

# The EU's New Economic Geography after the Eastern Enlargement

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## Abstract

*Using a centre-two periphery new economic geography model we study the location and real wage effects of the EU's Eastern enlargement on current and future EU member countries under pure trade integration and with migration of skilled labour. The quality of final and intermediate products differs across countries according to their effective endowments of human capital engaged in R&D. Allowing for migration prevents the relocation of firms into the integrating periphery. Moreover, the location of firms differs according to the sectors' skill and R&D intensity, low skill and low R&D firms tending to locate in the Eastern and Southern peripheries.*

• **JEL Classification:** F1, F2, L6, R1, R3

• **Key Words:** new economic geography, trade, EU enlargement

## I. Introduction

The recent inclusion of Mexico into NAFTA and the forthcoming expansion of the EU with the accession of the countries of Central and Eastern Europe offer an interesting policy dilemma for politicians. Should trade integration be coupled with free migration of labour or not? In economic integration the distributional aspect is as important as efficiency gains since it ultimately determines whether integration is sustainable. This issue is particularly important for heterogeneous integrated areas such as the EU or NAFTA. In particular, the regional development

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gap already present in the EU-15 will substantially increase in 2004 with the accession of poorer Central and Eastern European countries. The post-enlargement EU-25 will consist of three main groups of countries – higher income (North, *N*), middle income (South, *S*) and lower income (East, *E*) – that will differ in size, factor endowments, productivity, and market access. In NAFTA there are also three distinct regions, higher income USA, middle income Canada, and lower income Mexico. The new economic geography framework has been successfully used to explain the distributional aspect of integration.<sup>1</sup> Krugman (1991) seminal paper presented a two-country centre-periphery model with labour migration as source of agglomeration of economic activities. The extension to a world of three countries in Krugman (1993) introduced the hub effect: a country is said to be a hub if the transport costs between itself and each of the two other countries are lower than the transport costs between the latter two. This could be considered to be the northern group of countries in the EU or the USA in the NAFTA model. An alternative source of agglomeration, input-output linkages due to intermediate goods, was proposed by Krugman and Venables (1995), extended to *M* countries by Puga and Venables (1997) and to *M* sectors by Venables (1999). Puga (1999) constructed a model where both sources are present and interact to produce less extreme outcomes. Finally, Forslid (1999) incorporated human capital in the simple model of Krugman (1991).

We extend the input-output linkages and labour migration model of Puga (1999) to incorporate both the Krugman (1993) hub effect and Forslid's (1999) fixed costs of human capital engaged in R&D. Our new economic geography model differs from the existing literature in the way these elements are modelled. First, the hub effect arises from considering both spatial and non-spatial trade costs. Spatial costs depend on distance, hence are always positive and country-pair specific. On the contrary nonspatial trade costs, defined as artificial barriers to trade, can be compressed to zero by integration. Second, the fixed costs of R&D are introduced alongside vertical differentiated products, and product quality differs across countries due to their different effective endowments of human capital engaged in R&D. This is accomplished by incorporating two quality weight functions, one in the consumer's utility function and another in the firm's cost function, such that both utility and fixed costs increase with the quality

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<sup>1</sup>For an exhaustive survey see, for example, Ottaviano and Puga (1998).

index.<sup>2</sup> As utility and fixed costs exhibit respectively a concave and convex behaviour with respect to quality, together they determine the maximum quality level that can be achieved in each country.

The objective of the paper is to use the constructed model to study how industrial sectors with different characteristics will be distributed among these three groups of member countries and the impact on real wages after the incoming enlargement in two polar cases: when the enlargement involves pure trade integration and when it additionally includes labour market integration. The migration of labour issue is very relevant in the 2004 EU enlargement, in which free migration from the acceding countries is still under discussion. Our model predicts that, in the absence of migration, firms will agglomerate in the acceding countries. For example, following Mexico's accession to NAFTA, US firms relocated on the Mexican side of the border. However, once migration of labour is permitted, we predict that firms will agglomerate in the hub.

An example of this type of behaviour can be found in Germany's reunification, when Eastern workers migrated west and German firms followed. The result was the partial deindustrialisation of East Germany and agglomeration of economic activity in the former West Germany. Huge transfers had to be made to compensate East Germany for its loss.

The paper is organised as follows: section 2 describes the formal model and solves it for equilibrium, section 3 looks at location and welfare effects when only trade is liberalised, section 4 studies the same effects when migration of skilled labour is allowed as well, and section 5 concludes.

## II. The model<sup>3</sup>

Countries  $N$  and  $S$  are members of an integrated area which will be enlarged to

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<sup>2</sup>Alternative approaches for incorporating quality in the utility function within a quality of life or other analyses include Epplé (1987) and Giannias (1996), (1998). Their closed-form approach assumes that the utility function is quadratic, and that the quality index itself is a weighted function of amenities or other relevant factors. This formulation implies a linear hedonic price equation. Instead, we use a Dixit-Stiglitz formulation that allows for some degree of substitution between varieties of different quality. Our quality index is exogenous, as we are interested in the reaction of consumers and firms to quality, rather than trying to explain quality itself. Thus our approach is similar to that of models of North-South trade in vertically differentiated goods such as Flam and Helpman (1987) and Stokey (1991), who also find non-linear price equations producing the multiple equilibria characteristic of new economic geography models.

<sup>3</sup>WDue to space constraints we refer the readers not familiarised with new economic geography to Fujita et al. (2000) as an excellent background reading on the modelling techniques and functional forms.

accommodate country  $E$ . In addition, according to the definition of Krugman (1993), country  $N$  is a hub in that the trade costs between  $N$  and each of the two peripheries  $S$  and  $E$  are lower than those incurred by  $S$  and  $E$  when trading with each other. This hub effect persists after enlargement because trade costs have two distinct components. The first, non-spatial trade costs such as tariff and non-tariff trade barriers, can be compressed till zero by integration. These costs are the same for all member countries and will be denoted  $t$ . However, the second component of trade costs is purely spatial and depends on country pair-specific distance. Though they can be decreased by, e.g., infrastructure improvement, these costs can never equal zero. Spatial trade costs are denoted  $\tau_{ij}d_{ij}$ , with  $d$  the distance between countries  $i$  and  $j$ , and  $\tau_{ij} > 0$  a parameter that measures the quality of infrastructures in that country-pair.

Thus the total cost of trade between countries  $i$  and  $j$  is

$$T_{ij} = t + \tau_{ij}d_{ij}. \quad (1)$$

In each country there are three sectors and two factors of production, unskilled labour ( $L^U$ ) and industry-specific skilled labour ( $L^S$ ). The constant returns to scale agricultural sector is perfectly competitive and uses unskilled labour with unit marginal product to produce a homogeneous commodity  $Y$  that is costlessly tradable and will serve as numeraire. Thus for all countries, the price of the homogeneous good ( $p_Y$ ) and the wage of unskilled labour ( $w^U$ ) both equal one. The two increasing returns to scale industrial sectors ( $X_1$  and  $X_2$ ) are composed of imperfectly competitive firms that produce both final and intermediate differentiated goods in a Dixit and Stiglitz (1977) manner using both unskilled and skilled labour in different proportions.

### A. The consumer

Varieties can be indexed according to quality and consumers like quality such that it increases their utility. Incorporating an utility weight function  $\theta(k)=k^\eta$ , where  $\eta < 1$  is the elasticity of the consumer's valuation of quality with respect to the quality index  $k$ , the utility function for a consumer in country  $i$  can be written as:<sup>4,5</sup>

<sup>4</sup>Though there are three countries in the model, we will use a generic country subscript  $i$  as we assume that all countries share a preference structure with a CES functional form.

<sup>5</sup>The assumption of a share of manufactures in consumption not higher than 1/3 ensures that, even if all industry is concentrated in a single country, this country also has some agriculture and thus equilibrium industrial wages equal equilibrium agricultural wages in each country. In this model the equality applies to unskilled labour only since skilled labour is specific to industry. Thus it allows us to treat wage determination as if we still had one single factor of production in the model.

$$U_i = [(X_{il})^\gamma (X_{i2})^{1-\gamma}]^\rho (Y_i)^{1-\rho}, \quad 0 < \gamma < 1, \quad 0 < \rho \leq 1/3, \quad i=N,S,E \quad (2)$$

with each of the increasing returns to scale composite good formed as follows:

$$X_{ih} = \left( \int_0^{N_h} (k^\eta x_{ihk})^{\frac{\sigma-1}{\sigma}} dk \right)^{\frac{\sigma}{\sigma-1}}, \quad h = 1, 2, \quad \sigma > 1$$

where  $x_{ihk}$  is the quantity consumed of each variety  $k$  produced in sector  $h$  in country  $i$ ,  $N_h$  is the number of varieties effectively produced in sector  $h$ ,  $\sigma$  is the elasticity of substitution among varieties of the same good,  $\gamma$  is the share of expenditure on each differentiated good, and  $\rho$  is the share of expenditure on all the differentiated goods. Previous models can be seen as a particular case of this more general formulation in which the consumer attaches the same value to all varieties.

Let  $n_{ih}$  be the total number of varieties of differentiated goods of sector  $h$  effectively produced in country  $i$ ,  $p_i$  the Free-On-Board prices in the producer's location  $i$  and  $i_i$  individual income in country  $i$ . The budget constraint faced by a consumer in country  $i$  can then be written as:

$$p_i Y_i + \sum_{j=N,S,E} \sum_{h=1,2} \int_0^{n_{jh}} T_{ij} p_{jkh} x_{ihk} dk = i_i \quad (3)$$

Consumers maximise utility (2) subject to the budget constraint (3).<sup>6</sup>

## B. The firm

Assume that the price index  $P_i$  of each industry's aggregate good in country  $i$  is the same for inputs as for final products and is expressed as:<sup>7</sup>

$$p_{ih} = \left[ \sum_{j=N,S,E} \int_0^{n_{jh}} \left( \frac{T_{ij} p_{jkh}}{k^\eta} \right)^{1-\sigma} dk \right]^{\frac{1}{1-\sigma}}, \quad h = 1, 2 \quad (4)$$

<sup>7</sup>Each consumer allocates to good  $Y$  a share  $1-\rho$  of individual income. In addition, solving for the first order conditions, we find the demand functions in market  $i$  for a variety  $k$  of each sector  $X_1$  and  $X_2$  produced in country  $j$ , with  $i, j = N, S, E$ . These are represented by the first term in the total demand equation (6).

<sup>8</sup>The procedure for the derivation of the CES demand functions and corresponding price index is fully described in Fujita et al. (2000).

Following Venables (1999), we further assume that inter-industry linkages are sufficiently weaker than intra-industry linkages to be ignored. Finally, following Forslid (1999), we assign skilled labour to research (fixed costs) and unskilled labour to production (marginal costs) such that skill-intensive industries have a higher degree of scale economies. In addition, fixed costs become a function of quality, their natural limit being provided by the total supply of skilled labour available. As a consequence countries with more skilled labour are able to achieve higher quality levels. Using a fixed cost function  $\phi(k) = k^\delta$ , where  $\delta > 1$  is the elasticity of the firm's fixed cost of quality with respect to the quality index  $k$ , the minimum cost function for producing a variety  $k$  in country  $i$  will then be:

$$TC_{ihk} = (P_{ih})^\mu [(W_i^s)^\alpha k^\delta + (w^u)^{1-\alpha-\mu} c x_{ihk}], i=N, S, E, h=1, 2 \quad (5)$$

with  $w^S$  and  $w^U$  the wage rates for skilled and unskilled labour, respectively,  $\alpha$  the share of skilled labour in total cost,  $\mu$  the share of intermediates in total cost,  $c$  the marginal cost, and  $x$  the equilibrium output.

The total demand from consumers and firms of both sectors faced in market  $i$  by a firm producing variety  $k$  in country  $j$  is given by:

$$x_{ijhk} = [p_{jhk}]^{-\sigma} \left[ \frac{T_{ij}}{k^\eta p_{ih}} \right]^{1-\sigma} E_{ih}, i=N, S, E, h=1, 2 \quad (6)$$

with  $E_{ih}$  the expenditure function given by:

$$x_{i1} = \gamma \rho I_i + \mu \int_0^{n_{i1}} TC_{i1k} dk, E_{i2} = (1-\gamma) \rho I_i + \mu \int_0^{n_{i2}} TC_{i2k} dk \quad (7)$$

where  $I_i$  is the total income in country  $i$ . The profit maximising price is a mark-up over marginal cost:

$$p_{ihk} = \left( \frac{\sigma}{\sigma-1} \right) (w^u)^{1-\alpha-\mu} (p_{ih})^\mu c, h=1, 2 \quad (8)$$

From the zero profit condition we can obtain the firm's equilibrium output:

$$x_{ihk} = (\sigma-1) \frac{k^\delta (w_i^s)^\alpha}{c (w^u)^{1-\alpha-\mu}}, i=N, S, E, h=1, 2. \quad (9)$$

The firm's demand for labour is:

$$w_i^S \lambda_{ih}^S = \sigma \alpha (w_i^S)^\alpha (P_{ih})^\mu + \int_0^{n_{ih}} k^\delta dk, \quad h = 1, 2 \quad (10)$$

with  $\lambda_{ih}^S$  the share of country  $i$ 's skilled labour endowment working in manufacturing sector  $h$ . According to this condition, the equilibrium wage bill of skilled workers is equal to their share of the equilibrium revenue.<sup>8</sup> In addition, with quality differences firms are no longer symmetric and it is the mass of firms that determines total production.<sup>9</sup> Finally, due to the assumption of non-substitutability of labour skills, wages are determined independently: the skilled wage is determined in the differentiated goods sector by (10) and the unskilled wage is determined in the homogeneous goods sector.<sup>10</sup> Unskilled wages are always constant and equal to unity, skilled wages will be denoted simply  $w$ .

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<sup>8</sup>In equilibrium the zero profit condition applies and thus the equilibrium total revenue must equal the equilibrium total cost. Hence it is indifferent to think in terms of share in revenue or in costs.

<sup>9</sup>The mass of firms is described by the "quality integral". Since firms differ in the quality of their products according to some distribution function, it is the total mass of firms that is relevant and not just their number. Obviously if firms are symmetric the distribution is uniform and we obtain the special case that is currently treated in the literature in which the mass of firms depends directly on the number of firms.

<sup>10</sup>As in Krugman and Venables (1995), we assume that there is a perfectly elastic supply of labour from agriculture to industry as both sectors use unskilled labour, agriculture uses no other factor and only industry uses skilled labour. The agricultural wage effect is eliminated by assuming both constant returns to scale in agriculture and a share of manufactures in consumption not higher than 1/3. The first assumption ensures unit equilibrium agricultural wages in each country. The second assumption ensures that, even if all industry is concentrated in a single country, this country also has some agriculture and thus equilibrium industrial wages equal equilibrium agricultural wages in each country. The two assumptions together imply that in all countries equilibrium unskilled wages equal unity in both agriculture and industry. Therefore industry can draw labour from agriculture at a constant wage rate. Puga (1999) obtains wage flexibility in a model with finite elasticity of labour supply from agriculture to industry where both sectors share labour as a factor of production but agriculture additionally uses land. Unlike in Puga (1999), in our model such wage flexibility arises from the existence of two types of labour (skilled and unskilled) rather than from a finite elasticity of labour supply from agriculture. In our model, as in Krugman and Venables (1995), the elasticity of (unskilled) labour supply from agriculture is infinite, but that of skilled labour is not. The distinction between different skill levels is not present in the previous studies and it is the crucial aspect that allows us to obtain a result similar to Puga (1999) even for an infinite elasticity of labour supply from agriculture. As we assign unskilled labour to marginal costs, any training cost due to the transfer from the agricultural sector will affect exclusively marginal costs, thus being part of the constant  $c$ , which we assume to be the same for all countries. The cost of transferring unskilled labour from agriculture becomes second order and can be normalised by choosing units such that  $c = \frac{\sigma - 1}{\sigma}$ .

### C. General equilibrium

After choosing units such that  $c = \frac{\sigma-1}{\sigma}$ , we solve the model for equilibrium following the methodology described in Puga (1999). Rewriting the equilibrium conditions in vector form as in Puga and Venables (1997), Puga (1999) we have:

$$\text{Price index: } Q(n, p, \Theta) \equiv \frac{1}{1 + \eta(\sigma - 1)} \Theta \hat{p}^{\mu(1-\sigma)} n^{1+\eta(\sigma-1)} - p^{1-\sigma} = 0 \quad (11)$$

$$\text{Profit: } \Pi(n, p, \Theta, w) \equiv \frac{1}{1 + \eta(\sigma - 1)} \Theta \hat{p}^{\sigma-1} \hat{n}^{\eta(\sigma-1)} \left[ \frac{\gamma p(1+\delta)}{\sigma} (\hat{w} L^S + L^U) n^{-\delta} + \mu \hat{w}^{\alpha} \hat{p}^{\mu} n \right] - \hat{w}^{\alpha} p^{\alpha\mu} = 0 \quad (12)$$

$$\text{Labour demand: } \Lambda(n, p, w, \lambda^S) \equiv \frac{\sigma\alpha}{1+\delta} \hat{w}^{\alpha} \hat{p}^{\mu} n^{1+\delta} - \hat{w} \lambda^S = 0 \quad (13)$$

where  $n, P, w, L^S, L^U, \lambda^S$  denote 3-column, superscript  $\hat{\cdot}$  denotes a diagonal matrix with the  $i^{\text{th}}$  element of the corresponding vector in position  $(i,i)$  and zeros off the diagonal, and  $\Theta$  is a 3x3 symmetric matrix with representative element  $T_{ij}^{1-\sigma}, i \neq j$ , off the diagonal and ones in the diagonal.

In the short run skilled labour is immobile across countries, but in the long run it is free to migrate. Migration happens until differences in real wages are eliminated. Thus, following Puga (1999), we now have one more equilibrium condition that results from considering that the equality of real wages at equilibrium means the equality of indirect utility in all countries:

$$V(P, w) \equiv \hat{P}^{-\gamma p} w = 0 \quad (14)$$

Equilibrium values of: the number of firms; the price index of industrial goods; and the wage of skilled labour in each country, are a simultaneous solution to the system (11)-(13).<sup>11</sup> Our objective is to study the location and real wage effects of symmetric changes in trading arrangements characterised by a matrix  $d\Theta$  of changes in the trade costs matrix  $\Theta$ . We incorporate asymmetry by assuming that the decrease in trade costs is not the same for country pairs  $NE$  and  $SE$ , since as

<sup>11</sup>The methodology for derivation of the simultaneous solution to a system of this type is provided in detail by Puga (1999).



stated before the existence of both spatial and non-spatial trade costs leads to a different evolution across country pairs.

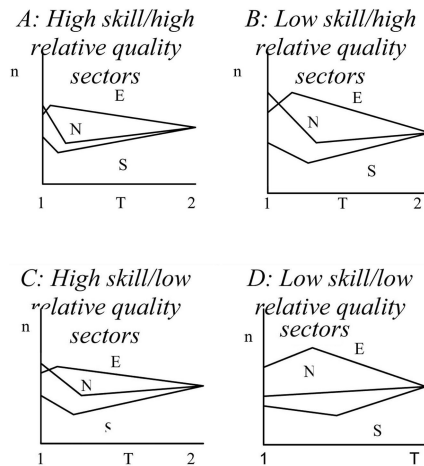
### III. Agglomeration without migration

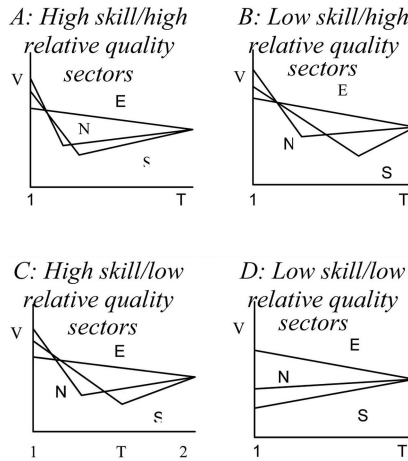
We start by normalising the endowment of unskilled labour to one and totally differentiating the system (11)-(13) assuming that skilled labour presents sector-specific skills and is thus immobile across sectors. As we are considering the implications of integration we plot below the location and welfare effects of a consequential reduction in trade costs for firms. Trade costs ( $T$ ) are of the iceberg type: the initial value of 2 represents the situation where a firm must ship the equivalent of two units for one unit to arrive, whilst at unity firms suffer no trade or transport costs.

Figs. 1 and 2 are representative of the impact on firms in the high and low technology sectors and are further subdivided by the size of fixed cost investment undertaken by firms, a proxy for the relative quality of good that is produced by a firm within a sector. The larger is the investment the higher is the relative quality of the good. Parameter values were selected to correspond to those used in Puga and Venables (1997), Puga (1999), that is,  $\gamma=0.5$ ,  $\rho=0.3$ ,  $\sigma=6$ . In addition, a value for consumer preference for quality of  $\eta=0.5$  was incorporated.

It can be seen that as  $E$  integrates with  $N$  and  $S$ , the number of firms ( $n$ ) and the real wage ( $V$ ) decline initially in both  $N$  and  $S$ , but increase in  $E$ . However, even

**Fig. 1.** Location effects of trade liberalisation in the absence of skilled labour migration



**Fig. 2.** Real wage effects of trade liberalisation in the absence of skilled labour migration

though non-spatial trade costs change equally for the *NE* and *SE* country pairs, the spatial component still makes the difference since *N* is a hub. Thus it is relatively more expensive to buy inputs from *S* and so the latter is more affected than *N*. The movement of firms from *N* and *S* to *E* is eventually reversed as *T* approaches one, though this does not happen simultaneously for the different types of industries: those with lower share of skilled labour are the first to return to the original location.<sup>12</sup> Comparing Figs. 1A and 1B it can be seen that in low skill sectors the turning point occurs sooner and gains grow at a greater rate. Since there is no migration of skilled labour, industries that are less skill-intensive will have more mobility. In addition, *N* regains firms before *S* does, due to the centrality of its location. The turning points also change with firms' R&D costs. Intermediate R&D cost firms find it profitable to stay in the hub, but not in the peripheries (especially the recently integrated *E*). Fig. 2 shows that the real wages of skilled labour increase in *E* due to higher demand by a greater number of firms and decrease in *N* and *S* following the decrease in demand by a smaller number of firms. The real wages of hub *N*'s skilled labour decrease less than those of periphery *S* since the former registers a smaller loss of firms and keeps the advantage of centrality that translates into a lower price index. Whereas *E*'s gain is not reversible, the other countries' losses are reversible when trade costs are low enough. For *N*, real wages follow the behaviour of firms. In the case of *S*, the

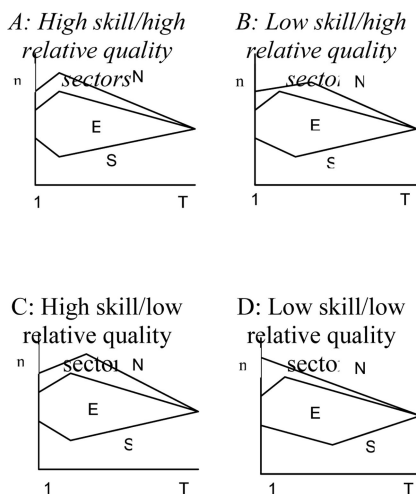
<sup>12</sup>Full details of the *T* turning point values can be obtained from the authors upon request. As an example, for the Leather products sector the turning point is a relatively high 1.25 in *N*, whereas in the Machinery sector it is an extremely low 1.01.

turning point of real wages, unlike that of firms, occurs much before in low skill/low R&D sectors than in high skill/high R&D sectors, giving rise to a great difference in the turning points of  $N$  and  $S$  in low skill sectors. In addition,  $S$  suffers a dramatic fall in real wages for low integration levels. This behaviour is due to two main effects. First, there is a comparative advantage effect by which  $S$  is more competitive in low skill sectors, suffering more intense competition in high skill sectors. Second, there is a cost reduction effect by which the reduction in nominal wages induced by the exit of firms leads to a price decrease that pulls demand out of  $N$  and  $E$  into  $S$  and drives real wages up relatively early in the integration process.

The results above are similar to those of Puga (1999) in that integration must go far enough in order to get convergence and differ from those of Krugman and Venables (1995) who find divergence for low values of trade costs. Our result is due to wage flexibility in the absence of migration. As explained in footnote (12), unlike in Puga (1999), such wage flexibility arises from the existence of two types of labour (skilled and unskilled) rather than from a finite elasticity of labour supply from agriculture. In our model, as in Krugman and Venables (1995), the elasticity of (unskilled) labour supply from agriculture is infinite, but that of skilled labour is not. The distinction between different skill levels is not present in the previous studies and it is the crucial aspect that allows us to obtain a result similar to Puga (1999) even for an infinite elasticity of labour supply from agriculture. We now turn to the analysis of location and real wage effects when migration of skilled labour is allowed.

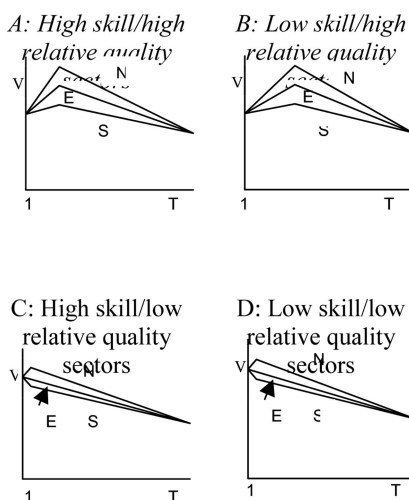
#### **IV. Agglomeration with migration**

The migration of skilled labour transforms the reaction of firms, which is found by totally differentiating the system (11)-(13) together with (14): there is an increase in the number of firms in  $N$  and in turn a reduction in the number relocating to  $E$ . Having a pool of skilled labour available that can be drawn from other countries, firms naturally prefer to locate in the hub at the expense of the peripheries (Fig. 3). The high skill sectors reveal a more uniform behaviour, with the three countries having similar turning points. On the contrary, for high integration levels,  $N$  loses firms in low skill sectors in favour of  $S$  before  $E$  does. Once more a comparative advantage argument can be invoked to explain this behaviour.

**Fig. 3.** Location effects of trade liberalisation in the presence of skilled labour migration

With migration, equilibrium is reached at each moment not through adjustment in real wages but through adjustment in the share of skilled workers employed in each country and sector. Thus as real wages converge (Fig. 4) skilled labour migrates from *E* into *N* (and to a lesser extent *S*). Once again our results come close to those of Puga (1999) and thus replicate the story of the initial centre-periphery model of Krugman (1991). Migration intensifies agglomeration while eliminating real wage differentials. As has been shown, firms concentrate in the hub instead of the peripheries as real wages in the centre and the peripheries converge. This is possible as the lower demand for labour in the peripheries is compensated by a lower supply of labour due to the migration flows towards the centre.

In addition Fig. 4 shows that the real wage of each country unequivocally increases as trade costs reduce. As the relaxation of the migration constraint can be considered to be the long run impact of the changes discussed in section 3, the results imply that there is a role for government policy following integration. In the short run real wages and therefore welfare decline in *N* and *S*. In the long run this reverses and welfare is enhanced in each country. Similarly, whilst the number of firms declines in *N* in the short run, this also reverses in the long run. However, the number of firms declines in both the short and long run in *S* and the impact is particularly strong in the high skill, high quality sectors.

**Fig. 4.** Real wage effects of trade liberalisation in the presence of skilled labour migration

## V. Conclusions

In this paper we developed a new economic geography model with heterogeneous product quality in order to study the location and real wage effects of a second periphery's accession to a centre/periphery integrated area, as the EU or NAFTA. We consider two different cases: when the enlargement involves pure trade integration and when it additionally includes labour market integration.

Think in particular of EU's Eastern enlargement (or alternatively of NAFTA's inclusion of Mexico). In the absence of migration, as Eastern Europe integrates with EU it is expected to pull firms out of the latter. During the initial stages of integration EUSouth suffers the greatest loss of firms and a dramatic fall in real wages, especially in high-skill sectors. It can recover if trade costs decrease below a certain threshold. Allowing skilled labour migration allows the convergence of real wages and prevents firms from relocating in the East, firms prefer to locate in the hub at the expense of the peripheries. EU-South now has a real wage gain at low integration levels, though it loses firms in favour of EU-North.

It has been demonstrated that it is always be in the interest of EU-North to encourage migration of Eastern skilled workers, whereas EU-South should actually encourage it at low integration levels and discourage it at high integration levels. This is because, as a result of migration, EU-North gains firms and thus, through greater demand for skilled labour, the increase in supply is more than compensated. The final effect for the North is both more firms and higher real

wages of skilled labour. On the contrary, at high integration levels, real wages in the South behave less favourably in the presence of migration. The supply of labour increases but, as a periphery, the South is not capable of attracting enough firms to create large enough demand for labour and thus, after some critical level of trade costs, real wages start decreasing. If migration is not allowed for, the opposite happens and real wages *increase* in the South after some critical level of trade costs. Thus in the long run the South's scope for an increase in welfare is higher if trade integration with the East is *not* accompanied by migration of skilled labour. Hence from the policy point of view it would be desirable to either assure the South compensation for its loss in the initial stages of integration in the absence of migration or open up to migration thus benefiting *both* North and South.

The two policy experiments presented in the paper can be seen as two extreme cases, those of total absence of migration flows after the enlargement, and of frictionless migration. In reality, even if migration is permitted with no restrictions, the frictions to which any migration process is subject can lead to low migration flows (such is currently the case in Europe where labour mobility is extremely low when compared to, e.g., the US). If this is the case, the no migration scenario is the more realistic of the two and the compensation issue becomes the more pressing. A "flying geese" argument can be forwarded according to which the pull out of relatively inefficient and uncompetitive sectors can compensate for the push in of other more efficient and competitive sectors thus leading for a long term gain. Yet this does not prevent the appearance of short-term adjustment costs that can be more or less persistent depending on the particular sector under consideration.

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