WIFO
ÖSTERREICHISCHES INSTITUT
FÜR WIRTSCHAFTSFORSCHUNG

WORKING PAPERS

Market Potential and Border Effects in Europe

Michael Pfaffermayr, Peter Huber,
Yvonne Wolfmayr

235/2004

Market Potential and Border Effects in Europe

Michael Pfaffermayr, Peter Huber, Yvonne Wolfmayr

WIFO Working Papers, No. 235
November 2004

E-mail address: michael.pfaffermayr@uibk.ac.at, Peter.Huber@wifo.ac.at, Yvonne.Wolfmayr@wifo.ac.at
2004/342/W/6302

Market Potential and Border Effects in Europe

Michael Pfaffermayr, Peter Huber, Yvonne Wolfmayr*

November 11, 2004

Abstract

We estimate a linear approximation of the market potential function derived in geography and trade models. Using a spatial econometric estimation approach, border effects can be identified by a differential impact of neighboring regions' purchasing power, depending on whether two regions are located in (i) the same country (ii) within the EU15 or (iii) outside the EU15. Our results suggest that there are substantial market potential effects on nominal wage rates. We also find significant border effects between EU15 and non-EU15 countries. Our estimation results suggests that the enlargement of the EU on May 2004 may lead to pronounced wage effects in the new member states, but to relatively small ones for the existing members.

Keyword: Market Potential, Border Effects, Spatial Econometrics

Jel: F10, R12, F12, C21

*Affiliation of all three authors: Austrian Institute of Economic Research, PO-Box 91, A-1103-Vienna, Austria, Michael Paffermayr is also affiliated at the Department of Economics at the University of Innsbruck. E-mail: Peter.Huber@wifo.ac.at, yvonne.wolfmayr@wifo.ac.at and Michael.Pfaffermayr@uibk.ac.at. We gratefully acknowledge financial support from the 5th Framework Project ACCESSLAB and the Austrain National Bank, Jubilaeumsfond Grant Nr. 10057.

1 Introduction

Since the fall of the Iron Curtain and the opening-up of Central and Eastern Europe (CEEC) at the beginning of the nineties major steps of economic integration have been undertaken between the EU and EFTA countries and the CEEC. Examples of this are the reduction of tariffs and other trade barriers with the completion of the Europe Agreements and the introduction of a pan-European cumulative tariff system which replaced the complex system of rules of origin in the European Union. These steps culminated in the accession of eight countries from the region in May 2004.

This accession has been associated with a number of concerns amongst which regional issues and labour market effects figured prominently. In the public debate concerns about the intensified competition for border regions often have been voiced. The majority of economic studies so far, however, mainly focussed on the analysis of wage and employment effects of trade integration for single countries (specifically, the US and the UK). The regional perspective is still under-researched, although new economic geography models suggest major regional impacts of integration. These models make two central predictions on the spatial structure of wages and the effects of integration on wages in border regions. First, falling transport costs across national borders (which is a synonym for integration in these models) may change the spatial structure of wage rates within the country (see: Krugman and Livas, 1992, Fujita, Krugman and Venables, 1999, Crozet and Koenig Soubeyran 2002, Paluzzie, 2001) as well as between countries. As recently pointed out for instance by Brülhart et al. (2004), the reduction in cross border transport costs embodied in EU enlargement may change the spatial structure of EU countries and accession countries. Second, economic geography models predict that regional wage levels follow a non-linear version of the market potential function proposed by Harris (1954). Following the seminal work by Hanson (1998, 2001), who based his estimates of the parameters of this market potential function on the Helpman (1998) version of the so-called Krugman (1991) core-periphery model, a number of contributions provide estimations of the market potential function for the EU15 (Niehbur, 2004) and individual EU countries (Roos, 2001, Brackman et al., 2002, De Bruyne, 2003, Mion 2003).

In this paper we use these two central predictions of economic geography models to test the significance of border effects of EU15-internal and external borders and to simulate a scenario of the potential spatial impact of EU-enlargement. As in Mion (2003), we linearly approximate the non-linear potential function implied by the core-periphery model to derive a simple linear specification. This specification is estimated for a cross-section of NUTSII regions encompassing the EU15, the largest new EU member states as well as Switzerland and Norway. We extend previous analysis in two ways: First, we identify border effects both within the EU15 and between EU15 and Non-EU15 regions. This is important because our results indicate that there are (i) substantial interaction of wage rates across borders of countries within the EU15 and (ii) that external borders form a major impediment to trade and factor mobility, leading to pronounced extra-EU15 border effects. Second, we use our estimated specification to quantify the impact of the accession of the CEEC to the EU15 on regional wage rates by assuming that in the long run border effects between EU15 and new member states will converge to those found currently among the EU15. These calculations suggest that removing the borders between EU15 and accessions countries results in a significant increase of wage rates in the accessions countries, while those of the incumbent countries remain virtually unaffected.

2 The econometric specification of the market potential function

The starting point of our analysis is the structural market potential function, which relates the nominal wage rate (w_i) in region i to the spatially weighted sum of purchasing power (measured in terms of nominal GDP, y_i) in its neighboring regions. This relation is based on following equilibrium conditions of the Krugman (1991) model:

$$\frac{w_i}{T_i^{\mu}} = \frac{w_j}{T_j^{\mu}} \tag{1}$$

$$T_i = \left[\sum_{i=1}^{J} \lambda_j (w_j e^{\tau d_{ij}})^{1-\sigma}\right]^{\frac{1}{1-\sigma}} \tag{2}$$

$$w_i = \left[\sum_{i=1}^{J} Y_j (e^{-\tau(\sigma-1)d_{ij}}) T_j^{\sigma-1}\right]^{\frac{1}{\sigma}} \tag{3}$$

where subscripts i and j index regions. $\sigma > 1$ denotes the elasticity of substitution between any two variants of manufacturing goods. (1) states that in equilibrium real wages are the same in all regions so that there is no incentive for workers to relocate. The price level in each region is given by T_i^{μ}, where μ denotes the expenditure share of the differentiated manufacturing good produced under increasing returns ($1 - \mu$ percent of the budget are allocated to a agricultural, homogenous numeraire good). This good can be costlessly traded and its price is normalized to 1. Forward and backward linkages induce spatial concentration of workers and firms and constitute the well known centripetal and centrifugal forces in the model (Krugman, 1991). (2) illustrates that the price level of differentiated goods in region j depends on the share of manufacturing goods produced in j, denoted by λ_j, and the index spatially weighted wage rates of all other regions. A region's weight declines in distance (d_{ij}) at rate τ. Lastly, the equilibrium wage rate of region i is given by (3), which forms the basis of our econometric specification we intend to estimate. We take the logs of (3) to receive:

$$\begin{aligned} \ln w_i &= \frac{1}{\sigma} \ln \left(\sum_{j=1}^{J} Y_j (e^{-\tau(\sigma-1)d_{ij}}) T_j^{\sigma-1} \right) \qquad (4) \\ &= \frac{1}{\sigma} \ln \left(\sum_{j=1}^{J} Y_j \widetilde{d}_{ij} T_j^{\sigma-1} \right), \end{aligned}$$

defining $\widetilde{d}_{ij} = e^{-\tau(\sigma-1)d_{ij}}$. Following Hanson (1998, 2001), Roos (2001), Niebuhr (2004) and others, we have to eliminate the empirically unobservable price index (T_j) in (3) to arrive at an estimable specification. Our assumptions to derive the basic specification are less restrictive than in the previous literature, which either assumes that real wages are the same in all regions or that the price indices are identical. Also, the model assumes an identical technology across regions, which is unrealistic. Our sample contains Central and Eastern European regions with productivity levels much lower than the EU15 average. There is also a considerable variance in productivity levels between EU15-regions. We assume that wages differ according to labor productivity and country group effects (Eastern European Countries, Non-EU15-EFTA countries and EU15 countries being the base). Formally, let

$$
\begin{aligned}
\frac{w_i}{T_i^{\mu}} &= \omega_i && (5)\\
\frac{w_j}{T_j^{\mu}} &= \delta_i^{-1}\omega_i \;\Rightarrow && (6)\\
T_j &= \left(\frac{w_j}{\omega_i}\delta_i\right)^{\frac{1}{\mu}} && (7)
\end{aligned}
$$

where δ_i^{-1} is the correction for factor productivity differences for region i and it is defined as the percentage deviation from the overall mean. Under these assumptions, substituting equation (7) into (4) yields:

$$
\begin{aligned}
\frac{1}{\sigma}\ln(w_i) &= \frac{1}{\sigma}\ln\left(\sum_{j=1}^{J} Y_j\widetilde{d}_{ij}(\frac{w_j}{\omega_i}\delta_i)^{\frac{\sigma-1}{\mu}}\right) = \qquad (8)\\
&= \frac{1-\sigma}{\sigma\mu}\ln(\omega_i) + \frac{1}{\sigma}\ln\left(\sum_{j\neq i}^{J} Y_j(w_j\delta_i)^{\frac{\sigma-1}{\mu}}\widetilde{d}_{ij}\right)
\end{aligned}
$$

To derive the empirical specification, we approximate linearly around the average yearly wage rate $\overline{w}$ on the left hand side and around the yearly averages on the right hand side. Hence, the linear approximation yields the market potential function in percentages of yearly means of the variables. It enables us to identify the border effects without a non-linear least squares approach.

$$
\begin{aligned}
& \ln \overline{w}_t + \frac{(w_i - \overline{w})}{\overline{w}_t} && (9)\\
\approx\ & \frac{1-\sigma}{\sigma\mu} \ln(\omega_i) + \frac{1}{\sigma} \ln \left(\overline{Y} (\overline{w}\overline{\delta})^{\frac{\sigma-1}{\mu}} \sum_{j \neq i}^{J} \widetilde{d}_{ij} \right) && (10)\\
& + \frac{1}{\sigma} \frac{\sum_{j\neq i}^{J} (\overline{w}\overline{\delta})^{\frac{\sigma-1}{\mu}} \widetilde{d}_{ij} (Y_j - \overline{Y})}{\sum_{j\neq i}^{J} \overline{Y} (\overline{w}\overline{\delta})^{\frac{\sigma-1}{\mu}} \widetilde{d}_{ij}}\\
& + \frac{\sigma-1}{\sigma\mu} \frac{\sum_{j\neq i}^{J} \overline{Y}\,\overline{w}^{\frac{\sigma-1}{\mu}-1} \overline{\delta}^{\frac{\sigma-1}{\mu}} \widetilde{d}_{ij} (w_j - \overline{w})}{\sum_{j\neq i}^{J} \overline{Y} (\overline{w}\overline{\delta})^{\frac{\sigma-1}{\mu}} \widetilde{d}_{ij}}\\
& + \frac{\sigma-1}{\sigma\mu} \frac{\sum_{j\neq i}^{J} \overline{Y}\,\overline{w}^{\frac{\sigma-1}{\mu}} \overline{\delta}^{\frac{\sigma-1}{\mu}-1} \widetilde{d}_{ij} (\delta_i - \overline{\delta})}{\sum_{j\neq i}^{J} \overline{Y} (\overline{w}\overline{\delta})^{\frac{\sigma-1}{\mu}} \widetilde{d}_{ij}}\\
=\ & \frac{1}{\sigma} \sum_{j\neq i}^{J} \frac{\widetilde{d}_{ij} (Y_j - \overline{Y})}{\overline{Y}} + \frac{\sigma-1}{\sigma\mu} \sum_{j\neq i}^{J} \frac{\widetilde{d}_{ij} (w_j - \overline{w})}{\overline{w}}\\
& + \frac{\sigma-1}{\sigma\mu} \frac{(\delta_i - \overline{\delta})}{\overline{\delta}} + \frac{1-\sigma}{\sigma\mu} \ln(\omega_i) + K && (11)
\end{aligned}
$$

where we make use of the row normalized spatial weighting matrix with $\sum_{j=1}^{J} \theta_{ij} = 1$. K captures all remaining terms which are independent of i or j. In our empirical application this spatial weighting matrix possesses the typical element $\theta_{ij} = \frac{\exp(-d_{ij}/\gamma)}{\sum_{i\neq j}^{J} \exp(-d_{ij}/\gamma)}$ for $i \neq j$ and $\theta_{ij} = 0$ for $i = j$ and it follows $\sum_{i\neq j}^{J} \theta_{ij} = 1$. Lastly, $\widetilde{d}_{ij}$ is specified as $\rho\theta_{ij}$, ρ being a spatial parameter to be estimated. Adding the iid error term (or a spatially correlated error term) yields the specification, we estimate below.

$$
\begin{aligned}
\frac{w_i - \overline{w}}{\overline{w}} =\ & K + \frac{1}{\sigma} \frac{(Y_i - \overline{Y})}{\overline{Y}} + \frac{\sigma-1}{\sigma\mu} \frac{(w_i - \overline{w})}{\overline{w}} + \frac{\sigma-1}{\sigma\mu} \frac{(\delta_i - \overline{\delta})}{\overline{\delta}}\\
& \frac{\rho}{\sigma} \sum_{i\neq j}^{J} \frac{\theta_{ij} (Y_j - \overline{Y})}{\overline{Y}} + \frac{(\sigma-1)\,\rho}{\sigma\mu} \sum_{i\neq j}^{J} \frac{\theta_{ij} (w_j - \overline{w})}{\overline{w}} + \varepsilon_i
\end{aligned}
$$

or

$$\frac{w_i - \overline{w}}{\overline{w}} = \widetilde{K} + \frac{\mu}{\sigma(\mu-1)+1}\frac{(Y_i - \overline{Y})}{\overline{Y}} + \frac{\sigma - 1}{(\sigma(\mu-1)+1)}\frac{(\delta_i - \overline{\delta})}{\overline{\delta}}$$
$$+\frac{\rho\mu}{\sigma(\mu-1)+1}\sum_{i\neq j}^{J}\frac{\theta_{ij}(Y_j - \overline{Y})}{\overline{Y}} + \frac{\rho\,(\sigma-1)}{\sigma(\mu-1)+1}\sum_{i\neq j}^{J}\frac{\theta_{ij}(w_j - \overline{w})}{\overline{w}} + \varepsilon_i$$

We envisage the EU border effect as a differential impact of the neighbors' purchasing power (measured by ρ), depending on whether they are located in the same country, (ii) within the EU15 or (iii) outside the EU15. We use the follwing decomposition:

$$\sum_{i\neq j}^{J}\frac{\theta_{ij}(Y_j - \overline{Y})}{\overline{Y}} = \sum_{i\neq j,\ same\ country}^{J}\frac{\theta_{ij}(Y_j - \overline{Y})}{\overline{Y}} + \sum_{i\neq j,\ EU}^{J}\frac{\theta_{ij}(Y_j - \overline{Y})}{\overline{Y}}$$
$$+\sum_{i\neq j,\ Non-EU}^{J}\frac{\theta_{ij}(Y_j - \overline{Y})}{\overline{Y}}$$

Now define the percentage deviation Y, and w from their overall means, e.g. $\widetilde{Y}_i = \frac{Y_i - \overline{Y}}{\overline{Y}}$. Then. in vector notation the linear approximation to be estimated reads[1]:

$$\widetilde{\mathbf{w}} = \beta_1\widetilde{\mathbf{Y}} + \beta_2\mathbf{W}\widetilde{\mathbf{Y}} + \beta_3\mathbf{W}^{EU}\widetilde{\mathbf{Y}} + \beta_4\mathbf{W}^{NEU}\widetilde{\mathbf{Y}}$$
$$+\beta_5\mathbf{W}\widetilde{\mathbf{w}} + \beta_6\mathbf{p} + \beta_7\mathbf{D}_1 + \beta_8\mathbf{D_2} + \mathbf{u} \tag{12}$$

where $\mathbf{W}^{EU}$ is identical to $\mathbf{W}$ if the two regions are located in different countries but within the borders of the EU15 and zero otherwise. $\mathbf{W}^{NEU}$ is identical to $\mathbf{W}$ if one region is in the EU15 and the other outside, or if both regions are in different Non-EU15 (NEU) countries. Hence, β_2 refers to the base of regions from within the same country. $\mathbf{W}$ is the block diagonal spatial weighting matrix with typical $N \times N$ matrix with row normalized spatial weights. $\mathbf{u}$ denotes the error term and we envisage $\mathbf{u} = \boldsymbol{\phi}\mathbf{W}\mathbf{u} + \boldsymbol{\varepsilon}$, $\varepsilon_j \sim iidN(0, \sigma_\varepsilon^2)$. $\mathbf{X}$ comprises additional controls such as productivity. We also introduce a Dummy for the Eastern European countries ($\mathbf{D}_1$) and one

[1] Note, that we have to correct the constant by adding $\left(\frac{\rho_{EU}\mu}{\sigma(\mu-1)+1}\mathbf{W}^{EU} + \frac{\rho_{NEU}\mu}{\sigma(\mu-1)+1}\mathbf{W}^{NEU}\right)\overline{\mathbf{Y}}$, where $\overline{\mathbf{Y}}$ is the vector of means. This correction is particularly important, when calculating counterfactuals.

for Non-EU15-EFTA countries (Switzerland and Norway, $\mathbf{D}_2$) to control for differences in wages due to country group effects. Since we have eight estimated parameters and only three in the theoretical model, identification of the latter is not possible. We thus confine our inference on the signs of the estimated reduced form parameters. Estimating border effects is still possible, however.

3 Data and Estimation results

We use data for a total of 215 regions provided by Cambridge Econometrics, containing NUTSII level information from the Eurostat New Cronos database on regional GVA and wages for EU15 member states and a subset of the largest new EU member states (Hungary, Poland and the Czech Republic) as well as Switzerland and Norway. To avoid problems with non-contingent spaces (due to lacking data on the Balkans) we omitted Greece from the dataset. Furthermore for German regions wage data (compensation per employee) are available only at the level of NUTS I. In the cross-section estimates we draw data for the year 2001. As the dependent variable we use nominal compensation per employee. Regional income (purchasing power), is approximated by nominal GVA and regional differences in labor productivity are added as control variable. Finally, distance is measured as the crow fly distance between the capitals of each NUTSII region.

[Table 1]

Table 1 for each country in our data displays the average distance weighted purchasing power (GVA) of all accessible regions (in column 1). Furthermore, the average distance weighted purchasing power of regions either located (i) in another country but within the EU15 borders (column 2) (ii) in different countries along the EU15- non EU15 border and NonEU15-NonEU15 border (column 3) and finally (iii) in different countries along the border of the EU15 and the three new member states in the sample (column 4). The last column thus gives an indication on how much of regional purchasing power is relocated from outside to inside EU-internal borders after the accession of Hungary, Poland and the Czech Republic. This table corroborates the results of Brülhart, Crozet and Koenig-Souberain (2004) which indicate that the additional market potential of the new EU member states is small relative to the existing EU's market potential for the old member states. Austria is the country which stands to gain most in terms of market potential by enlargement, but even here the market potential of the average Austrian region in the new member states amounts to less than 6% of the market potential in old EU member states. For countries more distant from the new member states such as Spain the market potential in the new member states is almost zero. In the new member states by contrast a substantial amount of the market potential is located in the old EU member states. In the Czech Republic, Hungary, and Poland around 90% of the total market potential is located in regions in the EU. This table thus suggests that enlargement of the EU could have a large effect on the spatial structure of at least the new member states.

[Table 2]

The old EU member states and the new ones have been integrating for more than a decade, suggesting that some of the potential adjustment may already have taken place in previous years. Specifically, this should materialize in cross-sectional estimates based on data from 2001.

We apply the spatial GM-estimator of Kelejian and Prucha (1999). Since $\mathbf{W}\widetilde{\mathbf{w}}$ is endogenous, we use the spatially lagged values of all exogenous variables as instruments, but we include only those which pass the Sargan overidentifcation test. Shea's R^2 as well as an F-test show that these instruments are relevant. Based on an initial IV-regression, we estimate $\boldsymbol{\phi}$ by solving the GM-conditions of Kelejian and Prucha (1999). The final estimation results are derived using a Cochrane-Orcutt type transformation $\mathbf{y}^*(\widehat{\phi}) = (I - \widehat{\phi}\mathbf{W})\mathbf{y}$ and applying 2SLS on the transformed data.

Table 2 presents results of estimating equation (12) in three versions, which differ with respect to the weight of distance in the spatial weighting matrix. Specification I assumes a medium decay of spatial dependence ($w_{ij} = \exp(\alpha d_{ij})/\sum_j \exp(\alpha d_{ij}), \alpha = 0.01$), while specifications II and III look at $\alpha = 0.1$ and 0.004 (i.e fast and slow decay, respectively). For each weighting scheme, we estimate two variants, one without (a) and one with (b) an endogenous spatial lag, the former being interpreted as a reduced form of (12). The estimation results indicate significant spatial correlation of the error term (confer the significant Moran I-test of Kelejian and Prucha, 2001) and we prefer Specification I with $\alpha = 0.01$ for further interpretation. Specification II implies a faster decay in distance and leads to similar results, while Specification III with the lowest decay gives higher spatial parameters. In qualitative terms, the different specifications yield similar estimation results. The estimation results also show that controlling for labor productivity is very important since the estimated coefficient is highly significant. Further, we find a small, but insignificant positive effect of own regional income (y) which is not in line with theory. One of the reasons could be the correlation with the productivity level. Using the spatially weighted average of the purchasing power of regions within the same country as the base, we identify border effects by the differential impact of the spatially weighted purchasing power of neighboring regions from within the EU15 as compared to those outside. The coefficient of the base ($\mathbf{Wy}$) turns out to be negative in all specifications, in some even significantly. This does not come as a surprise, since within countries, wages are rather homogenous and inter alia determined by centralized wage bargaining combined with higher labor mobility. Furthermore, the correction for productivity may also be a reason behind this finding. The impact of the purchasing power from neighbors within the EU15 ($\mathbf{Wy}$: EU-EU) is highest and turns out to be robust and significant. For EU15 regions the purchasing power of Non-EU15 regions is generally smaller, and in most specifications insignificant. The simple F-tests on border effects in Table 2 suggests significant differences in the impact of regions within the EU15 and outside the EU15 for Specification I and III. In Specification II both parameters are not estimated very precisely. Although the estimation results have to be interpreted with due care, there is some support that there are still substantial border effects between EU15 and Non EU15 regions. Since, most of the Non-EU15 regions are located in the accession countries, on can expect a positive impact on the wage rates in these countries following accession to the EU.

To gauge the potential impact of accession on the European regional wage structure, based on the cross sectional estimation results reported in Table 2, we perform a simulation, in which we use the estimated coefficient of the within EU15 market potential ($\mathbf{Wy}$:EU-EU) of Specification Ib (assuming a medium decay of spatial dependence) for the newly joined member states (Czech Republic, Hungary and Poland) and calculate the percentage wage change resulting from this forecast.

[Table 3]
[Figure 1]

Figure 1 presents the simulated wage effects in the form of a map[2]. Table 3 summarizes the simulation results at the level of countries and compares results assuming different distance weights or distance decay functions ("medium decay" vs. "fast decay"). Three main findings emerge from the results. First, wage effects due to a reduction of cross border transport costs (border effects) in the process of EU enlargement are of a much higher magnitude for the new EU member states in the sample than for EU15 countries. Secondly, regions closest to the borders of the "old" and "new" EU are to gain most in terms of wage increases. In specific, our simulations suggest that wages in regions in the new member states near to the EU15 border should increase by 30% to 114% if border effects were of the same magnitude as within the EU15 (Figure 1). Regions more distant from the borders of the EU15 would also have higher wages in this case. As already stated, for the old member states effects would be much smaller. Regions near the old EU15 border should experience wages increases between 0,4% and 1,56%. At the country level, the results for EU15 countries indicate the most pronounced wage effects for Austria (0,6%), followed by Germany (0,4%), Denmark, Sweden and Italy. Within the group of the three new member countries the Czech Republic is to be most affected. Last not least, the absolute magnitude of the simulated wage changes is highly dependent on the assumed distance decay. A look at table 3 reveals that the simulated wage change is roughly cut to half assuming a fast distance decay and as such can be seen as representing a lower bound of wage impacts. Since the simulations are based on cross-section estimations the resulting wage effects reflect long run adjustments. Also, they reflect the influence of market potential and the change in border effects due to accession only, ignoring other major influences like productivity changes.

4 Conclusions

In this paper we estimate a linear approximation of the market potential function derived in geography and trade models, which relates the wage in a region to its own purchasing power and that of its neighbors. Using a

[2]We calculate the direct wage effects as $\frac{w'-w}{w} = \frac{\overline{w}}{w}(\beta_3 - \beta_4)\Delta\mathbf{W}^{EU}\widetilde{\mathbf{Y}} + \frac{\overline{w}}{w}(\beta_3 - \beta_4)\Delta\mathbf{W}^{EU}\overline{\mathbf{Y}}$, where $\Delta\mathbf{W}^{EU} = -\Delta\mathbf{W}^{NEU}$ is the difference between the old and the new distance matrix where the zeros for the Eastern European regions have been replaced by the corresponding weights. w' is the estimated counterfactual wage rate.

spatial econometric estimation approach, we identify border effects differing between regions located in (i) the same country (ii) different countries in the EU15 or (iii) outside the EU15. Our major finding is that the market potential located across the external borders of the EU15 exerts no significant impact on the regional wage structure, indicating that despite the integration process over the last decade, there are still substantial border effects between EU15 and Non-EU15 regions. Hence, one can expect an additional positive impact of enlargement of the EU15 on wages especially in the regions close to the EU15 borders. Our simulations suggest that the accession may lead to pronounced wage effects in the new member states, but to low ones for the existing members. The results which are based on a medium distance decay function suggest, that regions in the new member states nearest to the EU15 border should experience wage increases of as high as 30% to 114%. For regions located in the old member states effects would be smaller. Wages of regions in the old member states closest to the border should rise by 0,4% to 1,6%.

5 References

Brakman, S., Garretsen, H., Schramm, M. (2002), New Economic Geography in Germany: Testing the Helpman-Hanson Model, HWWA Discussion Paper No. 172, Hamburg.

Brülhart, M., Crozet, M., Koenig, P. (2004) Enlargement and the EU periphery: the Impact of Changing Market Potential, HWWA Discussion Paper No.270.

Crozet, Matthieu and Pamina Koenig-Soubeyran (2002) EU Enlargement and industrial relocation within the CEECs, Manuscript, TEAM – Paris 1 Pantheon-Sorbonne University, CNRS, Maison des Sciences Economiques, Paris.

De Bruyne, K. (2003), The location of economic activity. Is there a spatial employment structure in Belgium?, processed CES-KULeuven, Leuven.

Fujita M, Paul Krugman and A.J. Venables (1999) The Spatial Economy, MIT-Press, Cambridge, Massachusetts.

Harris, C. (1954), The market as a factor in the localisation of industry in the United States, Annals of the Association of American Geographers 44, 315-348.

Hanson, G. (1998), Market Potential, Increasing Returns, and Geographic Concentration, National Bureau of Economic Research Working Paper No. 6429.

Hanson, G. (2001), Market Potential, Increasing Returns, and Geographic Concentration, mimeo, University of Michigan (revised version of Hanson, 1998).

Helpman, E. (1998), The Size of Regions, in: D. Pines, E. Dadka and I. Zilcha (eds.), Topics in Public Economics, Cambridge University Press.

Kelejian, Harry, H. and Igmar Prucha (1999), A Generalized Method of Moments Estimator for the Autoregressive Paramter in a Spatila Model, International Economic Review 40, pp. 509-533.

Kelejian, Harry, H. and Igmar Prucha (2001), On the Asymptotic Distribution of the Moran I Test Statistic with Applications, Journal of Econometrics 104, , pp. 219-257.

Krugman, P. (1991), Increasing Returns and Economic Geography, Journal of Political Economy, 3, 383-499.

Krugmann P. (1991) Geography and Trade, MIT-Press, Cambridge, Masachusetts

Krugman, P., Livas-Elizondo. R. (1992) Trade policy and the third world metropolis, NBER Working Paper No. 4238, National Bureau of Economic research, Cambridge, MA.

Mion, G. (2003) Spatial externalities and empirical analysis. The case of Italy, ZEW Discussion Paper No. 03-38, Mannheim.

Montfort, P. and R. Nicollini (1998) Regional Convergence and International Integration, manuscript, IRES and Department of Economics Universite Catholique de Louvain.

Niebuhr, A. (2004), Market Access and Regional Disparities. New Economic Geography in Europe. HWWA Discussion Paper No.269, Hamburg.

Roos, M. (2001), Wages and Market Potential in Germany, Jahrbuch für Regionalwissenschaft, 21: 171-195.

Paluzzie, Elisenda (2001) Trade Policy and regional inequalities, Papers in Regional Science, 80, pp. 67 – 85.

Table 1: Market Potential by Country, 2001

	Distance weighted purchasing power[1)] of regions			
	total Wy	outside the country but within EU15 Wy: EU-EU	outside the country and outside EU15 Wy: EU-NEU	in 3 accession countries[2)] Wy: EU-NEUOst; NEUOst-NEUOst
	bn €			
Austria	39.7	28.9	4.4	1.7
Belgium	47.2	39.7	1.0	0.1
Switzerland	56.2	0.0	47.3	0.0
Czech Republic	30.5	0.0	29.4	28.6
Germany	48.6	15.4	2.7	0.9
Denmark	39.7	31.2	2.0	0.6
Spain	28.8	9.6	0.2	0.0
Finland	23.1	8.2	1.0	0.2
France	49.7	23.6	3.0	0.0
Hungary	15.9	0.0	13.6	13.3
Ireland	38.4	37.2	1.2	0.1
Italy	44.7	13.1	3.0	0.3
Netherlands	46.9	35.7	0.6	0.1
Norway	21.8	0.0	15.0	0.0
Poland	15.9	0.0	11.9	11.7
Portugal	20.8	13.7	0.0	0.0
Sweden	25.0	11.7	3.5	0.5
United Kingdom	29.0	8.4	0.2	0.0

1) Gross Value Added (GVA). - 2) Czech Republic, Hungary, Poland.

Table 2: Cross-section Estimation

	(I)				(II)				(III)			
	wij: exp(αdij)/Σ(exp(αdij)											
	(α=0.01)				(α=0.1)				(α=0.004)			
	(a)		(b)		(a)		(b)		(a)		(b)	
	b	t	b	t	b	t	b	t	b	t	b	t
Ww	-	-	0.427	3.22 ***	-	-	0.213	2.68 ***	-	-	0.586	3.68 ***
y	0.004	0.57	0.002	0.25	0.0001	0.02	-0.001	-0.17	0.005	0.69	0.003	0.44
Wy	-0.146	-2.57 **	-0.199	-3.8 ***	-0.0151	-1.26	-0.023	-1.85 *	-0.184	-1.96 **	-0.269	-3.31 ***
Wy:EU-EU	0.201	3.37 ***	0.182	2.83 ***	0.1096	1.99 **	0.095	1.62 *	0.284	3.41 ***	0.277	3.13 **
Wy:EU-NEU; NEU-NEU	0.013	0.16	-0.065	-0.83	0.0492	1.54 #	0.033	0.96	-0.052	-0.4	-0.121	-1.08
Lprod	0.538	13.76 ***	0.538	14.13 ***	0.5523	15.24 ***	0.514	11.18 ***	0.544	13.98 ***	0.546	14.9 ***
D1-Eastern European Countries	-0.464	-6.87 ***	-0.263	-4.18 ***	-0.4023	-8.14 **	-0.261	-5.32 ***	-0.401	-4.74 ***	-0.226	-3.59 ***
D2-Non-EU EFTA-countries	-0.045	-0.66	-0.076	-1.19	-0.0922	-1.51 #	-0.111	-2.15 ***	-0.004	-0.05	-0.012	-0.18
R^2		0.78		0.84		0.81		0.89		0.80		0.85
σ		0.14		0.15		0.15		0.15		0.15		0.15
Moran I		6.34 ***		3.31 ***		4.76 ***		-1.09		5.06 **		1.18
ϕ		0.68		0.29		0.26		-0.24		0.96		0.45
Instruments												
Relevance (Shea R^2)		-		0.40		-		0.29		-		0.68
Validity: Sargan- test		-		6.495		-		36.70 ***		-		10.13
F-tests on border effects												
EU-EU vs. EU-NEU; NEU-NEU		4.40 **		8.71 ***		0.98		0.88		5.74 **		10.89 ***
EU-EU vs. Base		12.98 ***		16.32 ***		4.62 **		3.71 **		10.26 ***		14.69 ***
EU-NEU; NEU-NEU vs. Base		1.85		1.54		2.88 *		1.84		0.49		0.84

*** significant at 1%; ** significant at 5%; * significant at 10%; # significant at 15%;

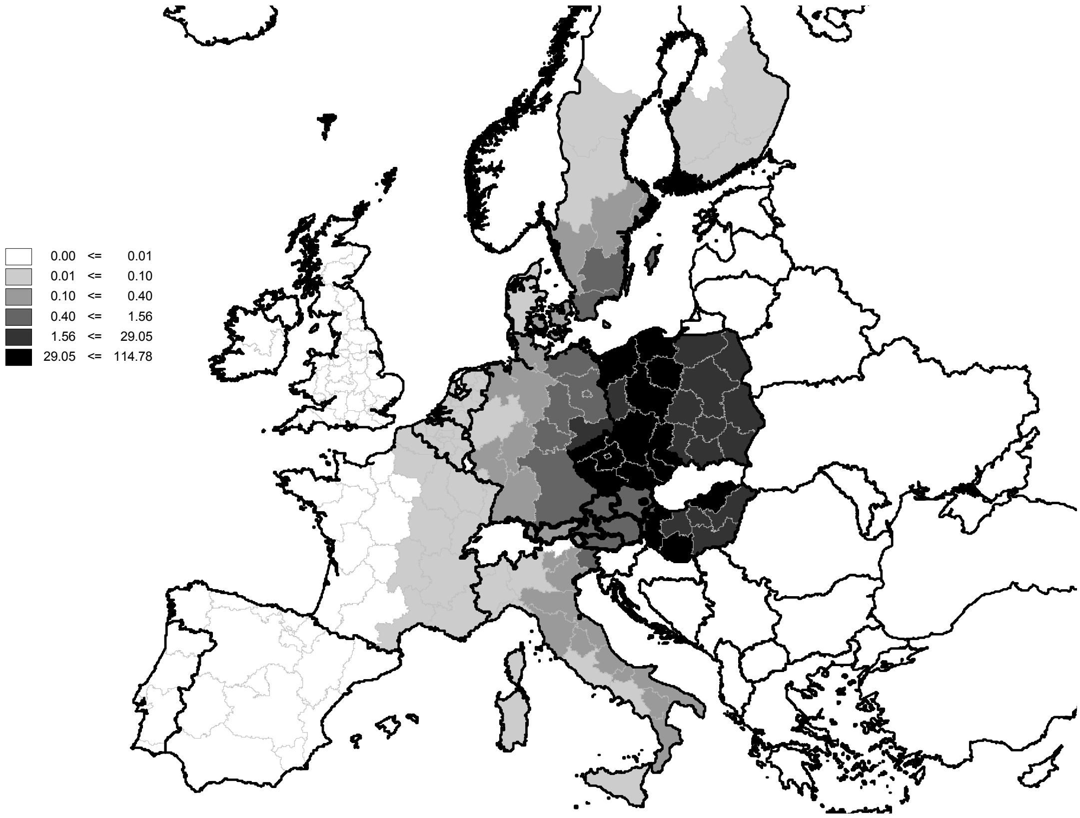
Table 3: Estimated Impact of EU-Enlargement by Poland, the Czech Republic and Hungary on Wages

	Simulations based on regression results			
	Specification II "medium decay"		Specification IV "fast decay"	
	EU15	New members	EU15	New members
	Simulated wage change in percent			
Austria	0.61		0.32	
Belgium	0.02		0.01	
Switzerland	0.00		0.00	
Czech Republic		62.73		32.74
Germany	0.42		0.22	
Denmark	0.24		0.13	
Spain	0.00		0.00	
Finland	0.06		0.03	
France	0.02		0.01	
Hungary		27.57		14.39
Ireland	0.03		0.02	
Italy	0.15		0.08	
Netherlands	0.05		0.02	
Norway	0.00		0.00	
Poland		29.40		15.34
Portugal	0.00		0.00	
Sweden	0.21		0.11	
United Kingdom	0.00		0.00	
Total	0.12	38.02	0.06	19.84

Figure 1:   Estimated Impact on Wages of the EU-Enlargement by Hungary, Poland and the Czech Republic

Simulation based on regression results for Specification II - medium decay

(Simulated wage change in percent)



Source: own calculations.

Medieninhaber (Verleger), Hersteller: Österreichisches Institut für Wirtschaftsforschung • Wien 3, Arsenal, Objekt 20 • A-1103 Wien, Postfach 91 • Tel. (43 1) 798 26 01-0 • Fax (43 1) 798 93 86 • http://www.wifo.ac.at/ • Verlags- und Herstellungsort: Wien

Die Working Papers geben nicht notwendigerweise die Meinung des WIFO wieder

Verkaufspreis: EUR 8,00 • Download kostenlos:
http://publikationen.wifo.ac.at/pls/wifosite/wifosite.wifo_search.get_abstract_type?p_language=1&pubid=25324