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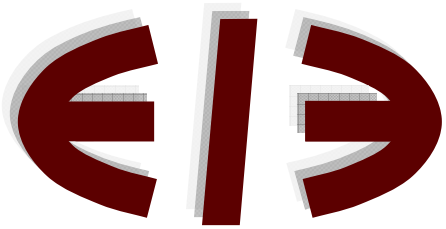
EERI Research Paper Series No 01/2006

ISSN: 2031-4892



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The Economic Geography of Labour Migration: Competition, Competitiveness and Development*

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Revised 2010

Abstract

The present paper studies labour migration in the enlarged EU. Adopting the Krugman's framework of the New Economic Geography, we are able to study both the determinants of labour migration, such as market potential, wages, cost of living on one hand, and labour migration on the other hand simultaneously, which allows us to address important issues facing the traditional reduced form studies. Our empirical findings suggest that European integration would trigger labour migration between and within the Member States of the enlarged EU. Given that in our framework migrants are attracted by market potential, but they also affect market potential, the emergence of a core-periphery pattern through labour migration not very likely in the enlarged EU.

Keywords: New Economic Geography, Market Potential, Labour Migration, Economic Integration.

JEL classification: F12, L11, R12, R23.

*The author acknowledges helpful comments from Andries Brandsma, Paul Cheshire, Matthieu Crozet, Jurgen Essletzbichler, Jay Gatrell, Geoff Meen and Henry Overman as well as seminar participants at LSE, CEPR and University of Leuven. The author acknowledges financial support from the Research Grant 'International Labor Migration in a Globalizing Economy'. The author is solely responsible for the content of the paper. The views expressed are purely those of the author and may not in any circumstances be regarded as stating an official position of the European Commission.

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1 Introduction

During the first two decades after the fall of the Wall, the context and assumptions around migration, have changed significantly. From the early nineties, when the centrally planned Central and Eastern European (CEE) countries started to transform their economies to market oriented, to the current time, when most of the EU Member States face an economic shock – a global economic crisis – both migration push and pull drivers have changed.[1] In the first years after the fall of the Wall, due to sizeable income differences between the East and the West, there was an enormous migration pressure in the East, which was opposed by a similarly strong pressure in the West to prevent mass immigration. During the first decade, the relative economic conditions improved significantly in the CEE transition economies, as a result of which the pressure to migrate decreased. The migration flows from the East started to increase in the middle of the second decade, when the new Member States joined the EU and it became possible to work legally in several old Member States. Due to the global economic crisis, the context and assumptions around immigration, changed again in the last two years. Whereas in the new EU sending countries the migration push drivers are increasing again, in the old EU receiving countries the political pressure to limit immigration is growing for the second time since the fall of the Wall (*Kancs* and *Kielyte* 2010, *Papademetriou et al* 2009).

There is a large body of literature that attempts to predict the size and impacts of potential labour migration in the enlarged EU. The predictions of early migration studies, most of which were based on reduced-form migration models and extrapolations of previous migration episodes, were rather high predicting emigration between 10.5% and 15% of the CEE's population (*Straubhaar* and *Zimmermann* 1993, *Boeri* and *Brücker* 2005). Confronting these predictions with the observed migration flows during the first two decades since the fall of the Wall, we note that the CEEs were indeed characterised by sizable migration flows of several millions of persons over the last twenty years. However, most of these migration flows took place within Eastern Europe, and it is estimated that less than 2.5% of the total CEE's population has emigrated to Western Europe during the first 20 years since the fall of the Wall (*European Commission* 2010). The huge discrepancy between the model-based predictions and the observed migration is not surprising, given that most of the early migration studies were based on reduced-form models, where ex-ante values of key explanatory

[1] In this paper Western Europe is referred to as old EU Member States and the CEE accession countries as new EU Member States, which in our study include the countries, which joined the EU in 2004, namely the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Poland, Slovakia (see Figure 1).

variables, such as wages and employment, have to be set by the researcher a priori. According to *Faini et al* (1999), a priori fixing of explanatory variables (drivers of migration) in small open economies, such as the CEE transition countries, where these variables are subject to dynamic changes, is both empirically and theoretically problematic. Fundamentally, making such predictions it needs to be recognised that migration itself affects wages, income, employment, and cost of living (*Borjas* 2001, *Krugman* 1991). This implies that, without a general equilibrium model, which also takes into account feedback effects of population movements, it is hardly possible to predict when the relocation of labour force will stop or even reverse. For example, the GDP per capita, which is one of the main explanatory variables in empirical migration models, has increased in most CEEs considerably faster than was typically assumed in reduced form models. Econometrically, the reverse causality and the related endogeneity issues make it difficult to obtain unbiased estimates (*Faini et al* 1999).

These notable deviations between the reduced form model predictions and the observed migrations patterns in the CEE transition countries suggest that the reduced-form approach is not a reliable tool for studying migration behaviour in small open economies in transition, which dynamically adjust to changes in factor and product market conditions. Instead, a methodological framework is required, which does not rely on ex ante predetermined estimates of migration drivers.

In order to account for the deficiencies of the reduced form approach to small open economies undergoing dynamic transition, we follow *Crozet* (2004), *Kancs* (2005), *Pons et al* (2007), *Hering* and *Paillacar* (2008) and *Paluzie et al* (2009) and adopt an alternative - economic geography - approach for studying the direction and size of potential labour migration in the CEE accession countries. According to the NEG literature (*Krugman* 1991), migrants not only follow market potential, they also affect market potential. Given that the NEG approach incorporates important general equilibrium feedback mechanisms, which interacting with labour migration determine the equilibrium distribution of labour force, it has been empirically more successful than the reduced form approach (*Kancs* 2005).

The general equilibrium approach of the NEG framework is considerably more demanding than that of the reduced-form approach. In a first step, we derive an empirically verifiable migration equation from the theoretical economic geography model, where inter-regional migration is driven by real wage differentials (section 3), and estimate the migration model using data for historical migration patterns in the CEE accession countries, which provides estimates of key parameters of the theoretical economic geography model (section 4). In a second step, we use the theoretical

economic geography model and the estimated parameters to perform simulations of integration-induced impact on labour migration in the enlarged EU (section 5).

2 Migration in Europe after the fall of the Wall

2.1 Migration policy in the EU

During the first two decades after the fall of the Wall, the immigration policy in the old Member States towards the Eastern European neighbours was very restrictive. The enlargements of the EU to East in 2004 (and later in 2007, which is not the subject of this article) have significantly expanded the political geography of the free-movement area. Nationals from the CEE countries, on becoming citizens of the EU, have obtained rights of movement through the European Union and partner states (e.g. EFTA countries) that are broader than those available to migrants from other Eastern European countries, which are not part of the EU.

In the light of concerns that a massive influx of workers from the CEE would negatively affect the local wages and employment in Western Europe, the Accession Treaties allowed for transitional arrangements partly or fully restricting the free movement of workers from the CEEs. The transitional arrangements can be applied for up to seven years, with the policy reviewed after two and again after five years (*European Commission* 2007).

Only three old Member States – Ireland, Sweden and the United Kingdom – opened their labour markets to the CEE's workers from the date of accession. At the end of the first two-year period, four more Member States – Spain, Finland, Greece and Portugal – opened their labour markets, later followed by Italy, the Netherlands, Luxembourg, and France. Belgium and Denmark lifted the restrictions in 2009, while in Austria and Germany the inflows of workers from the CEE are regulated by national law (mainly through seasonal work-permit schemes operating under bilateral agreements) and have to be lifted by 1 May 2011 at the latest. However, a number of exemptions have opened labour markets for high skilled workers and specific categories in these countries (*Altamirano* 1995; *Kancs* and *Kielyte* 2010).

2.2 Migration in the Baltics

After the fall of the Wall, the Baltics experienced significant migration outflows, mostly of the "Russian speaking" population returning to their countries of origin. In Estonia about 100 thousand have returned to their 'homelands', with the majority leaving to Russia. As a consequence, these countries became net emigration countries.

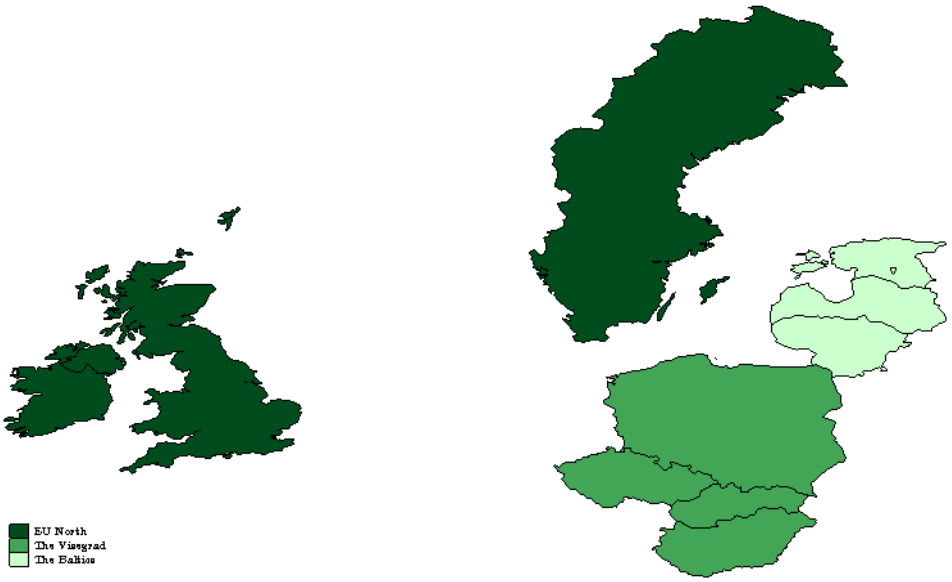

Figure 1: Countries of the study: EU North (Ireland, Sweden, the United Kingdom), the Visegrad (the Czech Republic, Hungary, Poland and Slovakia) and the Baltics (Estonia, Latvia and Lithuania)

At the end of the 1990s, emigration flows weakened considerably and the net outflows became slightly positive in Estonia and Lithuania for several years.

In around the same time, the migration to the Western countries started to increase, e.g. the net emigration from Latvia to the West increased from nearly zero to 1500 in 1996. The major destinations for migrants from the Baltics were Finland and Germany for Estonia, and Israel, the US and Germany for Latvia and Lithuania. Nevertheless, with 15 thousand Estonians, 8 thousand Lithuanians and 7.5 thousand Latvians the number of legal Baltic countries' residents living in West European countries was relatively low at the end of the 1990s (*Kancs* and *Kielyte* 2002).

After the accession to the EU in 2004, the emigration from the Baltic States to Western Europe increased substantially (*Traser* and *Venables* 2005). In all three Baltic countries the largest outflow of emigrants occurred in the years after the accession (2004-2005), when the share of emigrants increased substantially. Due to improving income possibilities in the Baltics relative to Western Europe, it started to diminish in 2006 and 2007. The weakening of worker outflow after 2005 was also related to the domestic labour market tightening in the Baltics in 2006-2007. During this time Latvia, Lithuania and Estonia experienced the highest increases in wage rates among all EU member states and relatively low unemployment levels. On av-

erage, during 2002-2007, the largest gross flows of emigration were from Lithuania, followed by Latvia and Estonia. The average annual level of gross emigration was around 40 thousand people from Lithuania, 20 thousand from Latvia and 7 thousand from Estonia (*European Commission* 2007). As before, there were significant differences between the three countries in terms of destination countries. While the largest number of emigrants from Estonia went to Finland, followed by the UK and Ireland, the main destination country for emigrants from Latvia and Lithuania was the UK, followed by Ireland and Germany. Furthermore, while the annual emigration to most of the countries fluctuated in different years, it was relatively stable to Germany. In addition, the cross country differences are notable. Whereas the emigration flows increased fourfold from Lithuania and Latvia after the EU enlargement (compared to 2002-2003), they only doubled from Estonia. Twenty years after the fall of the Wall, the highest worker mobility rate among all EU member states was in Lithuania, with around 3% of the total population having moved to other EU member states since the EU enlargement *European Commission* (2010).

2.3 Migration in the Visegrád

Before EU enlargement, nearly 300 thousand persons from the Visegrád were legally employed in the EU, accounting for 0.2% of the EU workforce or around 6% of total non-EU foreign workers (*European Commission* 2007). Germany and Austria hosted 70% of Visegrád workers in the EU. Broken down by home country, 55 thousand were from Bulgaria, 35 thousand from the Czech Republic, 20 thousand from Slovakia, 77 thousand from Hungary, 435 thousand from Poland, and 155 thousand from Romania. As a result of closed labour markets but unrestricted travel, it was estimated that, in addition to legal workers, there were around 600 thousand undocumented workers from the Visegrád countries. The total number of legal immigrants, both working and non-active persons, from the Visegrád was approximately 830 thousand in the beginning of 2000s (*European Commission* 2007).

Simultaneously to outflows to the West, the Visegrád itself developed into a migrant-receiving area. The Czech Republic, a regional leader, hosted as many as 150 thousand migrant workers or foreign entrepreneurs in 2002, the majority of whom came from Slovakia and Ukraine. Also Hungary (and to lesser extent Poland) received substantial numbers of immigrants. Most of the countries recorded also large inflows of asylum seekers; e.g. between 1996 and 2003 the Czech Republic 63 thousand, Hungary 45 thousand, Poland 35 thousand and Slovakia 33 thousand (*European Commission* 2008).

The emigration to the West increased substantially after the enlargement in 2004. In 2004 the number of the residents from these countries stood at around 900 thousand. Although, the exact scale of post-enlargement migration flows are difficult to determine, population statistics and Eurostat's Labour Force Survey (LFS) data suggest that the total number of people from the Visegrád, living in Western Europe has increased by around 1.1 million since the enlargement in 2004 (*European Commission* 2010). Ireland has been by far the largest receiving country in the Visegrád relative to its population size, with around 5% of its current working age population from the Visegrád, followed by the UK (1.2%). Also Austria and Luxembourg host significant proportions of the recent arrivals from the Visegrád, albeit much fewer than in the UK and Ireland. In all other West European countries the population share of the recent Visegrád arrivals is very small, even in Sweden, which never applied restrictions to the free movement of workers, and in those MS, which have opened their labour markets since 2006.

As already noted, the mobility of labour force is different across the Visegrád countries. Polish citizens accounted for 25% of all EU citizens, who changed their residence to another EU member state in recent years. Around 60% of intra-EU Polish emigrants went to the UK, while the second destination was Ireland. In total, around 2% of total Polish and Slovak population have moved to other EU member states since the EU enlargement in 2004. The Czech Republic and Hungary showed rather low mobility rates, which are similar to those of Western Europe.

3 Theoretical framework

3.1 The setup

The reduced form approach, which is the standard approach in empirical studies of international labour migration, has been often criticised in the literature, because it ignores the general equilibrium feedback effects caused by labour migration both in the origin and destination regions (*Massey et al* 1993, *Gallup* 1997, *Fertig* and *Schmidt* 2001). Given that small and open economies are particularly sensitive to international shocks, the reduced form approach is not suitable for predicting the international labour migration in small open dynamic economies, such as the CEE transition economies.

In order to account for the deficiencies of the reduced form approach to small open economies undergoing dynamic transition, we follow *Crozet* (2004), *Kancs* (2005), *Pons et al* (2007), *Hering* and *Paillacar* (2008) and *Paluzie et al* (2009) and adopt

an alternative - the NEG approach - where both the migration flows and the drivers of migration are determined endogenously. The main difference of the NEG approach from the traditional reduced form migration models is that it not only allows the migration pull and push factors to trigger migration, it also accounts for the general equilibrium feedback effects, which migration triggers on the pull and push factors (market potential). According to the underlying NEG approach, labour migration is driven by differences in income, and it also affects the relative income differences between the origin and destination regions, which is in line with the empirical evidence (*Massey et al* 1993, *Gallup* 1997, *Fertig* and *Schmidt* 2001). For example, in our model, when an integration policy reduces transportation costs, the net income differences between regions increase, and firms and workers will have the tendency to relocate to the high wage/profit regions. However, the relocation of workers and firms also increases the competition on factor and product markets in that region. Because of the increased competition, the wages and profits will decrease in the destination region. At each level of integration (which are modelled as transport costs in our model), the relocation of workers and firms equalise the net (of transport costs) wages and profits between regions, until neither workers nor firms will have a further incentive to move to another region. By comparing this situation with the initial regional shares of workforce and industry, we can calculate the equilibrium migration. Hence, our approach is able to predict the equilibrium labour migration, i.e. we can predict the share of workforce which will change its location due to regional integration. Usually, this is not possible in reduced form migration models, where where the migration pull and push factors (market potential) are fixed exogenously.

The key variables of the theoretical model, which we use for simulations, can be summarised as follows. Following *Kancs* (2005), the world consists of R regions, each of which is endowed with two factors of production, an immobile factor, L, and a mobile factor, H. Regional supplies of the immobile factor are exogenous to the model and fixed: each region contains L_r units of the immobile factor. As in *Krugman* (1991), the mobile factor (labour) is inter-regionally mobile. The world hosts H units of labour, where $H = \sum_{r=1}^{R} H_r$ with $r \in \{1, .., r, .., R\}$. Workers may relocate between regions maximising their utility, which implies that the inter-regional distribution of labour will change in the course of integration. H_r captures the region initial endowment of labour, and $\hat{H}_r$ - regions' labour endowment after the integration-triggered adjustment. Hence, H_r is an exogenous variable, whereas $\hat{H}_r$ will be calculated within the model. Each region hosts two types of industries: 'traditional' industries, A, and 'manufacturing' industries, X. Both types of goods, A and X, are traded among all regions. The traditional sector is perfectly competitive,

it produces a homogenous good under perfect competition, it is spatially immobile, because it only uses the immobile factor in producing goods. Traditional goods are traded at zero trade costs both inter-regionally and internationally, they serve as a numeraire in the model. The monopolistically competitive manufacturing industries, which represent all increasing-returns and mobile production activities in the economy, produce horizontally differentiated goods, which are traded between regions at *iceberg*-type cost T_{od}.

3.2 Integration, migration and agglomeration

The simple NEG model of *Kancs* (2010), which, as described above includes inter-regional labour mobility, allows us to investigate the central question of our study: what type of changes will the regional integration trigger in the inter-regional distribution of the mobile workforce and economic activity?

To answer this question, consider a country that consists of two symmetric regions o and d. Assume that workers migrate between regions in response to differences in real wages and that manufacturing firms enter or leave the region in response to profits or losses. Further, assume that regional integration induces some workers, or alternatively some manufacturing firms, from origin region o to move to destination region d.[2] We want to know how does this affect the incentives of workers and firms for further relocation between regions? If wages and profits in region d (which are initially zero) fall relative to region o, then the diversified equilibrium is stable: the new workers and firms are encouraged to exit and the initial equilibrium is restored. However, if the relative wages and profits in region d rise, the initial equilibrium is unstable. More workers and firms are encouraged to enter the region and the country moves towards an equilibrium with agglomeration: region d attracts manufacturing activity which is over-proportional to its endowment.

According to the underlying NEG model, the reallocation of a worker or a firm from o to d induces three effects on the above discussed push and pull drivers of migration, the sequence of which depends on who moves first - the worker or the firm. In line with the standard NEG literature, we assume that the starting point is the reallocation of a firm. The first effect which the reallocation of a firm induces is the so called *price-index effect*. An additional firm entering the region lowers the manufacturing goods' price index, P_d, which in turn reduces the demand facing each existing firm (demand and marginal revenue curves shift downwards). This competi-

[2] In the underlying NEG model region r's share in the total workforce is proportional to region r's share in the total industry. Hence, in relative terms, the relocation of workers is proportional to the relocation of firms.

tion effect, captured through the number of firms, reduces the manufacturing firms' profits. The competition effect contained in equation (1) discourages the entrance of further firms, facilitating in such a way the establishment of a new diversified equilibrium.

$$P_d = \frac{\sigma}{\sigma - 1} \left[\sum_{d=1}^{R} H_d T_{od}^{1-\sigma} \right]^{\frac{1}{1-\sigma}} \tag{1}$$

The second effect of the reallocation of a firm is the so-called *demand or backward linkage*. An extra firm raises the demand for local labour in region d. This puts incipient pressure on local wages, which encourages more workers from o to migrate to d. Additional workers immigrating into region d raise the demand for local varieties. As a result, the local demand and the marginal revenue increase, which in turn raises the profitability of manufacturing firms, encouraging more firms to follow. Hence, the demand or backward linkage contained in equation (2) contains an important source of firm and worker agglomeration, the so-called demand or backward linkage.

$$X_d = \sum_{d=1}^{R} \left(H_d + L_d \right) T_{od} x_{od} \tag{2}$$

According to equation (1), entry by a new firm lowers the price index of region o, which induces the third effect, the so-called *cost or forward linkage*. Given that the entry of additional firms lowers price index in region d, the declining workers' cost of living tends to raise the real wages and workers' utility (*Musterd* and *Muus* 1995). More workers are encouraged to immigrate into region d, because of higher utility. In the long-run, the resulting immigration of workers restores the inter-regional equality of real wages, implying that the nominal wage must fall, which shifts the average and marginal cost curves downwards. Falling wages in turn raise the profitability of manufacturing firms encouraging additional firms to enter. Hence, equation (3) contains an important source of firm and worker agglomeration, the so-called cost or forward linkage.

$$W_d = \frac{\alpha}{\sigma} \sum_{d=1}^{R} \left[\frac{\left(H_d + L_d \right) T_{od}^{1-\sigma}}{\sum_o \left(H_o T_{od}^{1-\sigma} \right)} \right] \tag{3}$$

To summarise, in our model the three agglomeration/dispersion forces of the *Krugman*'s (1991) model are realised through worker migration and firm relocation. Workers move to regions, where the utility, V_d, is higher than in the home region, V_d, and firms relocate to regions where the profits are higher.

By moving between regions, workers equalise the real wages, the prices of manufacturing goods, and the utilities across regions. The long-run equilibrium is achieved when the inter-regional utility differences, $\triangle V_{od}$, are equalised. Given that the share of the mobile workforce, H_d, is A function of regional utility and hence a function of inter-regional utility differences, $\triangle V_{od}$, equation (4) contains circular causality forces of *Krugman* (1991). In other words, as shown in equation (4), the labour migration, $\triangle H_d$, is driven by the cost of living ratio between the origin and destination regions, P_d/P_o, and the wage difference, $W_o - W_d$, which in turn are affected by the relative size of mobile labour force, H_d, and hence by labour migration itself.

$$\begin{aligned} \triangle H_d &= \triangle H_d\left(\triangle V_{od}\right) \\ \triangle V_{od} &= V_o - V_d = \alpha \ln(\frac{P_d}{P_o}) + (W_o - W_d) \end{aligned} \tag{4}$$

Equations (1), (3) and (4) describe the long-run equilibrium relationship in terms of four endogenous variables: the cost of living index,P_r, the nominal wage rate, W_r, the indirect utility, V_r, and the region r's size of the mobile workforce, H_r. The main advantage of the underlying NEG approach, which we briefly introduced, is the ability to endogenise both the RHS explanatory and the LHS dependent variables, i.e., our approach allows the drivers of migration to adjust to economic integration and migration-induced changes, which is not possible in reduced form models in a consistent way. As shown above, in the underlying NEG framework an integration policy shock is absorbed through adjustments in the relative prices, wages, and quantities produced and consumed. Because of adjustments in the drivers of migration, the utility is no longer equal among regions, which gives workers and firms an incentive to relocate toward regions with a higher utility/profit. Firms' entry (workers' immigration) in turn actuates further adjustments in the regional economies. Depending on the characteristics of regions and the relative strength of the explained agglomeration/dispersion forces, a regional integration policy may trigger either agglomeration or dispersion of economic activities and mobile labour between regions.

4 Integration-induced migration in the EU

4.1 Baseline equilibrium

The empirical implementation of the theoretical NEG model requires two types of data: a cross-section of exogenous variables and numerical values of model's parame-

ters. We use the Eurostat New Cronos database. Endowments with the immobile factor (land) are drawn from the New Cronos Theme 1 - General Statistics, Domain - Central European Countries. Sectoral expenditure shares are drawn from the New Cronos Theme 2 - Economy and Finance, Domain - Accession countries non-financial accounts (NA_MNAG). Base year endowments with the mobile factor (labour) are drawn from the New Cronos Theme 3 - Population and social conditions, Domain - Employment (EMPLOY).

Solving the economic geography model, we obtain short-run equilibrium values for all (endogenous) variables, which on the one hand are determining migration, and on the other hand affected by labour migration.

These, in the model predicted variables - prices, manufacturing output, wages, sectoral employment for each region - are specific to each CEE region. In a second step, regional integration induces net (of transportation costs) differences in the manufacturing price index and wage rate, which give rise to inter-regional differences in the indirect utility, V_r, and firm profits. According to the underlying economic geography model, the transition from the short-run equilibrium to the long-run equilibrium occurs through workers' migration and firm relocation. In line with empirical evidence, also in the model workers migrate to regions with the highest attainable utility and firms relocate to regions with the highest profits. Practically, we calculate the number of workers required to enter/leave each region in order to achieve the long run equilibrium of the regional share of mobile workers and the explanatory variables, using the short run equilibrium values of price index, P_r, worker wages, W_r, and industry output, X_r, and fixing the inter-regional utility differences at zero, $\triangle V_{od} = 0, \forall r$. Subtracting the short-run equilibrium values of labour force, H_r, from the predicted long run equilibrium values, $\hat{H}_r$, and expressing these in terms of the initial labour endowment, we obtain a net migration rate for each region, $\hat{M}_r^{BR}$. This migration rate tells us how many mobile workers would have to move into or out of each region in order to establish an inter-regional equilibrium in the long-run.

In order to assess the robustness of the base run results, we compare the predicted net migration rate, $\hat{M}_r^{BR}$, in the base run with the observed migration flows in 2004, M_r^{04}.[3] This comparison is not straightforward, however. First, because of misspecification of the model (missing variables, specific functional forms), there are differences between the driving forces of worker migration in the model and in the reality. For example, according to the underlying economic geography model, the only way that workers can deliberately increase their utility, is to move from a low-wage region to

[3] 2004 is the latest year for which all the necessary endowment, migration and trade data is available to the authors.

a high-wage region. In reality, however, because of language, cultural, political and many other non-pecuniary aspects, workers might prefer to stay put or even move to low-wage regions. Second, the time-scales are different. In statistical data migration is usually expressed either as a number of migrants per year or in percent of the total population per year. Our simulation results, on the other hand, do not give any time reference, i.e. the underlying economic geography model does not provide any information about how long the transition from the short-run equilibrium to the long-run equilibrium will last.

In order to account for these limitations in the comparability of the results, instead of comparing the absolute migration rates, we also compare the relative migration rates. I.e. we express the predicted migration in region 1 in terms of migration in region 2 ($\hat{M}_1/\hat{M}_2$, where $\hat{M}_1$ and $\hat{M}_1$ are the predicted net migration rates in regions 1 and 2) and compare it with the corresponding values observed in the data (M_1/M_2). These comparisons indicate that the relative migration rates predicted by our model, are indeed of the same order of magnitude as those recorded in the historical statistical data, which allows us to conclude that our results are robust, at least in relative terms. Differences in the absolute values of migration underline that numerical results should not be overemphasised, but have to be seen in a context of model's assumptions, which are detailed in *Kancs* (2010).

4.2 Integration-induced migration in the Baltics

The factor and product market integration in the CEE accession countries is modelled as declining inter-regional trade costs. For setting up integration scenarios of declining border-crossing costs, two types of transport cost data are required: (i) the magnitude of transport costs in the base year, and (ii) the integration-induced changes in the inter-regional transportation costs. Trade openness has been estimated in *Kancs* (2010). Reliable estimates of transportation cost changes related to the future labour and product market integration in the CEE accession countries are not available in the literature yet. Therefore, in order to overcome this data limitation, we construct several hypothetical scenarios, which will help us to understand what type of labour migration effects could be expected from the EU integration.

In order to simulate the labour and product market integration and to assess the integration-induced labour migration in the CEE accession countries, we proceed as follows. First, we exogenously change the level of trade costs to the peripheral regions in 10% steps up to 60%. Solving the model for the short-run equilibrium, where workers are immobile between regions, we obtain a solution with sizeable inter-

regional differences in price indices, wages and worker utility. As explained above, this is not a stable long-run equilibrium solution, because inter-regional differences in explanatory variables give workers an incentive for relocating. Therefore, in a second step we solve the model for a new inter-regional distribution of $\hat{H}_r$, such that the indirect utility is equalised between regions. In other words, we exogenously set $\triangle V_{do} = 0$ for all pairs of regions and solve the model for new equilibrium values of $\hat{H}_r$. The net migration is then calculated as $\hat{M}_r = H_r - \hat{H}_r$,[4] where negative values stand for emigration of region r and positive values stand for migration to region r. Migration rate is obtained by normalising $\hat{M}_r$ by H_r.

Table 1: The dynamics of integration-induced net migration in the Baltics, share of labour force

	$\hat{M}_r^{10}$	$\hat{M}_r^{20}$	$\hat{M}_r^{30}$	$\hat{M}_r^{40}$	$\hat{M}_r^{50}$	$\hat{M}_r^{60}$
Estonia	-11.387	-11.025	-10.371	-9.069	-6.044	1.906
Latvia	-3.691	-3.911	-4.312	-5.112	-6.935	-11.755
Lithuania	7.071	7.076	7.088	7.112	7.144	7.250

Notes: NEG model calculations based on estimated parameters and New Cronos data for 2004. $\hat{M}_r$: (−) emigration, (+) immigration.

Table 1 reports the simulation results for six different levels of trade cost reductions: $\hat{M}_r^{20}(T_{13}^{80}), ..., \hat{M}_r^{60}(T_{13}^{40})$ and Figure 2 presents the regional distribution of the net worker relocation.[5] The columns 2-6 of Table 1 report the predicted migration rate as a percentage of regions' initial endowment with mobile workers at national level. Considering the estimates reported in Table 1, we note that an asymmetric integration shock results in substantial differences in the net migration rate among the three Baltic countries. The aggregate migration flows (immigration minus emigration) do, however, sum up to zero in each period fulfilling the general equilibrium condition of the total labour supply.[6]

The simulation results reported in Table 1 also suggest that, if factor and product market integration in the Baltics would follow the gravity pattern we assumed in the simulations, then the two peripheral regions would be the largest winners in terms of region's share of mobile workers (column $\hat{M}_r^{60}$ in Table 1) and manufacturing firms.

[4] Analytically, we are able to calculate the long-run equilibrium solution for regions' share of mobile factor. Empirically, in the R-region case with region-specific parameters it turns out impossible to solve the model for the long-run equilibrium in one step.

[5] Base run migration: $\hat{M}_r^{BR} = T_{13}^{100}$.

[6] Zero net migration balance, when all regions weighted by their population are summed up.

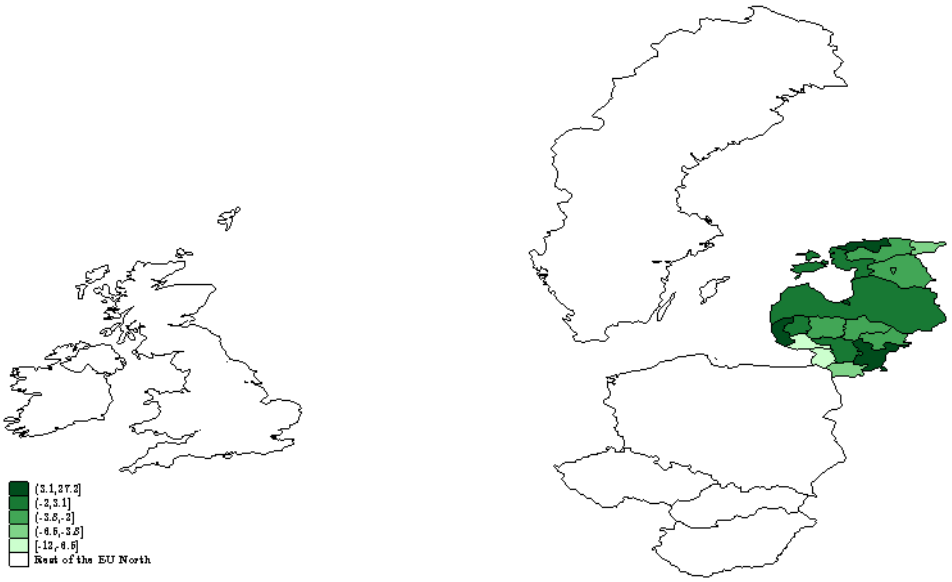

Figure 2: The regional distribution of integration-induced net migration in the Baltics, share of labour force

As expected from the underlying economic geography framework, a transport cost reduction between the two asymmetric peripheral regions allows the largest peripheral region (Lithuania) to attract relatively more mobile workers than the smallest peripheral region (Estonia). Lithuania steadily attracts more and more mobile workers from other regions throughout the whole interval of integration: $\hat{M}_3$, increases from 7.07% when transport costs are reduced by 10% to 7.25% when transport costs are reduced by 60% (Table 1).

Latvia, the 'core region' in the Baltics, turns out to be the largest looser from the labour market integration, if transport costs to the peripheral regions decline more rapidly than to the core region. The emigration rate from Latvia, $\hat{M}_2$, is continuously increasing from 3.69%, when transport costs are reduced by 10%, to 11.75%, when transport costs are reduced by 60% (Table 1). Given that transport costs are reduced asymmetrically favouring the two peripheral regions (Estonia and Lithuania), these results are in line with our expectations and with the underlying theoretical framework.

Estonia is eventually the most interesting country from the new economic geography perspective. According to our simulations, the relationship between market integration and Estonia's share with mobile labour, $\hat{H}_r$, is non-linear and non-monotonic. Initially, the trade cost reduction to the peripheral regions, of which Lithuania is rela-

tively large and Estonia is relatively small, gives rise to agglomeration of workers and firms in the peripheral region with the largest internal market (Lithuania). At the beginning of the simulated integration process the peripheral region with the smallest internal market (Estonia) looses more than 11% of its mobile work force (columns $\hat{M}_r^{10}$ and $\hat{M}_r^{20}$ in Table 1). When the inter-regional transport costs fall below some critical level, Estonia starts to attract mobile workers and its share of mobile workers begins to increase.

A regional breakdown of the net relocation of workers in the Baltics is presented in Figure 2, which breaks down the last column of Table 1 by NUTS 3 regions. The dark-shaded areas represent immigration, whereas the light-shaded areas represent emigration. Figure 2 suggests substantial differences in the net migration rates both between and within the Baltics ("-" means emigration, "+" means immigration). These differences are particularly pronounced in Latvia, were migration rates range from -12% to +26%. In Estonia and Lithuania the intranational differences in the net migration rate are smaller, they range from -4.6% to +27.2% and from -11.1% to +18.1%, respectively. In line with previous findings, Figure 2 confirms that people are more mobile between regions than within countries.

4.3 Integration-induced migration in the Visegrád

Next, we study the integration-induced migration in the Visegrád countries by performing the same simulation exercises as for the Baltic countries. The results of the dynamics of integration-induced net migration in the Visegrád are reported in Table 2, whereas the regional distribution of the integration-induced net migration is reported in Figure 3. According to Table 2, the largest winner of integration in the Visegrád is Hungary, where the immigration of labour steadily increases from 0.88% ($\hat{M}_r^{10}$) to 8.24% ($\hat{M}_r^{60}$) compared to the base run. However, Hungary reaches agglomeration peak (break point) at circa $\hat{M}_r^{50}$, from when the immigration starts to decline (from 8.35% to 8.24%). These results are consistent with the estimated trade openness for Hungary, which is the highest among all Visegrád countries (*Kancs* 2010). The two other Visegrád countries benefiting from economic integration are the Czech Republic and Slovakia. However, Table 2 indicates that the pattern of integration-induced migration is different among these two Visegrád countries. The Czech Republic first attracts mobile labour, then starts to lose, whereas Slovakia loses economic activity and labour at the beginning of integration, but starts to attract workers at around $\hat{M}_r^{30}$. Poland is the ultimate looser of integration in terms of mobile labour, although Poland has the largest internal market. These losses may be

associated with the highest transport costs (lowest trade openness) relative to other Visegrád countries (*Kancs* 2010).

Table 2: The dynamics of integration-induced net migration in the Visegrád, share of labour force

	$\hat{M}_r^{10}$	$\hat{M}_r^{20}$	$\hat{M}_r^{30}$	$\hat{M}_r^{40}$	$\hat{M}_r^{50}$	$\hat{M}_r^{60}$
Czech Republic	7.943	9.465	11.448	2.520	1.782	0.845
Hungary	0.889	1.265	3.120	8.008	8.358	8.240
Poland	-2.418	-3.057	-4.139	-3.167	-3.072	-2.748
Slovakia	-1.837	-1.251	-2.293	-0.092	0.548	1.285

Notes: NEG model calculations based on estimated parameters and New Cronos data for 2004. $\hat{M}_r$: (−) emigration, (+) immigration.

Similar to the Baltics, Table 2 indicates that the regional share of labour and hence migration rate is non-linear and non-monotonic in transport costs. Because these three agglomeration/dispersion forces - the price-index effect, the demand linkages and cost linkages - are region-specific, the net effect of factor and product market integration between regions on utility of workers and, hence, on inter-regional migration can go either way. The presented numerical simulations offer a useful insight in the possible relationships between migration pull and push factors in light of the ongoing factor and product market integration in the EU. The ability to predict the levels at which the net migration rate will start to decrease and reach zero are one of the key advantages of the economic geography approach, they are exogenous in reduced form models.

Analogously to the Baltics, the regional breakdown of the net relocation of workers in the Visegrád is presented in Figure 2, which breaks down the last column of Table 2 by NUTS 3 regions. Again, Figure 2 suggests substantial differences in the net migration rates both between and within the Visegrád states. Generally, except for the Warsaw region, the integration would induce workers to migrate from the East Visegrád (light areas in Figure 2) to the West Visegrád (dark areas in Figure 2). This result is significantly different from the Baltics, where neither a clear-cut East-West nor a South-North pattern of migration could be identified (Figure 2). The East-West migration pattern predicted for the Visegrád can be explained by the increasing market potential in direction from the East to the West. These results are in line with findings of *Boeri* and *Brücker* (2001).

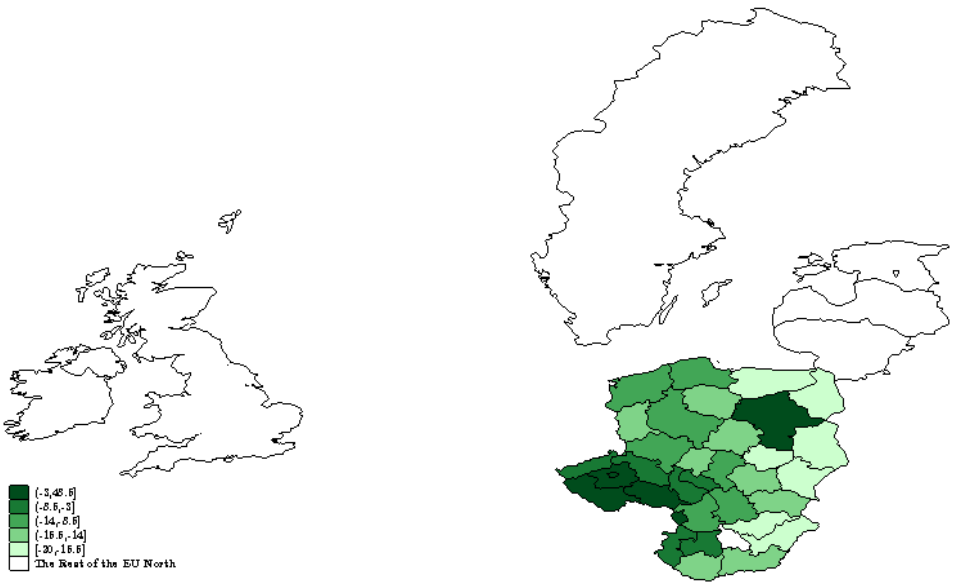

Figure 3: The regional distribution of integration-induced net migration in the Visegrád, share of labour force

4.4 East-West migration

In this section we perform stylised simulation exercises of labour and product market integration between the old and new Member States. Ireland, the UK, and Sweden are the only old Member States, which opened their labour markets as from the first day of the accession. Therefore, in addition to the new Member States, we include these three North European Member States in the set of potential destination choices for migrants.[7]

As in the previous two sections, we draw the data for regional endowment with the immobile factor (land), the initial endowment with labour and the income share spent on manufacturing goods from the Eurostat's New Cronos database. Parameters for the Baltics and the Visegrád have already been estimated and are averaged by weighting according to regions' share of labour force.[8] Parameter values for the North European Member States are drawn from *Kancs* and *Kielyte* (2010). For studying the East-West migration, we assume that factor and product market integration between the old and new Member States would symmetrically reduce inter-regional transaction costs.

[7] EU-North: Ireland, the UK, and Sweden (see Figure 1).

[8] A consistent parameter estimation would require estimation based on aggregate data, which is beyond scope of the present study.

Table 3: The dynamics of integration-induced East-West net migration, share of labour force

	$\hat{M}_r^{10}$	$\hat{M}_r^{20}$	$\hat{M}_r^{30}$	$\hat{M}_r^{40}$	$\hat{M}_r^{50}$	$\hat{M}_r^{60}$
Baltics	-3.827	-5.478	-7.989	-6.208	-5.675	-5.442
Visegrád	-0.669	-1.108	-2.015	-3.755	-3.806	-3.612
EU-North	0.855	1.337	2.249	3.389	3.379	3.211

Notes: NEG model calculations based on estimated parameters and New Cronos data for 2004. $\hat{M}_r$: (−) emigration, (+) immigration.

Table 3 reports the dynamics of the simulation results for the three EU regions: the Baltics, the Visegrád and the EU-North, and Figure 4 reports the geographic breakdown of source and destination countries. According to Table 3, workers from the Baltics and the Visegrád would migrate to the EU North, if the three European regions would symmetrically reduce inter-regional transaction costs by the same percentage between all regions: the mobile labour share declines in the Baltics and in the Visegrád, while it increases in the EU-North. At some lower level of inter-regional transport costs (which are region-specific), the agglomeration (net migration) stabilises. The share of mobile labour force starts to increase in CEE and decline in EU North. In that sense these results are similar to intra-Baltic and intra-Visegrád migration results reported in the two previous sections, and are in line with *Krugman* (1991).

According to Figure 4, where the light-shaded areas imply emigration and the dark-shaded areas imply immigration, the European integration would induce workers from the East to relocate to the West, which is consistent with the last column in Table 3. Our model predicts the highest emigration rates for Latvia and Poland, which is consistent with previous studies (e.g. *Kancs* and *Kielyte* 2010). In terms of the receiving old Member States, we estimate the highest immigration rates for Ireland and Sweden, followed by the United Kingdom. Again, the results are consistent with findings of *Boeri* and *Brücker* (2005).

4.5 Comparison with previous studies and limitations

In order to explore whether migrants follow the market potential, a growing number of migration studies rely on the economic geography framework (*Crozet* 2004, *Kancs* 2005, *Pons et al* 2007, *Hering* and *Paillacar* 2008, *Paluzie et al* 2009). *Crozet*, *Pons et al*, and *Paluzie et al* estimate quasi-structural economic geography models relating

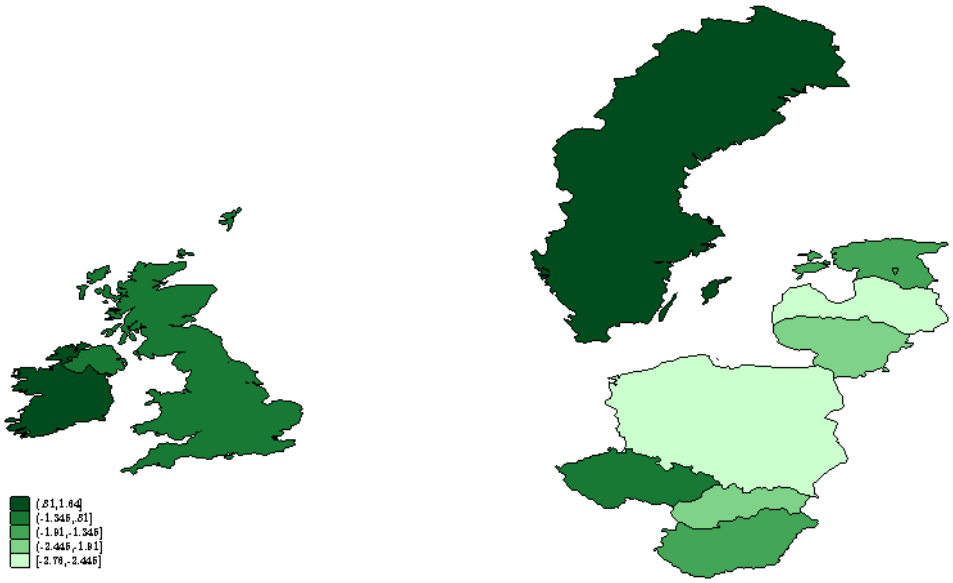

Figure 4: The regional distribution of integration-induced East-West net migration, share of labour force

workers' location choices in Europe to market access. The results of all three studies suggest that the economic geography framework provides a promising framework for studying migrant behaviour in small open economies. *Hering* and *Paillacar* analyse bilateral migration between Brazilian states using regional differences in access to international markets. They find that workers choose to migrate to states with higher market access. *Kancs* (2005) uses a similar economic geography model to predict migration flows in the Baltics. Simulating European integration as a reduction in trade costs, he finds that, depending on the integration scenario, between 3.5% and 6.2% of workers would change their country of residence. Hence, the results presented in this study are in line with the NEG literature, suggesting that migrants follow the market potential.

Comparing our predictions with those of the reduced form models, we note that our calculations are different from the estimates in the conventional migration literature, which are much less conclusive. For more than a decade, the general assumption was that the common EU labour market would initiate massive labour migration from the CEE accession countries, with peak levels arising during the first years after EU enlargement. Accordingly, between 10.5 and 15.0% of the current CEE population was predicted to migrate to Western Europe in the medium and long run (10-30 years) (*Straubhaar* and *Zimmermann* 1993). This was corroborated by a wide range

of reduced form estimates, where all assumptions about the country developments and the response to integration, the migration and development are based on a priori fixed estimates of the economic differences between economies. Instead, our results which predict that between 5.44% (from the Baltics) and 3.61% (from the Visegrád) of the total labour force would move, allow for the endogenous narrowing of differences driving the migration.

Deviations among the previous studies and our calculations might be caused, among other issues, by misspecification of the model (missing variables, specific functional forms), differences in the data used, differences in the source and destination countries studied, and differences between the underlying conceptual frameworks. One particular feature that sets the NEG framework employed in our study apart from the traditional reduced-form specifications is implied by differences in the treatment of explanatory variables. According to the underlying economic geography model, the relocation of workers not only absorbs market distortions caused by short-run transitory shocks, it also induces changes in the explanatory variables, such as wage rate, utility and profits. For example, if the net wage (indirect utility) is a positive function of the region's size of labour force, as in the underlying economic geography model, then migration will induce circular causality forces in the economy. These circular causality forces are captured in the underlying economic geography model, but neglected in reduced form models (*Massey et al* 1993, *Gallup* 1997, *Fertig* and *Schmidt* 2001). As a result, in our model labour migration converges to zero endogenously, whereas in reduced form models it is exogenous, i.e. the equilibrium level of migration cannot be predicted with the model.

5 Conclusions

The present paper analyses how factor and product market integration might affect the labour migration in the CEE accession countries. The theoretical framework adopted in this study is different from the conventional migration studies, which usually rely on the reduced form models. Given that the traditional reduced-form approach, where explanatory variables are exogenous and fixed a priori, has serious drawbacks for studying migration in small open economies undergoing a dynamic transition process, we rely on an alternative approach, which is based on the economic geography theory à la *Krugman* (1991). The economic geography framework allows us to cope with several important conceptual issues of reduced-form models, such as wrong assumptions, endogeneity and reverse causality of the right-hand side explanatory variables, which is a particularly critical issue in the CEE transition

economies.

Our empirical findings predict a selective migration between the CEE accession economies, if market integration would advance. However, according to our empirical results, the labour migration and the determinants of labour migration are sufficiently balanced to make a swift emergence of a core-periphery pattern very unlikely neither in the Baltics nor in the Visegrád. These results are in line with previous studies of labour migration in the CEE (*European Commission* 2010).

The simulation results for the Baltics suggest that the peripheral regions would be the largest winners in terms of the share of workers and manufacturing activity. According to our simulation results, Lithuania steadily attracts more and more mobile workers from Estonia and Latvia: the immigration rate to Lithuania increases from 7.07% if transport costs decline by 10% to 7.25% if transport costs are reduced by 60%. Latvia, the core region, turns out to be the largest looser from integration in the Baltics. The emigration rate from Latvia is continuously increasing from 3.69% to 11.75%. Given that transport costs are reduced asymmetrically favouring the two peripheral regions (Estonia and Lithuania), these results are in line with our expectations and with the underlying economic geography framework. The results for Estonia are particularly interesting, as they suggest that the relationship between market integration and the share of mobile labour force is non-linear and non-monotonic.

The results for the Visegrád suggest that the largest winner of economic integration would be Hungary, where the share of mobile labour would increase by 8.35% compared to the pre-integration state. However, Hungary reaches the agglomeration peak soon, and its share of mobile labour starts to decline after that. The two other winners from integration in Visegrád would be the Czech Republic and Slovakia. Whereas the Czech Republic first attracts mobile labour, then starts to loose, Slovakia looses mobile workers at the beginning of integration and starts to attract them at more advanced levels of integration. Poland, which has the largest internal market in the Visegrád, turns out to be the ultimate looser of integration in terms of labour force and economic activities. Similarly to the results for the Baltics, these results suggest that the local share of mobile labour, and hence migration, is both non-linear and non-monotonic in transport costs.

The simulation results for the East-West migration are rather stylised and need to be interpreted particularly cautious, because migration costs, which are neglected in the present model, are important in reality. They suggest that workers from the Baltics and Visegrád would migrate to EU North, if market integration would symmetrically increase between the three European regions, implying that the share of

mobile labour would decline in the Baltics and in Visegrád, while it would increase in the EU-North. However, our results also suggest that at some lower levels of inter-regional transport costs (which are region-specific), the share of mobile labour force starts to increase in the CEE and decline in the EU North. This prediction is in line with the recent empirical migration literature relying on the NEG framework, which looking forward note that, the economically motivated migration, which largely depends on differences in the level of prosperity between home and destination regions, will likely become less marked as Europe becomes more integrated.

A potential downside of the adopted economic geography approach is that a structural model *per se* does not guarantee a better fit - certain reduced-form specifications might still perform better in terms of the explanatory power and the forecasting performance. Therefore, we urge for more research, both methodological and empirical, be devoted to estimating and testing of economic geography models in predicting the location of firms and workers. Future expectations may also play a significant part in migration decisions - expecting improvements in the home country's economy may delay migration decision or ultimately erase the idea of migration. This issue has not been considered in the current study and is a promising avenue for future research.

References

[1] Altamirano, A. T. (1995), Return migration on the policy agenda in Sweden, Applied Geography, 15: 3, 267-78.

[2] Bauer, T., Zimmermann, K. F., (1999), Occupational Mobility of Ethnic Migrants, Discussion Paper No. 58, IZA, Bonn.

[3] Boeri, T., H. Brücker (2001), The Impact of Eastern Enlargement on Employment and Labour Markets in the MS, European Commission, DG Employment and Social Affairs, Brussels.

[4] Boeri, T., H. Brücker (2005), Why are Europeans so tough on migrants?, Economic Policy, 44, 631-703.

[5] Borjas, G. J. (2001), Economics of Migration, International Encyclopedia of the Social and Behavioral Sciences, Elsevier, 9803-9809.

[6] Crozet, M. (2004), Do migrants follow market potentials?, Journal of Economic Geography, 4 (4): 439-458.

[7] European Commission (2007), Third Annual Report on Migration and Integration, Office for Official Publications of the European Communities, Luxembourg.

[8] European Commission (2008), The impact of free movement of workers in the context of EU enlargement, Communication from the European Commission.

[9] European Commission (2010), Fourth Annual Report on Migration and Integration, Office for Official Publications of the European Communities, Luxembourg.

[10] Faini R., de Melo J., Zimmermann KF (1999), Migration: The Controversies and the Evidence, London: Cambridge University Press for CEPR.

[11] Fertig M. (2001), The Economic Impact of EU-Enlargement: Assessing the Migration Potential, Empirical economics, 26 (4): 707-720.

[12] Fertig, M., M. Schmidt (2001), Aggregate-Level Migration Studies as a Tool for Forecasting Future Migration Streams, in International Migration, ed. S. Djajic, Routledge, London.

[13] Gallup J.L. (1997), Theories of Migration, Development Discussion Paper No. 569, Harvard University.

[14] Hering L., Paillacar R. (2008), On the relation between market access, migration and wages: An empirical analysis. European University Institute, Florence.

[15] Kancs, D. (2005), Can we use NEG models to predict migration flows? An example of CEE accession countries, Migration Letters, 2(1), 32-63.

[16] Kancs, D. (2010), Labour Migration in the Enlarged EU: A New Economic Geography Approach, LSE Research Papers in Environmental and Spatial Analysis No. 131, London School of Economics and Political Science, London.

[17] Kancs, D., Kielyte J. (2010), Educating in the East, Emigrating to the West? European Review, 18, 133-154.

[18] Kielyte, J., Kancs, D. (2002), Migration in the Enlarged European Union, Journal of Baltic Studies, 33 (3): 259-279.

[19] Krugman, P. (1991), Increasing Returns and Economic Geography, Journal of Political Economy, 99 (3): 483–99.

[20] Massey, D.S. et al (1993), Theories of International Migration: A Review and Appraisal, Population and Development Review, 19:3, 431-466.

[21] Musterd, S., Muus, P.J. (1995), Immigration: mismatches in labour, housing and space, Applied Geography, 15:3, 279-296.

[22] Paluzie E., J. Pons, J. Silvestre, D. A. Tirado (2009), Migrants and market potential in Spain over the twentieth century: a test of the new economic geography, Spanish Economic Review 11:4, 243-265.

[23] Papademetriou, D., Sumption, M. and Somerville, W. (2009), Migration and the Economic Downturn: What to Expect in the European Union, Transatlantic Council on Migration.

[24] Pons J, Paluzie E, Silvestre J, Tirado DA (2007), Testing the new economic geography: migrations and industrial agglomerations in Spain. Journal of Regional Science, 47:289–313.

[25] Straubhaar T., Zimmermann K.F. (1993), Towards a European Migration Policy, Population Research and Policy Review, 12 (3): 225-241.

[26] Traser, J., Venables, T. (2005), Report on the free movement of workers in EU-25. Brussels: European Citizen Action Service.

6 Appendix

6.1 Robustness and sensitivity analysis

The simulation results presented in section 4 depend to a large extent on the numerical values of the key parameters, notably on σ and α. Given that these parameters are estimated using a relatively small sample, they might be misestimated. This, however, might affect our simulation results depending on how sensitive is the model with respect to parameter values. In order to quantify the potential misestimation's impact, in this section we perform robustness tests. The results of parameter sensitivity tests for σ are summarised in Table 4, which reports regional shares of the mobile labour force $\hat{H}_r$ for different values of σ.[9] These results are obtained by exogenously changing the numerical values of σ from 1.3 to 5.8 and subsequently calculating the resulting regional shares of the mobile labour force $\hat{H}_r$.

The results reported in Table 4 suggest that the location decision of workers and, hence the inter-regional migration, indeed depends on numerical values of the elasticity of substitution, as σ enters both price and wage equations in the model. These

[9] A full set of sensitivity analysis results is available from the author upon request.

Table 4: Sensitivity analysis: the impact of σ on $\hat{H}_r$, changes in percent

σ_r	1.3	1.8	2.8	3.8	4.8	5.8
Estonia	0.290	0.239	0.186	0.148	0.112	0.078
Latvia	0.187	0.213	0.204	0.172	0.138	0.106
Lithuania	0.523	0.548	0.609	0.680	0.750	0.817

Notes: Results for $\hat{H}_r^{30}$ inter-regional transport costs reduced by 30%.

results highlight the downside of the underlying new economic geography framework: the empirical results depend on some few parameters of the model. Second, the results reported in Table 4 also suggest that the regional share of mobile labour force $\hat{H}_r$ is affected stronger at high values of σ compared to low values of σ. The second key parameter in the underlying NEG model is α_r, which captures consumers' preferences for manufactured goods. We investigate model's response for six different values of α_r ranging from 0.50 to 0.85. The obtained results suggest that simulation results are not sensitive with respect to different values of α_r.

Based on these sensitivity analysis results we may conclude that our simulation results, which we presented in section 4, are sensitive but not oversensitive to alternative parameter values. Although, different parameter values would imply different migration flows, they would not affect the order of magnitude and, more importantly, they would not change the direction of migration flows in our model. These results suggest that our simulation results are rather robust with respect to the estimated parameter values.