effect disappears in the sending countries when capital stocks have adjusted. Overall, migration reduces aggregate unemployment in the enlarged EU slightly in the short-run. Similarly, aggregate wages tend to decline by a mere 0.09% in the EU15 and to increase by 0.25% in the EU8 in the short-run, but remain constant in the long-run once the capital stock has adjusted.

The labor supply shocks can affect different groups in the labor market in different ways. Table 3 presents the impact of migration from the new member states into the EU15 by qualification groups. Note again that in this context, we have grouped the immigrants from the EU8 which arrived from 2004 onwards by occupation and linked these occupation groups to education levels in order to capture its actual impact on the different segments in the labor market.

We find that the effects are very balanced across the different groups of the labor force in the EU15. Less-skilled workers are slightly more affected in the short-term (-0.1) compared to medium-skilled workers (-0.09) and high-skilled workers (-0.07). In the long-run, high-skilled workers benefit slightly; while medium and low skilled workers lose slightly (Table 3). Similarly, the unemployment rate of the less-skilled tends to increase slightly more than that of the medium and high-skilled in the short-term. In the long-run, the unemployment rate remains by and large unchanged for all groups in the labor market of the EU15.

In the sending countries, we find again that the wage impact of migration is relatively balanced across the different groups in the labor market: wages tend to increase by 0.23% for the less and medium-skilled, and by 0.3% for the high-skilled. The long-run effects are negligible. However, we observe a different pattern for the development of the unemployment risks: the unemployment rate of the less-skilled declines by 0.8 percentage points, by 0.4 percentage points for the medium-skilled and by 0.2 percentage points for the high-skilled in the short-run. In the long-run, only the unemployment rate of the less-skilled declines significantly by 0.2 percentage points.

Table 3

**The impact of EU8 migration on wages by skill group**

	All		Low-skilled		Medium-skilled		High-skilled	
	Short-run	Long-run	Short-run	Long-run	Short-run	Long-run	Short-run	Long-run
<i>Changes in %</i>								
AT	-0.02	0.00	-0.02	0.00	-0.02	0.00	-0.02	0.00
BE	-0.04	0.00	-0.03	0.01	-0.03	0.00	-0.05	-0.01
DE	-0.03	0.00	-0.03	0.00	-0.03	0.00	-0.03	0.00
DK	-0.05	0.00	-0.05	0.00	-0.05	0.00	-0.05	0.00
ES	-0.04	0.00	-0.03	0.01	-0.14	-0.09	-0.01	0.04
FI	-0.03	0.00	-0.03	0.00	-0.03	0.00	-0.03	0.00
FR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
GR	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
IE	-1.61	0.00	-1.72	-0.19	-1.84	-0.23	-1.34	0.30
IT	-0.03	0.00	-0.03	0.00	-0.03	0.00	-0.03	0.00
LU	-0.25	0.00	-0.13	0.12	-0.14	0.11	-0.63	-0.38
NL	-0.02	0.00	-0.02	0.00	-0.02	0.00	-0.03	0.00
SE	-0.06	0.00	-0.05	0.01	-0.05	0.01	-0.08	-0.02
UK	-0.29	0.00	-0.35	-0.07	-0.35	-0.06	-0.19	0.11
CZ	0.03	0.00	0.03	0.00	0.02	0.00	0.03	0.01
EE	0.06	0.00	0.07	0.01	0.06	0.00	0.06	0.00
HU	0.11	0.00	0.09	-0.01	0.10	-0.01	0.12	0.01
LT	0.31	0.00	0.32	0.02	0.30	-0.01	0.33	0.01
LV	0.12	0.00	0.11	0.00	0.11	-0.01	0.13	0.01
PL	0.43	0.00	0.41	0.01	0.39	-0.03	0.51	0.06
SI	-0.04	0.00	-0.06	-0.02	-0.04	0.00	-0.03	0.01
SK	0.43	0.00	0.36	-0.02	0.41	-0.02	0.49	0.05
<b>EU15<sup>1)</sup></b>	<b>-0.09</b>	<b>0.00</b>	<b>-0.10</b>	<b>-0.01</b>	<b>-0.09</b>	<b>-0.01</b>	<b>-0.07</b>	<b>0.02</b>
<b>EU8</b>	<b>0.25</b>	<b>0.00</b>	<b>0.23</b>	<b>0.00</b>	<b>0.23</b>	<b>-0.02</b>	<b>0.30</b>	<b>0.03</b>
<b>Total</b>	<b>-0.07</b>	<b>0.00</b>	<b>-0.09</b>	<b>-0.01</b>	<b>-0.08</b>	<b>-0.01</b>	<b>-0.06</b>	<b>0.03</b>

Source: Own estimates and simulation, see text.

Notes: 1) Without Portugal

Altogether, migration from the new member states has only a moderate impact on the distribution of wages and unemployment risks among different groups in the labor markets of an enlarged EU, which can be inter alia traced back to the fact that the skill structure of migrants from the new member states is relatively balanced.

Finally, Table 4 presents the impact on natives and foreigners in the labor market. Here we do indeed observe a distinct difference in the wage effects of migration: while native wages tend to decline in the EU15 only by 0.07% in the short-run and to increase by 0.02% in the long-run, our simulation results suggest that the wages of the foreign workforce tend to decline by 0.41% in the short-run and by 0.34% in the long-run. Analogously, the unemployment risks are unequally distributed between foreigners and natives: the unemployment rate of the foreign workforce tends to increase by 0.19 percentage points and that of the native workforce by 0.03 percentage points in the short-run. In the long-run, the unemploy-

ment rate of the foreign workforce increases by 0.16 percentage points, while that of natives remains stable.

Table 4

**The impact of EU8 migration on native and non-native wages and unemployment**

	Native wages		Non-native wages		Native unemployment		Non-native unemployment	
	Short-run	Long-run	Short-run	Long-run	Short-run	Long-run	Short-run	Long-run
<i>Changes in % (unemployment rate: changes in percentage points)</i>								
AT	0.01	0.03	-0.30	-0.28	0.00	-0.01	0.11	0.10
BE	-0.03	0.01	-0.21	-0.17	0.01	-0.01	0.49	0.45
DE	-0.02	0.01	-0.17	-0.14	0.01	-0.01	0.12	0.09
DK	-0.05	0.00	-0.17	-0.13	0.01	-0.01	0.16	0.13
ES	-0.04	0.00	-0.06	-0.01	0.04	0.00	0.20	0.15
FI	-0.02	0.01	-0.50	-0.47	0.02	0.00	0.27	0.23
FR	0.00	0.00	0.00	0.00	0.00	0.00	0.01	0.01
GR	0.00	0.00	0.03	0.03	0.00	0.00	-0.03	-0.02
IE	-1.58	0.03	-2.36	-0.74	0.59	0.07	2.10	1.87
IT	-0.02	0.01	-0.17	-0.14	0.01	0.00	0.17	0.15
LU	-0.20	0.05	-0.32	-0.07	0.03	-0.02	0.19	0.10
NL	-0.02	0.01	-0.18	-0.16	0.00	0.00	0.14	0.13
SE	-0.04	0.01	-0.43	-0.38	0.02	-0.01	0.37	0.33
UK	-0.23	0.06	-2.89	-2.60	0.08	-0.02	3.28	3.21
<b>EU15<sup>1)</sup></b>	<b>-0.07</b>	<b>0.02</b>	<b>-0.41</b>	<b>-0.34</b>	<b>0.03</b>	<b>0.00</b>	<b>0.19</b>	<b>0.16</b>

Source: Own estimates and simulation, see text.

Notes: 1) Without Portugal

While we find no significant effects of migration on the distribution of earnings and unemployment risks across the different education groups of the labor market, immigration from the new member states has a significant impact on the distribution of wages and unemployment risks between natives and foreigners. The different implications of immigration from the new member states for the native and the foreign labor force in the EU15 can be traced back to two facts: first, migrants from the new member states are more similar to the foreign workforce with respect to observable human capital characteristics such as education and work experience, and hence, compete more in the same segments of the labor market. Second, according to our estimation results, migrants and natives are imperfect substitutes in the labor market, so that migrants tend to compete more with other foreigners than natives within the same skill and experience cells of the labor market.

## 4.2 The Sectoral Impact of Migration from the EU8 into the EU15

Labor migration from the EU8 into the EU15 does not only affect wages and unemployment risks at the aggregate levels of the economies involved, but also their sectors in different ways. A complete understanding of the distributional effects of



migration also requires, therefore, an analysis of structural change triggered by the EU's Eastern enlargement, since this also involves benefits and costs for the affected workers. To analyze the sectoral effects, we here apply the multi-sectoral CGE model outlined in Section 3.2 to Poland and the UK.

The UK is the most important receiving country in the EU15 in absolute terms; and Poland is the most important sending country. The UK had already opened its labor market to migrants from the EU8 in 2004. Furthermore, the economic conditions have been favorable there throughout the 2004-2007 period. In 2004, the unemployment rate was at 4.7%, below the EU15 average, and GDP growth, at 2.8%, was slightly above the EU average. These favorable conditions changed very little during the following years. According to the UK LFS, about 610,000 migrants from EU8 countries lived in the UK by the end of 2007. In our counterfactual scenario, we estimate that migration would have been about 155,000 without EU enlargement, and as a consequence, enlargement triggered an additional stock of migrants of 455,000. The share of migrants in the labor force is larger than their share in the population, since migrants from the new member states have an extremely high participation rate (75%).

In contrast, the economic situation looked gloomy in Poland at the outset of accession. Low GDP growth of 1.5% in 2001 and 2002 resulted in high unemployment rates which peaked at 20% in 2002 and, at 19%, were still high in 2004. This contributed to the relatively high emigration rates from Poland. According to our estimates, more than 1.3 million migrants from Poland resided in the EU15 in 2007; while only 630,000 Polish migrants would have lived there in our counterfactual scenario had enlargement not taken place. The difference accounts for about 2% of the Polish workforce.

According to our simulations, the strong labor market shocks in Poland (-1.8%) and the UK (+1.3%) decreased the GDP in Poland by 0.92% and increased it in the UK by 0.86%. In the UK, our simulations show an improvement of the balance of payments: the increase in exports is stronger than the increase in imports for both intra- or extra-EU trade. Nevertheless, intra-EU exports increase more strongly than extra-EU exports (1.24% intra-EU to 1.09% extra-EU), while the opposite holds true for intra- and extra-EU imports (0.81% intra-EU to 0.89% extra-EU).

In Poland, we can observe a worsening of the balance of payments: exports are shrinking faster (1.25% intra-EU and 1.24% extra-EU) than imports (-0.8% intra-EU and 0.81% extra-EU). In contrast to the UK, where we see only a small difference between intra-EU and extra-EU trade.

The trade effects are caused by a change in production structures. According to our production function, intermediary goods are additional input factors. In an

open economy not all intermediaries are available within a country. Therefore, imports have to react to a change in production, which is in turn triggered by changes in factor endowments. Beside the channel of intermediaries, exports react to a change in the real exchange rate. To meet demand in the goods market, a change in production has to be accompanied by a change in prices. A general price change affects the exchange rate and thus trade.

Table 5  
Simulation results, key macroeconomic figures

	UK	Poland
	<i>Changes in %</i>	
GDP	0.86	-0.92
GDP per capita	-0.03	0.81
Exports Intra-EU	1.24	-1.25
Exports Extra-EU	1.09	-1.24
Imports Intra-EU	0.81	-0.80
Imports Extra-EU	0.89	-0.81
Wages	-0.34	0.32
	<i>Changes in percentage points</i>	
Unemployment rate	0.13	-0.48

Source: Own estimates.

In our model, trade and sectoral effects strongly interact. On the one hand, a change in labor supply of a tradable sector instantly affects imports and exports. On the other hand, a change in the exchange rate affects the demand of goods of both an industry producing tradable goods and an industry demanding tradable intermediaries.

We see a strong reaction by the manufacturing industry in both the UK and Poland caused by the respective labor supply shocks. Manufacturing goods are mainly tradable goods, and the intermediaries needed for production in this sector are tradable, too. Consequently, a strong reaction in trade can be seen in a change in production in this sector. In the UK, manufacturing production increases by proportionately 1.1% more than the overall change in production of 0.8%. However, not only the tradable sectors benefit from the additional labor supply in the UK. Some service industries like the health and social work sector and education, also enhance their production at 0.9% above the average. The sectors which benefit only modestly from the additional labor supply are agriculture, and mining and quarrying.

In Poland, the production of the manufacturing sector is reduced by 1% (see Table 6), which is above the average decrease in production of 0.9%. In contrast, some industries producing domestic goods like hotels and restaurants and con-

struction reduce their production at 0.8% below the average. However, the sectoral effects are in general smaller in Poland than the shift in the sectoral structure of the economy in the UK.

Table 6

**Simulation results, sectoral impact**

	UK	Poland
	<i>Changes in %</i>	
Agriculture, hunting and forestry	0.7	-0.8
Fishing	0.5	-0.9
Mining and quarrying	0.4	-1.0
Manufacturing	1.1	-1.0
Electricity, gas and water supply	0.7	-0.8
Construction	0.7	-0.8
Wholesale and retail trade <sup>1)</sup>	0.9	-0.9
Hotels and restaurants	0.8	-0.8
Transport, storage and communication	0.8	-0.9
Financial intermediation	0.6	-0.8
Real estate, renting and business activities	0.6	-0.8
Public administration and defence; compulsory social security	0.9	-0.9
Education	0.9	-0.9
Health and social work	0.9	-0.9
Other community, social and personal service activities	0.7	-0.9
Activities of households	0.9	-0.7
<b>Total</b>	<b>0.8</b>	<b>-0.9</b>

Source: Own estimates.

Notes: 1) Includes also repair of motor vehicles, motorcycles and personal and household goods.

Again, our results predict moderate effects of migration on wages and unemployment in both countries. The migration effect is mitigated by the partial adjustment of the capital-output ratio, by international trade and by the redistribution

of factors across sectors. Therefore, we observe that the increase in labor supply is accompanied by an increase in the physical capital stock in the UK. Furthermore, the balance of payments has improved there. In Poland, the capital stock correspondingly declines while the balance of payment worsens. As a third effect, the sectoral factor mobility assures that the new factor endowments are distributed to their most productive use, which yields additional gains in factor productivity and output.

## 6 Conclusions

In this chapter, we analyze the effects of migration on the distribution of factor incomes, employment opportunities and structural change. We find that the migration flows triggered by the EU's Eastern enlargement has increased the GDP in the integrated area by about 0.2%, or by about 24 billions euros.

The impact on aggregate wages and unemployment is surprisingly small. Our simulation results indicate that wages in the receiving countries of the EU15 decline by less than 0.1% in the short-run, while they remain stable in the long-run. Similarly, the unemployment rate increases only slightly in the EU15 in the short-run, but remains by and large unaffected by immigration in the long-run. Conversely, we observe increasing wage and declining unemployment rates in the sending countries in the short-term; while the aggregate labor market effects of migration are more or less neutral there in the long-term.

This moderate impact of migration can be traced back to two main factors: first, capital stocks tend to adjust to labor supply shocks even in the short-term. In the long-run, our empirical findings suggest that capital stocks adjust completely to changes in labor supply, both in the receiving and sending countries. As a consequence, aggregate wages and unemployment risks remain largely unaffected by the emigration or immigration of labor. Second, the economies also adjust with trade and sectoral change. The simulations in our second model, which consider these adjustment mechanisms, find therefore particularly small effects of migration on labor markets.

Moreover, we find only a moderate impact of migration on the distribution of wages and unemployment risks. This is caused largely by the relatively balanced skill structure of the migrant population from the new member states. In contrast to other groups of migrants, migrants from the new member states are characterized by a similar skill structure compared to the population of the receiving countries and are only moderately better qualified than the population in the sending countries. However, migrants from the new member states are employed well be-

low their skill levels in the EU15. Nevertheless, this has been considered in our simulations of the labor supply shocks. Overall, we find that the less-skilled are slightly more affected by falling wages and increasing unemployment risks than medium and high-skilled workers in the EU15. In the long-run however, the effects are pretty small, even for less-skilled workers. High and medium-skilled workers are either unaffected by immigration from the new member states in the long-run or tend to benefit.

There is, however, one important distributional impact of immigration from the new member states: while the native workforce tends to benefit, foreign workers which already reside in the EU15 tend to lose substantially. The wages of foreign workers decline by about 0.4% in the short-term, while the unemployment rate increases by about 0.2 percentage points. We thus find that natives in the receiving countries tend to benefit from migration triggered by the EU's Eastern enlargement, while foreigners tend to lose out. This can be traced back to our finding that foreigners and natives are imperfect substitutes in the labor market, and that the skill and work experience structure of the employed workforce from the new member states is more similar to that of other foreigners than to that of natives.

Finally, our simulation results demonstrate that the sectoral structure of the economy is affected in different ways by migration from the new member states. In the receiving countries, particularly the manufacturing sectors benefit from immigration; while these sectors contract in the sending countries.

Altogether, our findings suggest that the additional migration created by EU Eastern enlargement has triggered substantial aggregate gains for the enlarged EU, but it has affected the distribution of earnings and unemployment risks only very moderately. Opening the labor markets in all EU15 countries, including Austria and Germany, would therefore generate additional benefits for the enlarged EU according to our simulations, without adversely affecting the receiving countries. In contrast, the native population and the native workforce tend to gain from further immigration from the new member states, while the foreign workforce tends to lose there.

The financial crisis will, however, reduce the benefits from EU Eastern enlargement. It is very likely that net migration from the new member states into the EU will contract during the following years since migration is largely driven by employment opportunities in the receiving countries. As a consequence, immigration from the new member states will decline in the EU15 and return migration will increase, although the unemployment rates are likely to increase in the new member states as well.

It is speculative to assess whether the EU15 or the new member states will be more than proportionately affected by the financial crisis. According to the latest

forecasts by the EU, GDP will decline less in important sending countries such as Poland and Romania than in important destination countries such as the UK and Spain. This would further contribute to the contraction of net migration flows.

These developments will generate further benefits for natives in the receiving countries: a part of the employment decline in the most affected receiving countries will be absorbed by the adjustment of migration flows. However, net return migration would generate additional costs to the sending countries: the unemployment rate will increase there compared to a case without return migration. Nevertheless, from the perspective of the enlarged EU, open labor markets can contribute to reduce unemployment if a part of the macroeconomic shock is absorbed by increasing labor mobility.

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EU Labor Markets After Post-Enlargement Migration

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