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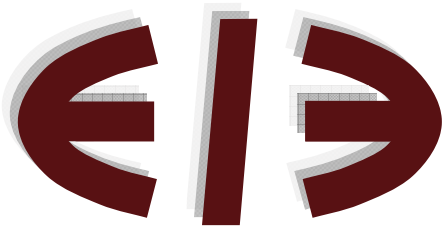

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Labour Migration in the Enlarged EU:

A New Economic Geography Approach[a]

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Abstract: The paper studies the impact of migration policy liberalisation on international labour migration in the enlarged EU in a structural NEG approach. The liberalisation of migration policy would induce additional 1.80 - 2.98 percent of the total EU workforce to change their country of location, with most of migrant workers relocating from the East to the West. The average net migration rate is decreasing in the level of integration, suggesting that from the economic point of view no regulatory policy responses are necessary to labour migration in the enlarged EU.

Keywords: Labour Migration, Economic Integration, Economic Geography, Market Access

JEL classification: F12, F14, F16, J21, J61, L11.

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1 INTRODUCTION

The paper studies the impact of migration policy liberalisation on labour migration in the enlarged EU. In particular, we attempt to assess the direction, size and dynamics of potential labour migration after the end of the 'transitional measures', which are restricting the relocation of workers from the NMS.[1] The paper tries to answer the following policy-relevant questions: Will the liberalisation of migration policy – the removal of 'transitional measures' – trigger labour migration in the enlarged EU? If so, are there endogenous forces in the EU economies which not only induce but also reduce migration endogenously or are there regulatory policy responses necessary? What lessons from the CEE-8 experience can be learned for the Balkan Member States and the Balkan Candidate Countries?

The questions about the direction, size and dynamics of potential labour migration in the enlarged EU have again sparked large political interest in context of the current economic and financial crisis. However, the context and assumptions around migration in Europe have changed significantly since the fall of the Wall. From the early nineties, when the centrally planned countries in Eastern Europe started to transform their economies to market oriented economies, to the current time, when most of the EU Member States face an economic shock - a global economic crisis - both migration push and pull forces have changed fundamentally (Kancs and Kielyte 2010).

There is a sizeable body of migration literature that attempts to predict the direction, size and dynamics 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 experiences from the South, were rather high, predicting an emigration of 10.5% to 15% of the CEE's population (Straubhaar and Zimmermann 1993). Confronting these predictions with the observed migration flows during the first two decades since the fall of the Wall, we note that only a tiny share of the CEE's population has emigrated to Western Europe (European Commission 2008, Kancs and Kielyte 2010). For example, the European

[1]In this paper EU-15 are referred to as the old EU Member States (OMS): Austria, Belgium, Finland, Greece, Luxembourg, Denmark, Spain, Netherlands, Germany, France, Portugal, Ireland, Italy, Sweden, United Kingdom. The CEE-8 accession countries are referred to as the new EU Member States (NMS): Poland, Czech Republic, Latvia, Lithuania, Slovenia, Estonia, Slovakia, Hungary. The Balkan-5 are referred to as the Balkan Member States (Bulgaria and Romania) and the Balkan Candidate Countries (Croatia, Macedonia and Montenegro).

Commission's (2008) report on the functioning of the 'transitional arrangements' set out in the 2004 Accession Treaty reports that very few citizens from the new EU Member States were actually moving to the old EU Member States (even to those OMs, which did not impose any restrictions to workers from the NMS). According to the report, the CEE-8 citizens represented less than 1% of the total working age population in all old EU Member States except Austria (1.4%) and Ireland (3.8%). Thus, the predictions of some quarters of 'floods of immigrants' arriving in the old EU Member States, a significant factor behind the labour market restrictions in the OMS, have turned out to be incorrect.

The huge discrepancy between the predicted and the observed labour migration flows in the EU is not surprising, given that most of the early migration studies were based on reduced-form migration models, where ex-ante values of the key explanatory variables, such as wages, are determined a priori and fixed exogenously. In order to account for deficiencies of the reduced form approach to international labour migration, more recently, an increasing number of migration studies adopt a structural general equilibrium framework, which is based on the theory of the new economic geography (NEG), for studying the relationship between the factor and product market integration and labour migration (Crozet 2004; Kancs 2005; Pons et al 2007; Hering and Paillacar 2008; Paluzie et al 2009). According to the NEG framework, migrants not only follow market potential, they also affect market potential. Hence, market access, wages and labour migration are mutually interdependent, implying that changes in one part of the economy will be offset through adjustments in others. Given that the NEG approach incorporates important general equilibrium feedback mechanisms around labour migration which, interacting with wages and market access, determine the equilibrium distribution of labour force across countries, it has been empirically more successful than the reduced form approach.

The present study follows Crozet (2004), Kancs (2005), Pons et al (2007), Hering and Paillacar (2008) and Paluzie et al (2009) and adopts a structural NEG approach for studying the direction, size and dynamics of potential labour migration in the enlarged EU. Our empirical findings predict a selective migration between the EU Member States in the post-transitionary period. According to our simulation results, the liberalisation of migration policy would induce additional 1.80 - 2.98 percent of the total EU workforce to change their country of location, with most of migrant workers relocating as expected from the East to the West. These figures are considerably lower than reduced-form models' predictions, but they are in line with other studies

based on the NEG framework, and empirical evidence. The observed empirical evidence suggests that, even in the absence of policy restrictions on international labour migration, the mobility of workers is rather low in the enlarged EU, despite sizeable and persistent disparities in wealth between countries.

The second important policy finding of our study is that the integration-induced relocation of workers seems to be a self-regulatory system, where migration arises and comes to a halt endogenously. Starting from market integration, which reduces trade costs and factor reallocation costs, results in better market access, lower costs and higher factor rewards. Increasing relative wages in one country in turn attracts workers from other countries, which triggers new migration. Larger workforce in turn exerts downward pressure on wages, which discourages more workers to emigrate. When the driving forces of migration, such as relative net wages, are equalised across countries, the economically-driven labour migration comes to a halt. According to our simulation results, the average net migration rate is increasing in the level of integration, but the rate of increase is decreasing (from 1.80% to 0.25%). In Portugal and the United Kingdom the immigration of workers has even reverted to emigration at higher levels of integration. Hence, from the economic point of view, no regulatory policy responses are necessary to labour migration in the enlarged EU.

These results have important policy implications. After the fall of the Wall two decades ago, highly restrictive policy measures very introduced to ‘protect’ the old EU Member States’ labour markets from workers from the East. With the enlargement in 2004, these restrictions were partially replaced by a complex set of 'transitional measures' with the aim to gradually liberalise policy restrictions on international labour mobility in the enlarged EU. The last restrictions on labour mobility from the CEE-8 were removed in April 2011. However, labour mobility restrictions still apply to workers from the Balkan Member States and the Balkan Candidate Countries.

These results for the CEE-8 suggest that the restrictions imposed on workers from the Balkan-5 countries are obsolete and can be removed without being afraid of mass inflows of migrant workers. Moreover, as noted by the European Commission (2010), efficient allocation of workforce will contribute to achieving the objectives of the Europe 2020 Growth Strategy. Therefore, the reduction of international labour mobility through policy interventions, as

currently practiced in the enlarged EU, is both obsolete and counterproductive. Obsolete, because the international mobility of workers is rather low in the enlarged EU, and it would come to a halt on itself. Counterproductive, because the transitional labour market restrictions distort the equilibrium allocation of workforce across countries and industries which, as shown by Borjas (2001), reduces the welfare and growth in the long run.

2 MIGRATION POLICY AND LABOUR MIGRATION IN THE ENLARGED EU

2.1 Factor market integration: the liberalisation of migration policy

Growing market integration in the EU is one of the main forces behind the increasing factor mobility, which contributes toward more efficient factor allocation and factor price equalisation between countries. Given that the liberalisation of migration policy in the enlarged EU could have strong implications on international labour migration, the Accession Treaties of 2004 and 2007 allowed for the introduction of 'transitional measures' on the movement of workers from the NMS. The 'transitional measures' scheme gave the old EU Member States the freedom of choice in May 2006, and again in May 2009, whether they would open up their labour markets to workers from the NMS or keep restrictions in place. Different old EU Member States introduced different schemas of 'transitional restrictions' lasting up to '2+3+2-years (from May 2004 until maximum April 2011), which resulted in a highly complex and heterogeneous set of international labour migration policy instruments within the EU.

The migration policies related to the free movement of workers from the CEE-8 within the EU-15 can be classified into four categories: liberal, semi-liberal, semi-restrictive and restrictive. Liberal migration policy, by keeping labour markets open, was chosen by Ireland, Sweden and the United Kingdom. Ireland was one of three countries which immediately opened its labour markets to all new member states in 2004 with the CEE-8 enlargement. An influx of an estimated 200,000 workers from Central Europe came to Ireland between 2004 and 2006. However, evidence suggests that a significant proportion of these labour migrants have since already left Ireland due to the country's severe economic downturn in 2008-2009, particularly in its construction industry, where many of the workers were employed (Kancs and Kielyte 2010). Also Sweden applied no restrictions to workers from the new EU member states. The United Kingdom was, together with Sweden and Ireland, the third country not to impose transitional

measures on CEE-8 workers in the first place. Its open-borders policy led to an estimated labour immigration of 450,000 to 600,000 within the two-and-a-half years following the May 2004 enlargement (Kancs and Kielyte 2010).

Semi-liberal migration policy, by removing restrictions by 2006, was chosen by Finland, Greece, Italy, Portugal and Spain. Finland lifted all restrictions on workers from the eight 2004 entrants on 1 May 2006. Previously, citizens of the new member states could get a job without a work permit only if the employment office decided there was no-one else available on the Finnish labour market. Greece dropped all restrictions on 2004 entrants as of 1 May 2006. In July 2006, Italy took the decision to end the transitory measures. Portugal and Spain dropped all restrictions from 1 May 2006. Between 2004 and 2006, Portugal imposed a 6,500 annual limit on immigrant workers of all nationalities and allowed immigration from 2006.

Semi-restrictive migration policy, by lifting the restrictions gradually between 2006 and 2009, was chosen by Belgium, Denmark, France, Luxembourg and the Netherlands. Belgium decided to open its labour market to citizens of the eight East European EU countries of the 2004 enlargement from 1 May 2009. A few months beforehand, the country made it easier to get work permits in areas of the economy where jobs are hard to fill. Denmark decided to open its labour market to citizens of the ten East European EU countries from 1 May 2009. Denmark was the 12th country among the EU-15 to abolish such restrictions. In early March 2006, France decided on a "step-by-step controlled lifting of restrictions" on free movement of labour from the CEE-8 countries. The partial opening of the French labour market started with sectors where labour was in short supply (e.g. social and health care, hotels and catering, transport and construction). On 1 July 2008 -- a year earlier than planned -- France opened its labour market to workers from the CEE-8. In November 2007, Luxembourg lifted restrictions for workers from the 2004 accession countries. As a first step to slowly phase out restrictions, the Netherlands opened, on 17 September 2006, 16 sectors of its labour market to workers from the CEE-8 states. The decision concerned sectors where workers are scarce or where there had been a high percentage of illegal workers. The Dutch government lifted all restrictions on 1 May 2007 for workers from the 2004 accession countries.

Restrictive migration policy, by keeping the restrictions in place until April 2011, was chosen by Austria and Germany. Citing "pessimistic" labour market forecasts, Austria along with Germany

is the only country which applied the restrictions until 2011. Workers from the 10 former communist states have to apply for work permits. There were also curbs on employers posting workers to Austria in certain sectors. Germany originally decided to continue the transition period for CEE-8 workers until 2009. However, Germany issued 500,000 of work permits between 2004 and 2006. On 25 April 2008 Germany announced it aimed to maintain barriers for Central and Eastern European workers until 2011.

For workers from the CEE-8 all 'transitional restrictions' ended on 30 April 2011. However, labour mobility restrictions still apply to workers from the Balkan Member States and the Balkan Candidate Countries.

2.2 Direction, size and dynamics of labour migration

Heterogeneity in migration policy between the EU countries and cross-country differences in wages and cultural/linguistical proximity between the sending and receiving countries resulted in complex patterns of labour migration in the first two decades since the fall of the Wall.

Right 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. 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 wage increases among all EU member states and relatively low unemployment levels. On average, during 2002-2007, the largest gross flows of emigration were from Lithuania, followed by Latvia and Estonia. The estimated 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).

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

Traditionally, international labour migration has been studied in reduced-form migration models, where ex-ante values of the key explanatory variables, such as wages, are determined a priori and fixed exogenously. In the context of international labour migration in small open transition economies, the fixing of explanatory variables is particularly problematic (Faini et al 1999; Borjas 2001, Kielyte 2008). Empirically, because the reverse causality and the related

endogeneity issues make it difficult to obtain unbiased estimates by considering the drivers, patterns and impacts of labour migration separately (Faini et al 1999). Conceptually, because migration itself affects wages, income, employment, and the cost of living, implying that the drivers, flows and impacts of labour migration are inter-dependent (Borjas 2001).

In order to account for deficiencies of the reduced form approach to international labour migration, more recently an increasing number of studies is adopting a structural general equilibrium framework, which is based on the theory of the new economic geography of *Krugman* (1991), for studying the relationship between the factor and product market integration and labour migration (Crozet 2004; Kancs 2005; Pons et al 2007; Hering and Paillacar 2008; Paluzie et al 2009). According to the NEG framework, migrants not only follow market potential, they also affect market potential. Hence, market access, wages and labour migration are mutually interdependent, implying that changes in one part of the economy will be offset through adjustments in others. Given that the NEG approach incorporates important general equilibrium feedback mechanisms around labour migration which, interacting with wages and market access, determine the equilibrium distribution of labour force across countries, it has been empirically more successful than the reduced form approach.

The present study follows Crozet (2004), Kancs (2005), Pons et al (2007), Hering and Paillacar (2008) and Paluzie et al (2009) and adopts a structural NEG approach for studying the direction, size and dynamics of potential labour migration in the enlarged EU. Following *Fujita*, *Krugman* and *Venables* (1999), 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. The mobile factor (labour), however, 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 by maximising their utility, which implies that the inter-regional distribution of labour force will likely change in the course of integration. H_r captures regions' initial endowment with labour, and $\hat{H}_r$ - regions' labour endowment after integration-induced adjustments. 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 for 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.

3.2 The model

Workers, who are the only consumers, consume both types of goods according to a two-tier utility function. The upper tier determines consumer division of expenditure between the traditional good, A, on the one hand, and manufacturing goods, X, on the other hand. The second tier determines consumer preferences over the differentiated manufacturing varieties. The functional form of the upper tier utility is quasi-linear (constant sectoral expenditure shares) and constant elasticity of substitution (CES) of the lower tier is.

First consumers divide their disposable income between the traditional and manufacturing good according to the following quasi-linear utility function:

$$U = \alpha \ln C_x + C_A \tag{1}$$

with $\alpha > 0$, C_x is the composite consumption index of manufacturing goods and C_A denotes consumption of the traditional good. The manufacturing goods' composite consumption index, C_x, is defined by the following CES function:

$$C_x = \left[\sum_{j=1}^{N} x_j^{\frac{\sigma-1}{\sigma}} \right]^{\frac{\sigma}{\sigma-1}} \tag{2}$$

where x_j represents consumption of variety j of manufacturing good x, N_r is the number of available varieties in region r, and σ is the elasticity of substitution between manufacturing varieties ($\sigma > 1$). Given the workers' disposable income, Y, each consumer maximises his utility subject to the budget constraint, $Y = C_A p_A + C_x p_x$, where p_{jod} represents the price of variety j

of manufacturing good x and p_A represents price of the traditional good ($p_x = \left(\sum_j p_j^{1-\sigma}\right)^{\frac{1}{1-\sigma}}$ and $p_A = 1, \forall r$).[2]

Combining equations (1) and (2), yields the demand emanating from consumers in region d consuming goods produced by producer j located in region o :

$$x_{jod} = p_{jod}^{-\sigma} \frac{\alpha}{\sum_j p_{jod}^{1-\sigma}} \tag{3}$$

Traditional goods are assumed to be traded at zero trade costs both inter-regionally and internationally,[3] implying that their prices equalise everywhere: $p_{A1} = p_{Ar}$. The cross-border trade of manufacturing goods is subject to positive trade costs, which are region-specific. As usual in economic geography models, manufacturing varieties produced in region r are sold by firms at mill price and the entire cross-border transaction cost is borne by consumers. Inter-regional trade costs of manufacturing goods are of '*iceberg*' type implying that when one unit is shipped, only $\frac{1}{T}$ actually arrives at the destination region d. Therefore, in order for one unit to arrive, T units have to be shipped, increasing the manufacturing good's price to pT.[4] Hence, iceberg trade costs imply that the c.i.f. price, p_{jod}, of variety j produced in region o and sold in region d contains the mill price and a trade cost component: $p_{jod} = p_o T_{od}$. Because of the symmetry of all varieties produced in the same region, we henceforth omit the variety subscript j.

As in *Krugman* (1991), combining equations (2) and (3) yields the industrial price index for each region d :

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[2]By choosing units such that the price of the traditional good equals to the wage rate in the traditional sector ($p_A = r_A$) in each region, and choosing the traditional good as a numeraire, the price of the traditional good is unitary in all regions, $p_{Ar} = 1, \forall r$.

[3]Equally we could also assume positive trade costs for the traditional goods. The qualitative results would however not change (*Fujita, Krugman and Venables*1999).

[4]We use T_{od} as a general expression of all cross-border transaction costs. We assume that trade costs are symmetric for any pair of regions, i.e. $T_{od} = T_{do}$, where o is the origin region and d is the destination region; and that intra-regional trade costs are zero, i.e. $T_{rr} = 1$.

$$P_d = \left[\sum_{o=1}^{R} N_o \left(p_o T_{od} \right)^{1-\sigma} \right]^{\frac{1}{1-\sigma}} \tag{4}$$

Using the industrial price index from equation (4), the individual demand of manufacturing goods (3) can now be expressed as:

$$x_{od} = \frac{\alpha \left(p_o T_{od} \right)^{-\sigma}}{P_d^{1-\sigma}} \tag{5}$$

Manufactured goods are produced in a monopolistically competitive industry that employs both the immobile and the mobile factor. Immobile factor is the only variable input. Labour enters only the fixed cost. The total cost of producing x_j units of variety j in region r is $TC_r\left(x_j\right) = W_r H_j + L_r x_j$, where W_r represents the compensation of labour supply in region r. Hence, manufacturing firm j's total cost, $TC_r\left(x_j\right)$, contains a fixed cost component that corresponds to one unit of labour input, and a marginal cost component in terms of the immobile factor, which is rented at a rent that is set equal to one. The fixed cost gives rise to increasing returns to scale.[5]

As usual in the monopolistic competition framework, we assume that each region contains a large number of manufacturing firms, each producing a single product. Hence, we obtain the following constant mark-up equation for profit maximising manufacturing firms:

$$p_o = \left[\frac{\sigma}{\sigma - 1} \right], \forall r \tag{6}$$

where p_o is the price of variety j produced in region o. The restriction $\sigma > 1$ ensures that price, p_o, is always positive. The equilibrium output of a manufacturing firm producing in region o is given by the market clearing for each variety. Using equation (5) and unit costs, we can derive the aggregate manufacturing output for region o:

$$X_o = \sum_{d=1}^{R} \left(H_d + L_d \right) T_{od} x_{od} \tag{7}$$

and the profit function of a representative firm located in region r is then given by:

[5] We drop subscript *j*, because all manufacturing firms are symmetric.

$$\Pi_r = p_r X_r - X_r - W_r \tag{8}$$

The number of manufacturing varieties produced in region r equals the number of firms located in region r, which is linked one to one to the number of workers. The zero-profit condition in equilibrium implies wage, W_r, adjustment. Using equations (6) and (8), and imposing zero profit condition we obtain the aggregate manufacturing output of region r:

$$X_r = W_r(\sigma - 1) \tag{9}$$

According to equation (9), manufacturing output, X_r, is increasing in wage rate, W_r, and elasticity of substitution, σ.

The inter-regional equilibrium can be described by vectors of manufacturing output, X_r, regional price index, P_r, wage rate, W_r, workers' indirect utility, V_r, and inter-regional distribution of mobile workers, H_r. In the short run workers are immobile between regions, implying that there is no adjustment in inter-regional distribution of mobile workers, H_r. The manufacturing price index, P_o, in region o can be expressed using equations (4) and (6):

$$P_o = \frac{\sigma}{\sigma - 1}\left[\sum_{o=1}^{R} H_o T_{od}^{1-\sigma}\right]^{\frac{1}{1-\sigma}} \tag{10}$$

with $\sigma > 1$.[6] For a given distribution of workers across regions, H_r, we use equations (5), (9) and (10) and derive the equilibrium value of the nominal wage rate, W_o:

$$W_o = \frac{\alpha}{\sigma}\sum_{d=1}^{R}\left[\frac{(H_d + L_d)T_{od}^{1-\sigma}}{\sum_o (H_o T_{od}^{1-\sigma})}\right] \tag{11}$$

In the long run, workers are mobile between regions. They relocate to regions, where the maximal attainable utility is higher than in the home region. By moving between regions, workers equalise real wages, prices of manufacturing goods, and utilities across regions. The long-run equilibrium is achieved when any inter-regional differences in the attainable utility are equalised.

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[6] Alternatively, in region d: $P_d = \frac{\sigma}{\sigma-1}\left[\sum_{d=1}^{R} H_d T_{od}^{1-\sigma}\right]^{\frac{1}{1-\sigma}}$.

From equation (1) the utility maximisation yields the following indirect utility function:

$$V_r = -\alpha \ln(P_r) + Y_r + \alpha \ln(\alpha - 1) \tag{12}$$

where Y_r is worker income in region r. Worker income, Y_r is defined as an increasing function of wage rate, W_r. Subtracting equation (12), we can derive the inter-regional utility differential, $\triangle V_{od}$, between destination region d and origin region o:

$$\Delta V_{od} = V_o - V_d = \alpha(\ln P_d - \ln P_o) + (W_o - W_d) \tag{13}$$

According to equation (13), the inter-regional utility differential, ΔV_{od}, depends on the relative cost of living in origin and destination regions, the difference in wage rate between the origin and destination regions, and parameters of the model. Region d's share of mobile workers, H_d, is given by:

$$H_d = H_d(\Delta V_{od}) \tag{14}$$

Although, the presented model can be solved analytically for the share of mobile workers in each region, H_r, the equilibrium expressions for cases where $R > 2$ regions are rather involved and, therefore, not presented here.

Equations (10), (11), (13) and (14) describe the inter-regional equilibrium relationship between market access, wages and labour migration. The labour market, which is of particular interest for the present study, contains two channels of adjustment to exogenous shocks: the price channel and the quantity channel. The former works though adjustments in wages (11), the latter through adjustments in the size of labour force through migration (14).

The main advantage of the underlying NEG approach is the ability to endogenise both the RHS explanatory and the LHS dependent variables, i.e., it allows market integration not only to induce labour migration, but also to reduce it and even to bring it to a halt. This is not possible in reduced-form migration models. For example, in the underlying NEG framework an integration policy shock is absorbed through adjustments in the relative prices, wages, quantities produced and consumed. Because of changes in these variables, worker utility and firm profit is no longer equal between regions, which gives workers and firms an incentive to relocate toward regions with a higher utility/profit. Firm entry and worker immigration in turn actuates further

adjustments in regional economies. Depending on the characteristics of regions and the relative strength of the agglomeration/dispersion forces, an integration policy shock may induce either agglomeration of economic activities and mobile labour or result in a more even distribution.

4 SIMULATING INTEGRATION-INDUCED MIGRATION IN THE EU

4.1 Baseline equilibrium

Empirical implementation of the economic geography model requires two types of data: a cross-section of exogenous variables and numerical values of model's parameters. Endowments with the immobile factor (land), sectoral expenditure shares, and base year endowments with the mobile factor (labour) are drawn from the Eurostat. The structural model parameters (α and σ) are estimated in Kancs (2010), which we employ for the purpose of the present study.

Solving the economic geography model empirically, we obtain base year equilibrium values for all endogenous variables, such as prices, manufacturing output, and wages for each country. A non-trivial challenge is the replication of the base year data in our model, because in the data both channels of labour market adjustment are present: the price (wage) channel and the quantity (migration) channel. In the enlarged EU we observe both sizeable wage differences between countries and international labour migration. In order to replicate this in the model, one needs to attribute part of the adjustment to the price channel, and part to the quantity channel. This is not straightforward, however, because in reality (and in the data) part of cross-country wage differences is due to migration costs, and part of international migration is not economically-motivated, e.g. family reunification, refugees and education. On the other hand, not all international labour migration taking place in the enlarged EU is recorded in the data, e.g. illegal migration.

In order to deal with these issues, we proceed as follows. First, we calculate market access by employing data for international trade costs (which is proxied by trade freeness, see Figures 1 and 2), country share of labour force in the base year, and the manufacturing price index. Using this measure of country market access and Eurostat (2009) for international migration in the base year, we solve the model for equilibrium wage differences between countries. The model-predicted international wage differences are systematically lower than the base year data

suggests for the enlarged EU. These differences are, among others, because in the model we have not accounted for migrations costs so far. In order to account for international migrations costs, we associate the differences between the model-predicted and base year data wages to international migration costs. This allows us to replicate the base run data in the model, while allowing for both channels of labour market adjustment: the price (wage) channel and the quantity (migration) channel.

Further, we make the following assumptions in the simulation analysis: (i) only economically-driven migration is present; (ii) no illegal migration is possible; and (iii) migration costs between countries do not change from the base year level.

4.2 Integration-induced migration in the EU

The factor and product market integration in the EU is modelled as declining migration costs. Reliable estimates of migration cost changes related to future factor and product market integration in the EU are not available in the literature yet. Therefore, in order to overcome this data limitation, we construct several hypothetical scenarios, which help us to understand what type of labour market effects could be expected from further factor and product market integration in the enlarged EU.

In order to simulate market integration in the enlarged EU, and to assess the integration-induced international labour migration flows, we exogenously reduce migration costs in 10% steps up to 30% of their base year values, and solve the model for a new inter-regional equilibrium. The net migration of labour is calculated as a difference in the workforce between the base year and the respective scenario results, where negative values stand for emigration of country r, and positive values stand for migration to country r. Migration rate is obtained by normalising the results by the total labour force.

Table 1 reports simulation results for three different levels of integration in the enlarged EU. Columns 2-4 report the predicted migration rate as a percentage of country's initial endowment with mobile workers. Considering the estimates reported in Table 1, we note that a symmetric integration shock results in substantial differences in the net migration rate among EU countries. Gross migration flows (immigration minus emigration) do, however, sum up to zero in each period fulfilling in such a way the general equilibrium condition of the total labour supply, which

does not change between the scenarios.[7]

Comparing the three integration scenarios ($\mathbb{M}^{10}$, $\mathbb{M}^{20}$ and $\mathbb{M}^{30}$), we note that the share of workforce, which would change its country of residence as a result of EU integration (not reported) increases continuously from 1.80% ($\mathbb{M}^{10}$) to 2.73% ($\mathbb{M}^{20}$) and 2.98% ($\mathbb{M}^{30}$), which implies that EU integration would induce additional 1.80 - 2.98 percent of the total EU workforce to relocate in the post-transitionary period. As explained above, these numbers refer solely to economically-driven migration, which in our model is solely due to cross-country differences in the net real income. Other types and drivers of migration, e.g. family reunification, refugees, education, are not included in these numbers. The simulation results reported in Table 1 also suggest that, on average, the migration rate is increasing, but with a decreasing rate: 1.80% ($\mathbb{M}^{10}$), 0.93% ($\mathbb{M}^{20}$) and 0.25% ($\mathbb{M}^{30}$).

Turning to country-specific results we note that, if factor and product market integration would increase symmetrically between EU countries, then Ireland followed by Luxembourg would be the largest gainers of workforce and manufacturing activity. Luxembourg is very centrally located (high market access) with very high per capita net income, which attracts workers. Ireland, one of the most open EU economies, is the only EU country, were the immigration rate of workforce is larger than 5% (scenario $\mathbb{M}^{30}$). According to our calculations, in terms of their workforce, the three Baltic States – Latvia, Estonia and Lithuania – lose the highest share of their workforce: -9.95%, -9.10% and -8.84%, respectively. These countries are peripheral (low market access) with relatively low per capita net income, which encourages workers to relocate to countries with better market access and higher wages.

In terms of the East-West migration, our model results are consistent with empirical evidence from the enlarged EU: seven out of eight CEE-8 are emigration countries, and all EU-15 are immigration countries (Kancs and Kielyte 2010). Slovenia is the only new EU Member State, which attracts workers from other countries. This can be explained by the fact that the wage rate in Slovenia is above the EU average and the proximity to other CEE countries.

From the perspective of the economic geography theory, Portugal and the United Kingdom are particularly interesting cases. In these two countries the size of workforce increases ($\mathbb{M}^{10}$), reaches its peak ($\mathbb{M}^{20}$), and finally it starts to decline ($\mathbb{M}^{30}$), suggesting that at higher levels of

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

integration the dispersion forces outweigh the agglomeration forces. Product and factor market integration reduces trade costs and factor reallocation costs, which results in better market access, lower costs and higher factor rewards. Increasing relative wages in one country in turn attracts workers from other countries, which triggers new migration. Larger workforce in turn exerts downward pressure on wages, which discourages more workers to emigrate. Hence, compared to reduced form migration models, which usually predict migration rates under a set of exogenous assumptions about explanatory variables, the underlying economic geography model is able to predict the equilibrium distribution of workforce under different levels of integration. As a result, in our model both labour migration is induced endogenously, and it comes to a halt endogenously, when the forces driving migration, such as wages and market access, has equalised across countries.

4.3 Comparison with previous studies and limitations

In order to study the relationship between market access, wages and labour migration, a growing number of migration studies rely on the structural 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 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 labour migration 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 new 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 region of residence. Hence, the results presented in this study are in line with the previous NEG literature, which suggests that migrants both follow and affect market potential. The somewhat lower potential migration rates from the CEE-8 can be explained by better data quality and endogenously determined explanatory variables.

Comparing our predictions to the reduced form migration models, we note that our calculations are different, particularly with respect to the dynamics of migration. For more than a decade, the general assumption in migration literature 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). In reality, however, a comparable small share of the total CEE population emigrated to Western Europe in first the two decades since the fall of the Wall. One of the main reasons for deviations between the reduced form models' predictions and the observed migration patterns is strong underlying assumptions about country developments and exogenously fixed response to integration, migration and development, which are based on the a priori and fixed estimates of the economic differences between countries.

In addition, deviations among previous studies and our calculations might be caused by misspecification of the model (missing variables, specific functional forms), differences in the employed data, differences in source and destination countries studied, and differences between the underlying conceptual frameworks. One particular feature that sets the conceptual framework employed in the present 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 explanatory variables, such as wage rate, utility and profits. For example, if the net wage (indirect utility) is a positive function of 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 relocation endogenously, whereas in reduced form models it is set exogenous.

5 CONCLUSIONS

The paper studies the impact of migration policy liberalisation on labour migration in the enlarged EU. In particular, we attempt to assess the direction, size and dynamics of potential labour migration after the end of the 'transitional measures', which are restricting the relocation of workers from the NMS. The paper tries to answer the following policy-relevant questions: How will the liberalisation of migration policy – the removal of 'transitional measures' – affect

the labour migration in the enlarged EU? If so, are there endogenous forces in the EU economies which not only induce but also reduce migration endogenously or are there regulatory policy responses necessary? What lessons from the CEE-8 experience can be learned for the Balkan Member States and the Balkan Candidate Countries?

Traditionally, international labour migration has been studied in reduced-form migration models, where ex-ante values of the key explanatory variables, such as wages, are determined a priori and fixed exogenously. In the context of international labour migration in small open transition economies, the fixing of explanatory variables is particularly problematic (Faini et al 1999; Borjas 2001; Kielyte 2008). In order to account for deficiencies of the reduced form approach to international labour migration, the present study follows Crozet (2004), Kancs (2005), Pons et al (2007), Hering and Paillacar (2008) and Paluzie et al (2009) and adopts a structural NEG approach for studying the direction, size and dynamics of potential labour migration in the enlarged EU.

Our empirical findings predict a selective migration between the EU Member States in the post-transitionary period. According to our simulation results, the liberalisation of migration policy would induce additional 1.80 - 2.98 percent of the total EU workforce to change their country of location, with most of migrant workers relocating as expected from the East to the West. These figures are considerably lower than reduced-form models' predictions, but they are in line with other studies based on the NEG framework, and the observed empirical evidence. The empirical evidence suggests that even in the absence of policy restrictions on international labour migration, the mobility of workers is rather low in the enlarged EU, despite sizeable and persistent disparities in wealth between countries.

The second important policy finding of our study is that the integration-induced relocation of workers seems to be a self-regulatory system, where migration arises and comes to a halt endogenously. Market integration reduces trade costs and factor reallocation costs, which results in better market access, lower costs and higher factor rewards. Increasing relative wages in one country in turn attracts workers from other countries, which triggers new migration. Larger workforce in turn exerts downward pressure on wages, which discourages more workers to emigrate. When the driving forces of migration, such as relative net wages, are equalised across countries, the economically-driven labour migration comes to a halt. According to our simulation

results, the average net migration rate is decreasing in the level of integration, but the rate of increase is decreasing (from 1.80% to 0.25%). In Portugal and the United Kingdom the immigration of workers has even reverted to emigration at higher levels of integration. Hence, from the economic point of view no regulatory policy responses are necessary to labour migration in the enlarged EU.

These results have important policy implications. After the fall of the Wall two decades ago, highly restrictive policy measures very introduced to ‘protect’ the old EU Member States’ labour markets from workers from the East. With the enlargement in 2004, these restrictions were partially replaced by a complex set of 'transitional measures' with the aim to gradually liberalise policy restrictions on international labour mobility in the enlarged EU. The last restrictions on labour mobility from the CEE-8 were removed in April 2011. However, labour mobility restrictions still apply to workers from the Balkan Member States and the Balkan Candidate Countries.

These results for the CEE-8 suggest that the labour mobility restrictions imposed on workers from the Balkan-5 countries are obsolete and can be removed without being afraid of mass inflows of migrant workers. Moreover, as noted by the European Commission (2010), efficient allocation of workforce will contribute to achieving the objectives of the Europe 2020 Growth Strategy. Therefore, the reduction of international labour mobility through policy interventions, as currently practiced in the enlarged EU, is both obsolete and counterproductive. Obsolete, because the international mobility of workers is rather low in the enlarged EU, and would come to a halt on itself. Counterproductive, because the transitional labour market restrictions distort the equilibrium distribution of workforce across countries, which as shown by Borjas (2001) reduces welfare on growth in the long run.

A potential downside of the adopted economic geography approach is that a structural general equilibrium model per se does not guarantee a better fit - certain reduced-form specifications might still perform better in terms of explanatory power and 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 (re)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.

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FIGURES & TABLES

Figure 1. Trade freeness in CEE-8, 1991-2009

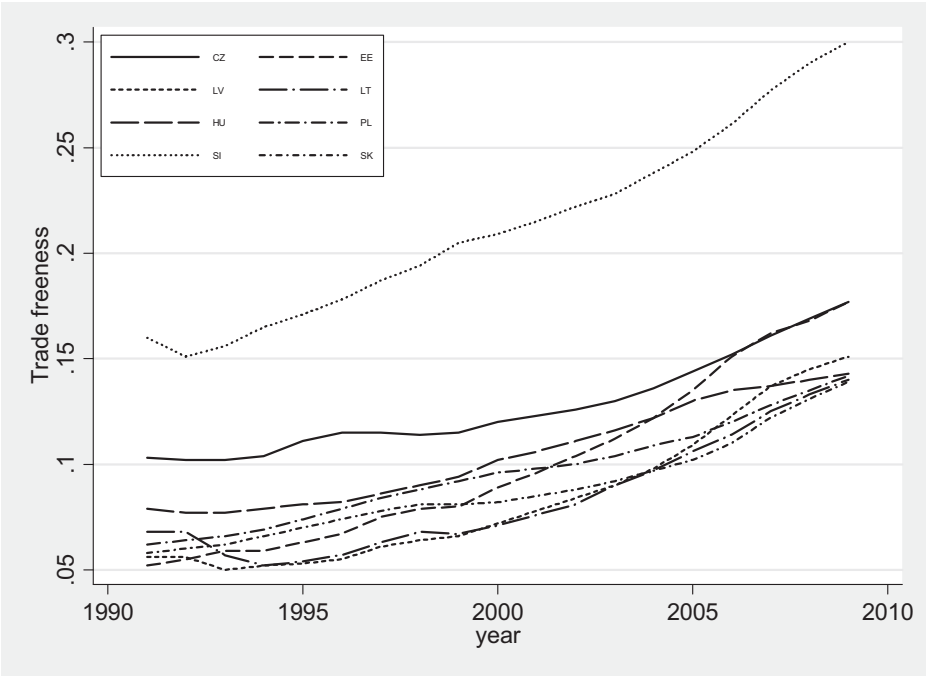

Figure 2. Trade freeness for EU-15, 1991-2009

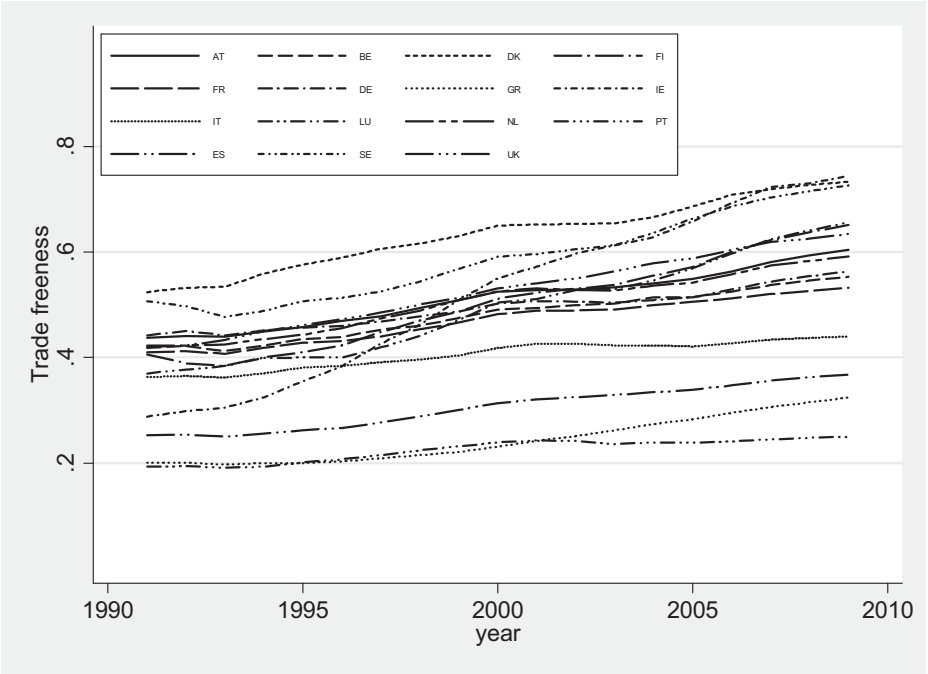

Table 1. Integration-induced reallocation of workforce in the EU, share of labour force

	Region	$\mathbb{M}^{10}$	$\mathbb{M}^{20}$	$\mathbb{M}^{30}$
	(1)	(2)	(3)	(4)
AUSTRIA	EU-15	+0.74	+1.12	+1.21
BELGIUM	EU-15	+0.62	+0.96	+1.07
CZECH REPUBLIC	CEE-8	-1.42	-2.30	-2.65
DENMARK	EU-15	+0.63	+1.04	+1.10
ESTONIA	CEE-8	-5.23	-8.24	-9.10
FINLAND	EU-15	+0.59	+0.94	+1.05
FRANCE	EU-15	+0.89	+1.35	+1.44
GERMANY	EU-15	+0.70	+1.31	+1.66
GREECE	EU-15	+0.84	+1.28	+1.37
HUNGARY	CEE-8	-2.18	-3.53	-4.07
IRELAND	EU-15	+2.95	+4.65	+5.18
ITALY	EU-15	+0.97	+0.92	+0.85
LATVIA	CEE-8	-5.34	-9.16	-9.95
LITHUANIA	CEE-8	-4.91	-7.86	-8.84
LUXEMBOURG	EU-15	+2.32	+3.65	+4.01
NETHERLANDS	EU-15	+1.05	+1.67	+1.80
POLAND	CEE-8	-1.53	-2.68	-2.89
PORTUGAL	EU-15	+0.94	+1.26	+1.12
SLOVAKIA	CEE-8	-1.01	-1.72	-2.04
SLOVENIA	CEE-8	+0.75	+1.20	+1.38
SPAIN	EU-15	+2.81	+2.36	+2.20
SWEDEN	EU-15	+0.98	+1.51	+1.73
UNITED KINGDOM	EU-15	+1.33	+1.98	+1.80

Notes: $\mathbb{M}$:"–" emigration, "+" immigration. Source: NEG model simulations based on Eurostat data for 2009.