New Economic Geography Meets Comecon: Regional Wages and Industry Location in Central Europe*

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Abstract

We analyze the internal spatial wage and employment structures of the Czech Republic, Hungary, Poland, Slovenia and Slovakia, using regional data for 1996-2000. A new economic geography model predicts wage gradients and specialization patterns that are smoothly related to regions' relative market access. As an alternative, we formulate a "Comecon hypothesis", according to which wages and sectoral location are not systematically related to market access except for discrete concentrations in capital regions. Our estimations confirm the ongoing relevance of the Comecon hypothesis: compared to pre-2004 EU members, Central European countries' average wages and service employment were still discretely higher in capital regions. Our results point towards an increase in relative wages and employment shares of Central Europe's provincial regions, favoring particularly those that are proximate to the large markets of incumbent EU members.

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1 Introduction

After the overthrow of their socialist regimes in 1989-90, most Central and Eastern European countries (CEECs) have rapidly adopted market-based economic systems and redirected the focus of their political and economic relations towards the European Union. This process has culminated in the accession to the EU of eight CEECs in 2004. One of the main benefits of EU enlargement will be to boost economic activity, both in accession countries and in incumbent member states. Lower barriers to trade yield gains that are well understood by economists and estimated to be significant (see e.g. Baldwin *et al.*, 1997).

Although the potential for aggregate economic gains through closer economic integration in Europe is undisputed, economists also acknowledge that integration transforms the internal structures of national economies, which can have important distributional consequences. One dimension of integration-induced restructuring concerns geography. How does European integration impact on the spatial distribution of activities, prices and incomes across regions? This question has been the object of a thriving research area in recent years.

It is somewhat surprising, given the vibrancy of the research field and the importance of the issue, that relatively little analysis has been conducted on the transforming economic geographies of CEECs.[1] For the academic researcher, these countries present an interesting "laboratory case", due to their legacy of centrally planned economic structures and rapid trade reorientation towards the EU. Is the old spatial organization of those economies unraveling and giving way to a different geographic distribution of activities, shaped by market forces? If so, what is the nature of these forces, and what new spatial equilibrium is likely to emerge?

We provide an analysis of the internal economic geographies of five CEECs, drawing on regional data for wages and sectoral employment in the Czech Republic, Hungary, Poland, Slovenia and Slovakia. Specifically, we estimate spatial wage and employment gradients inside those countries based on multi-country new economic geography (NEG) model. In this model, the better a region's access to large markets (and pools of suppliers), the higher its wages and the greater its locational attractiveness for mobile trade-oriented sectors. Depending on the precise modelling assumptions, access to markets will yield either high factor prices, large production, or a mix of both. The wage and output effects of market access are a typical feature of the NEG that sets these models apart from most neoclassical location theory. It makes the NEG approach eminently suitable as a theoretical framework for the analysis of locational changes in integrating economies with similar endowments.

As an alternative to the market-driven spatial structure described by the model, we formulate a "Comecon hypothesis", based on the idea that the artifice of central planning created economic geographies whose only regularity was a concentration of certain sectors and high wages in the capital region.

Our estimations based on data for the accession countries support both the NEG prediction and the "Comecon hypothesis". When we compare internal wage and employment gradients of accession countries with those of existing EU members, we find that accession countries are marked by significantly stronger concentrations of wages and of employment in both market services and public service sectors in their capital regions. One might therefore conjecture that market forces will in time attenuate those countries' economic concentration in capital regions and favor a dispersion of activities and an increase of relative wages in provincial regions - particularly in those that are located close to the core EU markets.

The paper is organized as follows. In section 2, we present the theoretical model that underpins our empirical approach and derive the estimable equations. Section 3 documents the trade integration of Central European countries with the EU that has already taken place,

[1] Descriptions of regional location patterns in CEECs have been provided by Resmini (2003) and Traistaru *et al.* (2003).

using a measure of "trade freeness" that is derived from the theory. Our estimations of wage and employment gradients in accession countries and in the full sample of 21 European countries are given in Section 4. Section 5 concludes.

2 Theory

The NEG provides a well suited framework for a formal analysis of the internal geography of countries that open their markets towards the outside world. In this section, we sketch the salient features of a three-region NEG model and derive the fundamental equations that underlie our empirical analysis.

2.1 The model

NEG models rely on four essential ingredients to explain the spatial configuration of economic activity.[2] First, production is subject to increasing returns to scale at the firm level. Second, the goods produced by different firms are imperfect substitutes. Third, firms are symmetric and sufficiently numerous to accommodate monopolistically competitive equilibria. Fourth, trade costs inhibit trade between locations and thereby give economic relevance to otherwise featureless geographic space.

An essential feature of these models is that market access acts as the principal determinant of the spatial structure of employment and factor prices. Market access is an increasing function of a location's own market size and of the size of other markets, and a decreasing function of the trade costs that separates the home location from all other locations. Changes in market access trigger locational forces, which, adopting Head and Mayer's (2004) terminology, we call the price version and the quantity version of the market access effect.

The *price version* can be illustrated as follows. Suppose a typical NEG framework with multiple locations, a unique production factor in the differentiated sector, industrial labor, and zero mobility of firms and labor. Consumers' utility increases with the number of varieties. The amount of variety i consumed by a representative consumer in j is equal to:

$$x_{ij} = \frac{(p_i \tau_{ij})^{-\sigma}}{P_j^{1-\sigma}} \mu Y_j, \tag{1}$$

where Y_j is the total income of region j, σ stands for the elasticity of substitution among goods from the competing symmetric firms, and μ is the share of expenditure that consumers allocate to the differentiated sector. P_j is the price index of the differentiated sector in region j:

$$P_j \equiv \left[\sum_i n_i (p_i \tau_{ij})^{1-\sigma} \right]^{\frac{1}{1-\sigma}}, \tag{2}$$

where n_i is the number of firms in i, p_{ij} is the final price paid by consumers in j ($p_{ij} = p_i \tau_{ij}$), and τ is the ad-valorem 'iceberg' cost of shipping goods between regions. Following Baldwin *et al.* (2003), we express trade costs as $\tau_{ij}^{1-\sigma} \equiv \Phi_{ij}$, which is comprised between 0 and 1 and is a measure of the degree of *trade freeness* between pairs of regions. At $\Phi_{ij} = 0$ trade costs are prohibitive, and $\Phi_{ij} = 1$ means perfectly free trade.

[2]For a comprehensive statement of the underlying modeling structure, see Fujita *et al.* (1999). Recent studies of the intra-national spatial effects of trade liberalization in NEG settings include Krugman and Livas (1996), Monfort and Nicolini (2000), Paluzie (2001), Alonso-Villar (2001), Behrens (2003), Crozet and Koenig (2004), and Brülhart *et al.* (2004).

The profit function of a representative firm in a differentiated sector and located in region i is:

$$\Pi_i = p_i x_i - w_i(F + cx_i). \tag{3}$$

To produce x_i units of the differentiated good, which it sells at price p_i, the firm uses F units of labor as a fixed input, and cx_i units as a variable input. Labor is paid a wage w_i. Each firm maximizes its profit by behaving as a monopolist for its own variety of the differentiated good. The first-order profit maximizing condition combined with the large-group assumption implied by monopolistic competition determine the price set by each firm, $p_i = w_i \frac{c\sigma}{\sigma-1}$. When incorporated in the profit function, this yields:

$$\Pi_i = w_i \left(\frac{x_i c}{\sigma - 1} - F \right). \tag{4}$$

We assume free entry in the differentiated sector. Hence, profits are zero in equilibrium. This allows us to derive the equilibrium quantity produced by each firm: $x_i^* = F(\sigma - 1)/c$. In the price version of the model, where labor is interregionally immobile, equilibrium in the market for industrial labor implies that the number of firms, n_i, is proportional to the number of industrial workers, $n_i = H_i/F$, in each region. Hence, adjustments to changes in market access can only occur through factor prices. This effect is visible in the expression for equilibrium in the market for a variety of the industrial good. It expresses equilibrium firm output in i, x_i^*, as the sum of demands coming from all regions j:

$$x_i^* = \sum_j p_i^{-\sigma} \; \Phi_{ij} \; P_j^{\sigma-1} \mu Y_j. \tag{5}$$

Incorporating the price set by each firm, the equilibrium output per firm, and a normalization on marginal costs such that $c = (\sigma - 1)/\sigma$ (and hence $p_i = w_i$ and $x_i^* = F\sigma$), equation (5) becomes:

$$w_i = \left[\frac{\mu}{F\sigma} \sum_j \Phi_{ij} P_j^{\sigma-1} Y_j \right]^{1/\sigma}. \tag{6}$$

We can see that the wage in each region is a function of the size of the demand to which it has access, Y_j, the level of trade freeness Φ_{ij}, and the price index, which can be understood as an inverse measure of the intensity of competition. Hence, through equation (6) it appears that central regions will pay higher wages, in order to compensate for the advantage in profitability. Central regions are large (have high Y_i), and/or they have good access (high Φs), to large partner regions (high $Y_j, j \neq i$).

The *quantity version* of the market-access effect can most easily be derived in a version of this model that assumes a single factor of production shared by two sectors, one of which is perfectly competitive and freely traded. In this case, the perfectly competitive sector pins down wages, and the industrial wage cannot increase in order to adjust for an increase in profitability of one of the region. Adjustment occurs through factor movements, either across sectors or across regions. Regions with better market access will host a (disproportionately) larger differentiated sector. When the ratio of a region's share of production in a sector and that region's share of demand (weighted by trade costs) is larger than one, one speaks of a "home-market effect" (see Krugman 1980).[3]

[3]It is worth underlining that, in saying this, we extrapolate the results of a three/multi region model from a two region model. Recent work by Behrens *et al.* (2004) suggests that a fully rigorous extension to the N-region case would in addition require taking account of spatial asymmetries. Given the empirical complexity this would

2.2 The estimable equations

Our approach is based on a reduced-form estimation of the market access effect described by the wage equation (6). This equation states that, in equilibrium, the nominal wage of a region i depends on the size of demand in each accessible market, multiplied by the intensity of competition in each of these markets, and weighted by the accessibility of each market. In our estimations, we focus on τ_{ij} as the essential characteristic that distinguishes regions' market access. The ideal empirical counterpart of τ_{ij} would be, for each region of interest, a measure of the level of trade costs with all existing outside potential markets as well as internally. We simplify this task by choosing, as in Hanson (1996, 1997), the access of each considered region to its principal markets, approximated by geographic distance.

Which are these principal markets in the case of the Central European countries? Before the dismantling of the Soviet bloc, those countries' trade was mainly focused on intra-Comecon (Council for Mutual Economic Cooperation) relationships. However, market forces played a minor role in shaping wages and location patterns compared to the importance of central planning. The explanatory power of market-based economic models, such as those of the NEG, regarding those countries' internal economic geographies prior to their conversion to market systems in the 1990s is therefore likely to be limited. By their very nature, however, centrally planned economies tend to be strongly centered on the capital region. We therefore formulate a "Comecon hypothesis" as the reference point for our analysis: under central planning, nominal wages as well as employment shares of sectors that are closely linked to the central authorities are significantly higher in the capital regions but they are otherwise unrelated to market access. In other words, our Comecon hypothesis implies a discrete jump in wages and employment shares between the capital region and the provinces and no systematic patterns among the provinces.

In contrast, according to the NEG prediction embodied in (6), wages should rise smoothly in market access. We model market access in terms of regions' distances (i) from their relative national capitals and (ii) from the EU, whose economic center of gravity we take to be Brussels. Continuous gradients of wages and/or employment shares relative to regions' market access are a general prediction of NEG models that we take as the alternative to our "Comecon hypothesis". We thus specify the following reduced-form expression for region i's relative wage:

$$\frac{w_i}{w_{\text{capital}}} = f\left(\Phi_{i\text{capital}}, \Phi_{i\text{EU}}, \mathit{capdum}, \text{other market access variables}\right), \tag{7}$$

where w_i is the regional nominal wage; w_{capital} is the wage in the capital; $\Phi_{i\text{capital}}$ and $\Phi_{i\text{EU}}$ denote trade freeness between i and, respectively, the EU and the national capital; and *capdum* is a dummy for the capital region. We use distance to represent trade freeness, and we specify a log-linear relation between the variables. Our first estimable equation is:

$$\ln\left(\frac{w_i}{w_{\text{capital}}}\right) = \beta_0 + \beta_1 \ln(d_{i\text{capital}}) + \beta_2 \ln(d_{i\text{EU}}) + \beta_3(\mathit{capdum}) + \vec{\beta}\vec{X}_i + \varepsilon_i, \tag{8}$$

where $\vec{X}$ is a vector of other variables that determine market access, and ε_i is an error term that consists of a country effect, a year effect and a white noise component. Based on the NEG model, we expect the estimated β_1 and β_2 to be negative.[4] The Comecon hypothesis, in turn, implies a significantly positive β_3 and insignificant β_1 and β_2.

Our second estimable equation focuses on the quantity version of the market access effect. As emphasized in section (2.1), in this variant of NEG models, the adjustment variable is the

entail, we choose to abstract from the issue here, leaving an examination of its relevance to future work.

[4]Note that in estimating a single equation for average wages across sectors - a choice necessitated by data constraints - we imply the assumption that labor is intersectorally mobile.

number of firms. Hence, regions with relatively good access to the main markets will have the relative high share of employment in differentiated sectors. We write the following reduced-form expression, which holds for regional relative employment inside an accession country:

$$\frac{l_{s_i}}{pop_i} = g_s(\Phi_{i\text{capital}}, \Phi_{i\text{EU}}, capdum, \text{other market access variables}). \tag{9}$$

l_{s_i} is employment in sector s and region i, and pop_i is the region's population. The right-hand side variables have been defined in (7). As for equation (8), we specify a log-linear relation between our variables and use distance to represent the trade costs. Our second estimable equation is

$$\ln\left(\frac{l_{s_i}}{pop_i}\right) = \alpha_{s_0} + \alpha_{s_1}\ln(d_{i\text{capital}}) + \alpha_{s_2}\ln(d_{i\text{EU}}) + \alpha_(s_3)(capdum) + \vec{\alpha}_s\vec{X}_i + \epsilon_{s_i}, \tag{10}$$

where we make the same assumptions on the structure of ε_i.

3 Trade freeness between the EU and the CEECs

Before analyzing spatial employment and wage patterns, we seek to quantify the gradual process of economic integration between the EU and the CEECs during the 1990s in a way that is consistent with the theory.

Starting from a multi-country version of the monopolistic-competition model outlined above, Head and Mayer (2004) have derived an expression of Φ_{ij} that can be estimated empirically with trade and production data. The first step involves dividing country j's imports from i (m_{ij}) by its imports from itself (m_{jj}) so as to eliminate unobservable importer-specific effects. This ratio is then multiplied by the corresponding ratio for country i, yielding:

$$\frac{m_{ij}m_{ji}}{m_{jj}m_{ii}} = \frac{\Phi_{ij}\Phi_{ji}}{\Phi_{jj}\Phi_{ii}}. \tag{11}$$

Two more assumptions are needed to derive the final expression. First, trade inside countries is assumed to be frictionless, thus $\Phi_{ii} = \Phi_{jj} = 1$. Second, trade barriers between countries are set to be symmetric, i.e. $\Phi_{ij} = \Phi_{ji}$. The expression for the measure of trade freeness between countries i and j is then:[5]

$$\hat{\Phi}_{ij} = \sqrt{\frac{m_{ij}m_{ji}}{m_{jj}m_{ii}}}. \tag{12}$$

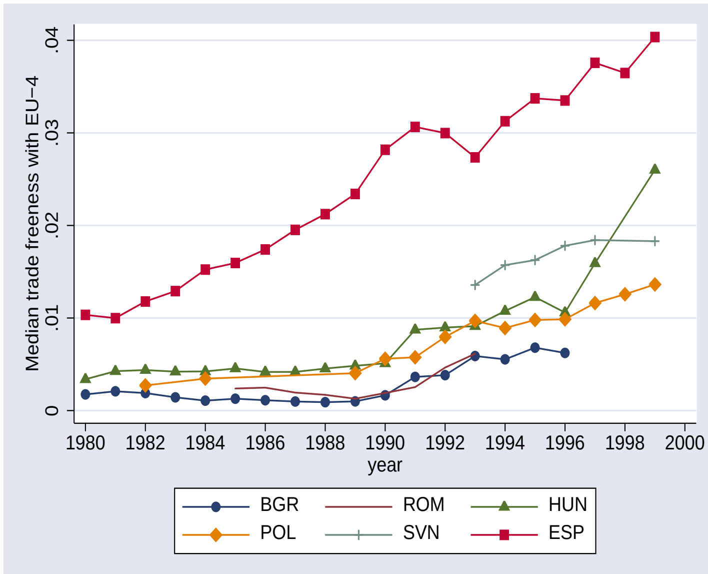
We calculate measures of trade freeness for different pairs of countries of the EU and the CEECs, using aggregate manufacturing trade flows. Imports of a country from itself are calculated as the value of manufacturing production minus the value of manufacturing exports. Production and trade data are taken from the international database constructed and made available by the World Bank.[6]

Figure 1 depicts the evolution of the median trade freeness of a sample of CEECs relative to the EU's four biggest economies (France, Germany, Italy and the United Kingdom, henceforth EU-4). We also report estimated trade freeness between Spain and these countries as a point of comparison. We discern two interesting features. First, the trade freeness towards the EU appears to be remarkably similar among CEECs, and to follow a consistent trend: whereas

[5] The measure of trade freeness differs from conventional measures of trade openness in the sense that the former does not depend on the size of countries.

[6] See Nicita and Olarreaga (2001). This database has been completed by the CEPII. We are grateful to Soledad Zignago for providing that extended dataset to us.

Figure 1: Median $\hat{\Phi}_{ij}$ with EU-4



trade freeness hardly changed during the 1980s, a clear upward trend appears after 1990. This increase in trade freeness coincides with the implementation of Europe Agreements between the EU and the candidate countries, aiming to liberalize trade progressively. The comparison between the trend followed respectively by the candidate countries and Spain leads us to the second interesting feature of Figure 1. Second, we find that by the end of our sample period Spain's trade freeness towards the EU-4 was noticeably higher than for the CEECs. Therefore, while trade integration between the CEECs and incumbent EU members has already progressed considerably, there appears to be substantial scope for a further deepening of this integration.

Figure 2 represents trade freeness among pairs of pre-2004 EU members. Although all country combinations cannot be shown in a single graph, we illustrate some representative levels of intra-EU trade freeness. The highest $\hat{\Phi}$s (thus the highest level of trade integration) are to be found either among pairs of large countries which lie in the EU core (France-Germany), or among country pairs with strong cultural or linguistic ties (Austria-Germany, Ireland-UK). Other country pairs, separated by larger physical or cultural distances, show lower levels of trade freeness. A comparison of Figures 1 and 2 reveals that the trade freeness between Spain and the EU-4, which in 1999 was still considerably higher than that of all sample CEECs, was in fact relatively low compared to other bilateral trade-freeness levels among EU countries (note different vertical scales). This strengthens our conclusion that considerable potential for further CEEC-EU trade integration remains.

Finally, Figure 3 describes the evolution of trade freeness between pairs of CEECs. We focus here on the changes that have taken place since 1989. We observe that the level of trade freeness among candidate countries is low compared to to that of Spain and the UK, which are included as a point of comparison. Yet, here too we observe an increasing tendency of trade freeness, which could be related to the implementation of the Central European Free Trade Agreement (CEFTA) among four CEECs (Hungary, Poland, the Czech Republic and Slovakia; Slovenia, Romania and Bulgaria joined respectively in 1995, 1997 and 1998).

Figure 2: Intra EU $\hat{\Phi}_{ij}$

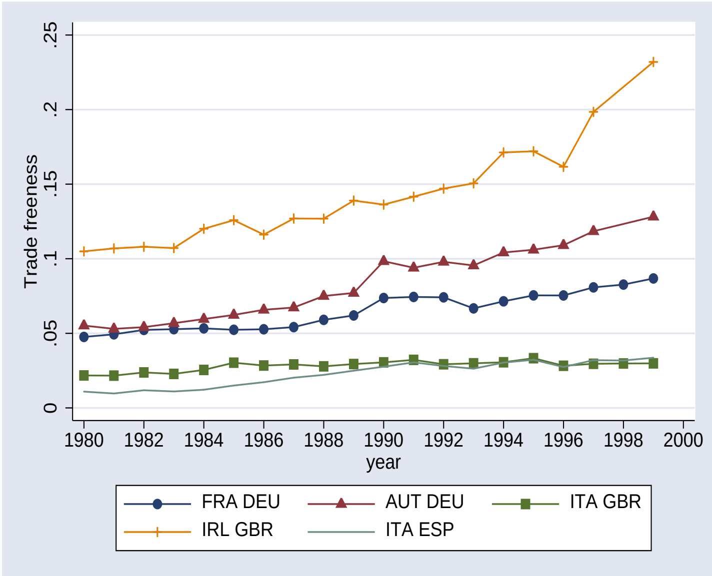
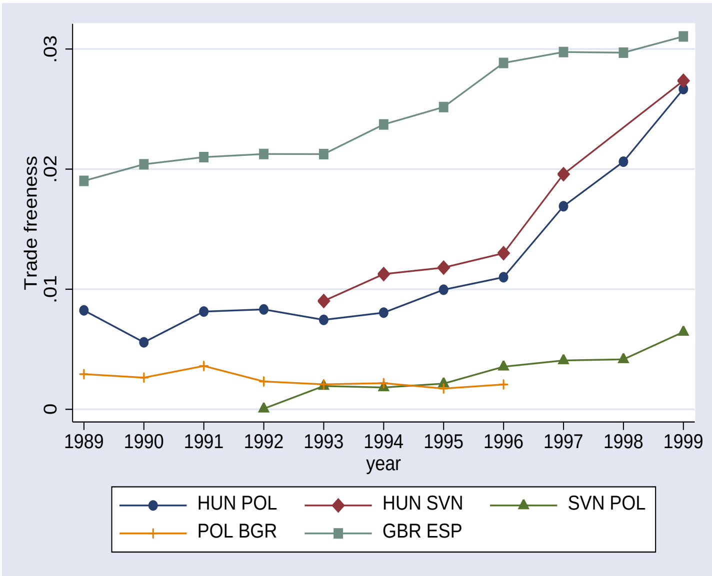


Figure 3: ESP-GBR and Intra CEECs $\hat{\Phi}_{ij}$



4 Wage and Employment Gradients

As Section 3 has shown, the increasing integration of CEEC economies with the EU over the 1990s is clearly evident in the data. We now explore to what extent regional wages and employment patterns inside Central European countries already reflected the new geography of market access in the second half of that decade.

4.1 The geography of wages and employment in CEECs

4.1.1 Wages

In this section we study the impact of market access on regional wages in the Czech Republic, Hungary, Poland, Slovenia and Slovakia, using annual data for 1996-2000 (see Appendix A for further details). We estimate equation (8) as a reduced form of the NEG model. All estimated standard errors are based on White-corrected variance-covariance matrices, since most of our regression models are clearly heteroskedastic (mainly due to different disturbance variances across countries).

Table 1: Regional wage gradients in CEECs, panel

	Dependent Variable: $\ln(w_i/w_{\text{CAP}})$		
Model :	(1)	(2)	(3)
ln dist. to Capital	-0.109	-0.034	-0.041
	(-10.69)	(-4.46)	(-5.35)
ln dist. to Brussels	-0.009	-0.097	-0.021
	(-0.18)	(-3.10)	(-0.56)
Capital		0.287	0.282
		(12.51)	(13.33)
Land border with EU, N, CH			0.027
			(3.52)
Land border with CEEC			0.006
			(0.64)
Access to sea			0.069
			(3.22)
CtrDum	Yes	Yes	Yes
YrDum	Yes	Yes	Yes
N	248	248	248
R^2	0.677	0.824	0.838

Note: t-statistics in parentheses

The first column of Table 1 reports the simplest specification that includes merely the two distance terms.[7] The results suggest that wages fall off with distance from national capitals but not with distance from the EU.

This model, however, is overly parsimonious. According to our "Comecon hypothesis", wages in centrally planned economies are higher in the capital region, but there is no compelling reason for expecting wages to fall off smoothly across provincial regions as they become more remote with respect to the capital. Hence, the second specification includes a dummy variable for

[7] We use great circle distances from the largest town in each region.

capital regions, to allow for the possibility of a discontinuous relationship between wages and distance to the capital.[8] Our results reported in the second column of Table 1 show that wage gradients are indeed discontinuous: being a capital region raises relative nominal wages by 29 percent, *ceteris paribus*. However, distance from the capital matters also in the provinces. In provincial regions, relative wages fall by 0.3 percent for every 10 percent increase in distance from the capital. It also turns out in this second regression model that proximity to the EU had a statistically significantly positive impact on regional wages in our sample countries already in the late 1990s, a mere half-decade after those countries' economic reorientation. A 10 percent increase in distance from Brussels was associated with 0.3 percent fall in relative regional wages.

Our final specification of the wage equation, reported in column 3 of Table (1), includes additional variables intended to represent market access: (*i*) a dummy for regions that share a land border with an EU country, in order to represent potentially discontinuous wage gradients also with respect to access to EU markets; (*ii*) a dummy for regions that share a land border with another accession country,[9] representing the potential importance of those markets; and (*iii*) a dummy for coastal regions, representing facilitated market access for goods transported by sea. We find that wage gradients relative to the EU are in fact entirely a phenomenon of higher relative wages in border regions (+ 2.7 percent, *ceteris paribus*), as distance to Brussels has no statistically significant effect on wages in non-border regions. Bordering another accession country, however, has no significant impact on wages, while sea access is associated with a 6.9 percent higher relative wage level.

In Table 2, we show results of our full model, estimated separately for each of the five CEECs in our sample. The most striking result is the consistent wage advantage of central regions. The estimated effect ranges from 21 percent (Slovenia) to 44 percent (Poland) and is statistically significant throughout.[10]

The wage effect of access to the EU market is more varied across sample countries. Proximity to the EU market has the strongest wage-boosting impact in Hungary, where relative wages are statistically significantly higher in border regions and fall off significantly with distance in non-border regions. Evidence of a wage boost through proximity is also found for Slovenia, where distant regions have significantly lower wages, and Slovakia, where border regions have significantly higher wages. The results are ambiguous for Poland, where we estimate a negative wage premium for border regions, and the Czech Republic, where distance from the EU seems to raise relative wages.

What we retain from the analysis of regional wage gradients in accession countries is that the nominal wage bonus of capital regions is highly significant in both economic and statistical terms. This is consistent with our "Comecon hypothesis". We also find some wage-boosting effects of market access to the EU, but these effects are statistically and economically less significant, and they apply less consistently across sample countries.

4.1.2 Sectoral employment

Using regional employment data for nine sectors covering the full spectrum of economic activities, we have estimated equation (10). The estimation results are reported in Table 3.

[8] The inclusion of this dummy variable has the further advantage of reducing the estimations' sensitivity to the way we model intra-regional distance in the capital regions. We model these distances as $d_{i_i} = 0.67 sqrt(area/\pi)$. The underlying assumption is that intra-regional economic geographies can be approximated by a disk where all firms are located at the center and consumers are spread uniformly over the area.

[9] For the construction of this dummy variable, we considered as accession countries our five sample countries plus Romania and Lithuania.

[10] The estimated magnitudes of these effects are affected by the way one models intra-regional distances in the capital regions. If our formula overestimates effective internal distances, the coefficient on the capital dummy will also be overestimated. We have experimented with smaller estimated intra-regional distances and found that the estimated capital-region effects remained very strong.

Table 2: Regional wage gradients in CEECs, by country

	Dependent Variable: $\ln(w_i/w_{\text{CAP}})$				
Model :	(A)	(B)	(C)	(D)	(E)
ln dist. to Capital	-0.043	-0.075	0.048	0.016	-0.004
	(-2.74)	(-6.47)	(1.59)	(0.97)	(-0.19)
Capital	0.295	0.240	0.439	0.214	0.340
	(6.82)	(6.19)	(18.00)	(15.88)	(17.01)
ln dist. to Brussels	0.218	-0.256	-0.105	-0.775	0.118
	(3.91)	(-3.55)	(-1.42)	(-2.97)	(0.47)
Land border with EU, N, CH	0.038	0.057	-0.062	-0.016	0.058
	(4.43)	(2.86)	(-3.12)	(-1.12)	(3.11)
Land border with CEEC	-0.025	-0.005	0.024	-0.040	0.000
	(-1.35)	(-0.30)	(1.50)	(-2.23)	(0.0)
Access to sea	0.000	0.000	0.020	0.098	0.000
	(0.0)	(0.0)	(1.21)	(5.74)	(0.0)
CtrDum	Yes	Yes	Yes	Yes	Yes
YrDum	Yes	Yes	Yes	Yes	Yes
N	56	80	32	48	32
R^2	0.904	0.79	0.937	0.833	0.886

Note: t-statistics in parentheses
Model A: Czech Republic, Model B: Hungary, Model C: Poland
Model D: Slovenia, Model E: Slovakia

Since we are regressing employment shares in regional population, simple adding-up constraints make it impossible for the coefficients on any of the dummy variables to have the same sign across sectors. For example, unless the provinces suffered from massive unemployment, it is impossible to find all sectors as being relatively concentrated in the capital regions. Indeed, it comes as no surprise that the share of agricultural employment is 78 percent smaller in capital regions than elsewhere and increases by 4.5 percent with every 10 percent increase in distance from the capital.

Given the standard labelling of the differentiated sectors in NEG models as "manufacturing", it might be less expected that manufacturing too accounts for a significantly smaller employment share in capital regions than in the provinces (-28 percent). Furthermore, manufacturing is not discretely larger in regions bordering the EU and is actually significantly smaller than elsewhere in coastal regions (-38 percent). The regional distribution of manufacturing employment does, however, conform with the NEG prediction in so far as it rises continuously with proximity to the EU: every 10 percent increase in distance from Brussels appears to reduce the share of manufacturing employment by 9 percent. This is an effect that is very strong both economically and statistically, and it suggests that manufacturing activities in accession countries is already strongly oriented towards the EU market.

Interestingly, our market-access model of employment shares has greatest explanatory power in tertiary sectors. Distribution (which comprises both wholesale and retail trades) stands out with the highest R-square and estimated coefficients suggesting that employment in the distribution sector is significantly concentrated in capital regions, border regions and coastal regions. According to our findings, therefore, distribution appears as the sector most affected

Table 3: Regional employment gradients in CEECs, by sector

	Dependent Variable: $\ln(l_i/\text{pop}_i)$							
Model :	(F)	(G)	(H)	(I)	(J)	(K)	(L)	(M)
ln dist. to Capital	0.451	0.012	0.062	0.007	0.026	-0.028	0.115	0.069
	(5.94)	(0.33)	(1.89)	(0.23)	(0.44)	(-0.42)	(3.27)	(3.49)
Capital	-0.781	-0.281	0.644	0.890	0.973	1.555	1.513	0.663
	(-2.85)	(-2.96)	(9.15)	(12.76)	(6.42)	(8.52)	(17.76)	(9.59)
ln dist. to Brussels	-0.488	-0.896	-0.685	-0.168	-0.301	0.411	-0.414	0.126
	(-1.24)	(-5.30)	(-3.35)	(-0.93)	(-1.08)	(0.99)	(-1.93)	(1.45)
Land border with EU, N, CH	0.006	-0.027	0.001	0.065	0.128	0.175	0.185	0.066
	(0.04)	(-0.73)	(0.03)	(1.59)	(1.98)	(2.09)	(4.12)	(3.50)
Land border with CEEC	-0.237	0.056	0.050	0.074	0.013	-0.095	-0.016	-0.048
	(-3.09)	(1.48)	(1.08)	(1.70)	(0.20)	(-1.15)	(-0.37)	(-2.67)
Access to sea	-0.135	-0.381	0.029	0.227	0.643	0.287	0.357	0.055
	(-0.79)	(-4.19)	(0.45)	(2.91)	(3.78)	(2.00)	(2.99)	(1.81)
Ctrdum	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yrdum	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	240	240	240	240	240	240	240	240
R^2	0.65	0.597	0.722	0.78	0.575	0.722	0.737	0.667

Note: t-statistics in parentheses
Model F: Agriculture, Model G: Manufacturing, Model H: Construction
Model I: Distribution, Model J: Transport and Communication
Model K: Banking and Insurance, Model L: Other market services
Model M: Non-market services

by market access considerations.[11]

4.2 A comparison with pre-2004 EU members

We have estimated wage and employment gradients in Central European accession countries, and we found confirmation that market access matters for wages and sectoral employment. Our results are at least partly consistent with both a central-planning explanation, which implies a discrete advantage for the capital region, and a market-based NEG model, which implies continuous wage and employment gradients on distance from economic centers. This is informative in itself, but it raises the question as to which force is likely to dominate in the foreseeable future. Specifically, are the intra-country economic geographies inherited from the central-planning period likely to persist, or are market forces pushing towards a spatial reorganization of Central European economies? Note that modern location theory offers little guidance on such practical questions, since NEG models typically feature multiple locally stable equilibria. If the world is indeed marked by strong locational discontinuities, unchanging economic geographies in accession countries could well be consistent with NEG models. Spatial stability would simply imply that the increase in market access to the EU has been insufficient to dislodge the spatial equilibrium inherited from the days of Comecon.

There are two analytical approaches to this issue. One is to track the evolution of spatial patterns in Central European countries over time since their transition in the early 1990s, and to extrapolate. We prefer a second approach, which is both less dependent on assumptions about timing and unaffected by the fact that the time dimension of our data panel is relatively

[11] Country-by-country regressions of the employment equation are reported in Appendix B.

short (5 years). This second approach consists in comparing wage and employment gradients of accession countries directly with those observed in existing EU member countries. Specifically, we re-estimate equations (8) and (10) in a sample consisting of the five accession countries plus a comparison group of 16 EU and EFTA countries.[12] By interacting market access variables with a dummy variable that identifies the five accession countries, we can estimate to what extent the internal geographies of accession economies differ from those of established member countries. If we assume, quite plausibly, that the existing EU economies are closer to their long-run spatial equilibrium than the economies of accession countries, we can interpret any significant effects on the interaction variables as an (inverse) indicator of impending spatial changes in accession countries.

4.2.1 Wages

Our estimations reported in Table 4 replicate those of Table 1 but this time drawing on the full sample of 21 countries and estimating coefficients for the accession countries *relative* to those of established member states. For the EU reference sample, we find statistically significant continuous wage gradients in all three specifications, and no additional wage bonus in capital regions.[13] The statistically significant coefficients on interaction terms confirm that the geography of wages is different in accession countries, where wages are discretely higher in capital regions but otherwise not significantly related to distance from the capital. We therefore find evidence for the ongoing relevance of the Comecon hypothesis. The implied conjecture is that market forces will smooth out wage gradients in accession countries. Nominal wages will still be relatively high in capital regions, but the difference particularly compared to proximate regions will erode.

What about border regions? The results reported in column (3) of Table 4 show that border regions of existing member countries pay relatively higher nominal wages, and that the corresponding effect in accession countries is significantly weaker. We can thus project an increasing tendency of relative nominal wages in border regions of accession countries.

4.2.2 Sectoral Employment

In Table 5, we show the results of our sectoral employment regressions for the full sample of 21 countries. Strong positive effects on the interaction term with the dummy for capital regions are found in the construction sector and in all service sectors. This is clear evidence of an excessively centralized legacy of central planning. In so far as existing EU countries are a valid benchmark, accession countries are due a significant dispersion of employment in these sectors away from their capital regions.

Access do the EU market, however, seems to play a minor role for those sectors. Our results in fact suggest that accession countries' construction and services jobs are already more strongly represented in EU border regions, and distance gradients relative to Brussels are no weaker, than is the case in incumbent member states.

Exactly the reverse pattern holds for manufacturing employment. Manufacturing jobs in accession countries seem to be relatively under-represented in capital regions as well as in EU border regions. Again, we can interpret these findings as evidence of a legacy from central planning, under which manufacturing plants were often located on the basis of purely political considerations. Our results therefore lead us to conjecture increasing relocation of CEECs' manufacturing activities towards capital regions and towards the border with fellow EU countries.

[12] Our reference group includes Norway and Switzerland, which, albeit not full members of the EU, are mature market economies that have enjoyed preferential access to EU markets for decades.

[13] Capital regions in the reference sample are defined as economic centers of gravity. These coincide with political capitals in all cases bar Germany (Köln-Bonn) and Italy (Milan).

Table 4: Regional wage gradients in CEECs, CEEC vs EU

	Dependent Variable: $\ln(w_i/\overline{w}_{\text{ctr}})$		
Model :	(P)	(Q)	(R)
ln dist. to Capital	-0.071	-0.065	-0.086
	(-7.58)	(-5.07)	(-6.60)
ln dist. to Cap × CEEC	-0.037	0.032	0.047
	(-2.71)	(2.14)	(3.15)
ln dist. to Brussels	0.085	0.081	0.097
	(3.33)	(2.89)	(3.62)
ln dist. to Bru. × CEEC	-0.094	-0.178	-0.079
	(-1.71)	(-4.29)	(-1.73)
CEEC	0.791	1.030	0.297
	(2.20)	(3.92)	(1.01)
Capital		0.030	0.022
		(0.69)	(0.53)
Capital × CEEC		0.257	0.261
		(5.23)	(5.66)
Land border with EU,N,CH			0.071
			(5.64)
CEEC × Land border with EU,N,CH			-0.040
			(-2.73)
Land border with CEEC			-0.018
			(-1.75)
Access to sea			0.076
			(6.96)
N	1520	1520	1520
R^2	0.123	0.138	0.176

Note: t-statistics in parentheses

Table 5: Regional employment gradients by sector, CEEC vs EU

	Dependent Variable: $\ln(l_i/\text{pop}_i)$							
Model :	(S)	(T)	(U)	(V)	(W)	(X)	(Y)	(Z)
dcap	0.202	0.049	-0.006	-0.026	-0.028	-0.050	-0.032	0.018
	(6.51)	(2.83)	(-0.60)	(-2.40)	(-2.52)	(-3.86)	(-2.93)	(1.77)
ln dist. to Cap × CEEC	0.215	-0.070	0.072	0.055	0.089	0.031	0.1 66	0.050
	(2.72)	(-1.66)	(2.13)	(1.60)	(1.53)	(0.43)	(4.57)	(2.30)
Capital	-1.014	-0.070	-0.080	0.369	0.363	0.297	0.357	0.267
	(-9.82)	(-1.35)	(-2.76)	(12.68)	(12.39)	(9.47)	(12.56)	(7.19)
Capital × CEEC	0.219	-0.225	0.726	0.532	0.631	1.265	1.167	0.397
	(0.76)	(-1.92)	(9.55)	(6.72)	(4.19)	(7.05)	(12.91)	(5.09)
ln dist. to Brussels	0.130	-0.30	0.035	-0.069	-0.072	-0.085	-0.076	0.031
	(2.49)	(-7.89)	(1.87)	(-3.77)	(-3.79)	(-3.97)	(-4.12)	(1.00)
ln dist. to Bru. × CEEC	-0.859	-0.841	-0.743	0.011	-0.241	0.421	-0. 340	0.049
	(-2.27)	(-5.10)	(-3.79)	(0.07)	(-1.00)	(1.07)	(-1.76)	(0.57)
Land border with EU,N,CH	0.000	0.036	-0.067	0.001	0.007	0.028	0. 013	0.005
	(-0.01)	(1.48)	(-4.07)	(0.05)	(0.52)	(1.80)	(1.00)	(0.42)
CEEC × Land border with EU,N,CH	-0.038	-0.107	0.070	0.091	0.155	0.152	0.192	0.058
	(-0.27)	(-2.46)	(1.49)	(2.24)	(2.36)	(1.88)	(4.11)	(2.60)
Land border with CEEC	-0.060	0.236	0.052	-0.022	-0.060	-0.084	-0.059	-0.026
	(-0.76)	(8.07)	(1.56)	(-0.85)	(-1.72)	(-1.84)	(-2.38)	(-1.71)
Access to sea	0.050	-0.203	-0.064	0.030	0.041	0.019	0.030	- 0.003
	(1.12)	(-9.46)	(-5.16)	(2.38)	(2.67)	(1.21)	(2.20)	(-0.34)
CEEC	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000
	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)	(0.0)
Ctrdum	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Yrdum	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1656	1656	1656	1656	1656	1656	1656	1656
R^2	0.61	0.433	0.688	0.812	0.72	0.869	0.876	0.884

Note: t-statistics in parentheses
Model S: Agriculture, Model T: Manufacturing and energy, Model U: Construction
Model V: Distribution, Model W: Transport and Communication
Model X: Banking and Insurance, Model Y: Other market services
Model Z: Non-market services

4.3 Is it really market access?

Our study has so far implicitly assumed either that all regions are identical except for their differential market access or that other relevant features of regions are uncorrelated with our market access variables. This assumption underlies practically all NEG models. Indeed it is by formalizing spatial concentration forces in such a uniform world that these models become so valuable. Unfortunately, this assumption is empirically implausible, particularly when applied to the scale of half a continent. Regions differ in natural and man-made endowments and technologies, and these differences may well to some extent correlate with our market access variables. It is, however, beyond the scope of this (and probably any) study to collect a full set of endowment and technology controls for all the regions in our sample.

Table 6: Regressing region dummies on market access variables

	Dependent Variable: Regdummy								
Model :	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
dcap	-0.117	-0.108	0.192	0.078	0.000	-0.004	0.004	0.002	0.079
	(-14.13)	(-2.36)	(10.30)	(3.82)	(-0.02)	(-0.21)	(0.17)	(0.12)	(7.98)
ln dist. to Cap & CEEC	0.071	0.053	0.044	0.034	0.217	0.242	0.3 29	0.376	0.088
	(4.23)	(0.58)	(1.18)	(0.83)	(7.90)	(6.63)	(7.28)	(10.60)	(4.40)
Capital	-0.030	-1.084	0.223	-0.069	0.357	0.376	0.361	0.380	0.361
	(-1.06)	(-7.04)	(3.52)	(-1.01)	(7.74)	(6.12)	(4.76)	(6.37)	(1 0.79)
Capital & CEEC	0.213	-0.699	0.060	0.802	0.827	1.023	1.885	1.398	0.514
	(4.56)	(-2.72)	(0.57)	(7.01)	(10.78)	(10.00)	(14.92)	(14.08)	(9.23)
ln dist. to Brussels	0.084	0.548	-0.180	-0.158	-0.163	-0.170	-0.188	-0.167	-0.048
	(10.93)	(13.04)	(-10.45)	(-8.41)	(-12.94)	(-10.12)	(-9.06)	(-10.28)	(- 5.27)
ln dist. to Bru. & CEEC	0.239	1.545	-0.153	-0.589	-1.870	-1.719	-3. 239	-1.926	-1.160
	(3.80)	(4.46)	(-1.07)	(-3.81)	(-18.07)	(-12.47)	(-1.00)	(-14.39)	(-1 5.45)
Land border with EU,N,CH	0.067	0.331	0.058	-0.109	-0.072	-0.052	-0. 034	-0.055	0.056
	(5.58)	(4.99)	(2.13)	(-3.66)	(-3.65)	(-1.97)	(-1.05)	(-2.16)	(3.87)
Land border with EU,N,CH & CEEC	0.027	-0.343	-0.127	0.322	0.065	0.334	0.112	0.255	-0.009
	(0.97)	(-2.24)	(-2.01)	(4.71)	(1.43)	(5.46)	(1.49)	(4.30)	(- 0.28)
Land border with CEEC	0.009	-0.023	0.093	-0.122	-0.004	-0.073	-0.009	-0.081	-0.008
	(0.52)	(-0.25)	(2.49)	(-2.99)	(-0.16)	(-2.00)	(-0.19)	(-2.28)	(- 0.40)
Access to sea	0.042	0.289	-0.383	-0.207	-0.007	0.030	-0.006	- 0.011	-0.066
	(3.53)	(4.39)	(-14.16)	(-7.02)	(-0.34)	(1.14)	(-0.18)	(-0.44)	(- 4.65)
CEEC	-2.186	-10.024	0.568	3.538	11.714	10.253	20.178	11.231	7.433
	(-5.14)	(-4.29)	(0.59)	(3.39)	(16.76)	(11.00)	(17.52)	(12.41)	(1 4.65)
N	1921	1921	1921	1921	1921	1921	1921	1921	1921
R^2	0.216	0.266	0.264	0.175	0.386	0.372	0.425	0.364	0.333

Note: t-statistics in parentheses

Model 1: wage equation, Model 2: employment (Agriculture)
Model 3: employment (Manufacturing and energy), Model 4: employment (Construction)
Model 5: employment (Distribution), Model 6: employment (Transport and communication)
Model 7: employment (Banking and Insurance), Model 8: employment (Other market services)
Model 9: employment (Non-mkt services)

As an alternative to estimating a full model that includes region-specific features other than market access, we estimate the extent to which total regional differences in wages and sectoral employment shares can be explained by differences in those regions' market access. Specifically, we re-estimate our wage and employment equations, substituting the market access variables by regional dummies. In a second step, we regress estimated coefficients for the regional dummies on our market access variables. The R-square of this second equation is taken as a gauge of the power of market access in explaining regional differences in wages and sectoral employment shares.[14]

The results are reported in Table (6) for the wage equation and the eight employment equations. The R-squares range from 0.18 to 0.43. Market access variables therefore explain up to 43 percent of the variance in regional fixed effects, which suggests that they are a significant explanatory factor in the spatial patterns of wages and sectoral employment.

As an aside, we note that the highest R-squares are found in employment regressions for tertiary sectors (Banking and insurance, and Distribution), which again confirms that the significance of geographic market access extends well beyond the manufacturing sector.

5 Conclusion

We have drawn on a multi-region new economic geography model to study the internal economic geographies of five Central European EU countries (Czech Republic, Hungary, Poland, Slovenia and Slovakia). According to the theory, the external trade liberalization represented by progressing integration into the EU market will have significant location effects in those countries, by strengthening the locational pull of regions with good market access. Depending on the mobility of labor and firms across regions and sectors, this will translate into regional relocations of sectors and/or into changes in the spatial structure of average wages.

As an alternative to this market-based scenario, we have formulated a "Comecon hypothesis", according to which the spatial structure of economic activity is not systematically related to regions' market access, except for a strong concentration of activity and high wages in the capital region.

Our estimations yield strong support for the ongoing relevance of the Comecon hypothesis in Central European countries. Wages are discretely higher in capital regions, and service employment (in the private as well as in the public sector) is strongly concentrated on those regions. The comparison with pre-2004 EU countries shows that these concentrations are significantly stronger in the accession countries than in the incumbent member states. We therefore conjecture that the extreme centralization of wages and service sectors in Central European capital cities is likely to erode and give way to smoother gradients driven by market access, as predicted by the theory and confirmed in the regressions for existing EU members. The exception to this result is manufacturing, which, compared to the EU, is relatively underrepresented in CEEC capital and border regions. Finally, both the theory and some of our comparative estimations suggest that CEECs' regions nearest the border to fellow EU countries stand to gain most in terms of relative wages and sectoral employment growth.

6 References

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[14]Perfect multicollinearity of course makes it impossible to include regional fixed effects in the wage and employment regressions together with our region specific and time invariant market access variables. See also Hanson (1997).

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Table 7: Regional employment gradients in CEECs (Agriculture)

	Dependent Variable: $\ln(l_i/\text{pop}_i)$				
Model :	(1)	(2)	(3)	(4)	(5)
ln dist. to capital	-0.158	0.30	0.129	0.712	-0.733
	(-0.86)	(4.97)	(0.32)	(3.02)	(-11.81)
Capital	-3.756	-1.719	-0.177	0.508	-1.948
	(-8.79)	(-9.17)	(-0.46)	(0.86)	(-41.87)
ln dist. to Brussels	1.629	-0.091	-1.141	0.538	3.831
	(1.85)	(-0.17)	(-1.14)	(0.15)	(4.85)
land border with EU,N,CH	-0.194	0.252	-0.102	-0.044	-0.259
	(-1.25)	(2.57)	(-0.34)	(-0.10)	(-6.39)
land border with CEEC	-0.559	-0.410	-0.229	0.446	0.000
	(-3.21)	(-5.45)	(-0.98)	(1.51)	(0.0)
access to sea	0.000	0.000	0.333	-0.476	0.000
	(0.0)	(0.0)	(1.56)	(-5.30)	(0.0)
Yrdum	Yes	Yes	Yes	Yes	Yes
N	56	80	32	48	24
R^2	0.811	0.788	0.442	0.217	0.905

Note: t-statistics in parentheses.
Model 1: Czech Republic, Model 2: Hungary
Model 3: Poland, Model 4: Slovenia, Model 5: Slovakia

A Data appendix for the regional data

The data used in section (4) was made available by the WIIW in Vienna. The original database contains information on population, employment, and wage (among others), for the five CEECs that we examine. Regional data are available at the NUTS-3 level (acronym for Eurostat's "Nomenclature of Territorial Units for Statistics") for the Czech Republic, Hungary, Slovakia, Slovenia; and at the NUTS-2 level for Poland. The sectoral classification used corresponds to the Statistical Classification of Economic Activities in the European Community, rev. 1, at the lowest level of disaggregation.

B Employment gradients by sector and country

Table 8: Regional employment gradients in CEECs (Manufacturing)

	Dependent Variable: $\ln(l_i/\text{pop}_i)$				
Model :	(1)	(2)	(3)	(4)	(5)
ln dist. to capital	0.101	-0.004	-0.137	-0.199	0.362
	(2.27)	(-0.06)	(-1.02)	(-3.30)	(2.31)
Capital	-0.573	-0.064	0.056	-0.553	0.107
	(-6.13)	(-0.28)	(0.52)	(-7.55)	(0.92)
ln dist. to Brussels	-0.793	-1.612	-1.698	0.005	-4.188
	(-3.81)	(-5.70)	(-3.76)	(0.01)	(-3.61)
land border with EU,N,CH	-0.117	0.327	-0.392	-0.002	0.059
	(-2.42)	(5.42)	(-3.32)	(-0.03)	(0.52)
land border with CEEC	0.109	-0.056	0.159	-0.022	0.000
	(2.66)	(-1.13)	(1.67)	(-0.24)	(0.0)
access to sea	0.000	0.000	-0.046	-0.603	0.000
	(0.0)	(0.0)	(-1.03)	(-12.23)	(0.0)
Yrdum	Yes	Yes	Yes	Yes	Yes
N	56	80	32	48	24
R^2	0.859	0.566	0.593	0.738	0.703

Note: t-statistics in parentheses.
Model 1: Czech Republic, Model 2: Hungary
Model 3: Poland, Model 4: Slovenia, Model 5: Slovakia

Table 9: Regional employment gradients in CEECs (Construction)

	Dependent Variable: $\ln(l_i/\text{pop}_i)$				
Model :	(1)	(2)	(3)	(4)	(5)
ln dist. to capital	0.074	0.136	0.192	-0.041	0.330
	(1.06)	(3.10)	(1.78)	(-0.40)	(3.26)
capital	0.626	0.974	0.654	0.329	0.977
	(3.92)	(8.12)	(6.43)	(4.74)	(10.71)
ln dist. to Brussels	0.674	-2.005	-0.909	-2.947	-2.817
	(2.24)	(-5.81)	(-2.93)	(-1.81)	(-3.68)
land border with EU,N,CH	0.117	0.089	-0.394	-0.129	0.099
	(2.20)	(0.93)	(-3.39)	(-1.34)	(1.23)
land border with CEEC	-0.151	-0.015	0.115	0.148	0.000
	(-2.21)	(-0.27)	(1.30)	(1.13)	(0.0)
access to sea	0.000	0.000	-0.015	0.155	0.000
	(0.0)	(0.0)	(-0.28)	(1.35)	(0.0)
Yrdum	Yes	Yes	Yes	Yes	Yes
N	56	80	32	48	24
R^2	0.717	0.696	0.638	0.355	0.864

Note: t-statistics in parentheses.
Model 1: Czech Republic, Model 2: Hungary
Model 3: Poland, Model 4: Slovenia, Model 5: Slovakia

Table 10: Regional employment gradients in CEECs (Distribution)

	Dependent Variable: $\ln(l_i/\text{pop}_i)$				
Model :	(1)	(2)	(3)	(4)	(5)
ln dist. to capital	0.058	-0.004	0.190	-0.098	0.157
	(1.05)	(-0.09)	(1.80)	(-1.91)	(1.81)
capital	1.136	1.061	0.889	0.903	0.909
	(8.25)	(6.49)	(11.64)	(26.00)	(10.00)
ln dist. to Brussels	-0.264	-0.077	-0.665	2.257	-2.041
	(-1.11)	(-0.22)	(-1.61)	(2.91)	(-2.80)
land border with EU,N,CH	0.053	0.224	-0.276	0.303	-0.099
	(1.18)	(2.03)	(-2.12)	(7.38)	(-1.17)
land border with CEEC	0.174	0.047	-0.031	-0.277	0.000
	(3.66)	(0.90)	(-0.32)	(-5.70)	(0.0)
access to sea	0.000	0.000	-0.054	0.456	0.000
	(0.0)	(0.0)	(-0.93)	(8.69)	(0.0)
Yrdum	Yes	Yes	Yes	Yes	Yes
N	56	80	32	48	24
R^2	0.845	0.820	0.74	0.882	0.873

Note: t-statistics in parentheses.
Model 1: Czech Republic, Model 2: Hungary
Model 3: Poland, Model 4: Slovenia, Model 5: Slovakia

Table 11: Regional employment gradients in CEECs (Transport and Comm.)

	Dependent Variable: $\ln(l_i/\text{pop}_i)$				
Model :	(1)	(2)	(3)	(4)	(5)
ln dist. to capital	-0.050	0.232	0.226	-0.004	-0.053
	(-0.80)	(4.74)	(1.88)	(-0.04)	(-0.52)
capital	0.563	2.350	0.737	0.472	0.941
	(4.42)	(4.95)	(7.09)	(2.48)	(12.58)
ln dist. to Brussels	0.099	-1.194	-0.064	-4.951	1.653
	(0.40)	(-3.53)	(-0.20)	(-3.97)	(1.29)
land border with EU,N,CH	0.076	0.178	0.050	-0.013	-0.092
	(1.26)	(2.57)	(0.64)	(-0.09)	(-1.38)
land border with CEEC	-0.032	0.079	-0.077	-0.160	0.000
	(-0.39)	(1.70)	(-1.17)	(-1.10)	(0.0)
access to sea	0.000	0.000	0.103	1.118	0.000
	(0.0)	(0.0)	(1.35)	(14.54)	(0.0)
Yrdum	Yes	Yes	Yes	Yes	Yes
N	56	80	32	48	24
R^2	0.622	0.85	0.724	0.698	0.664

Note: t-statistics in parentheses.
Model 1: Czech Republic, Model 2: Hungary
Model 3: Poland, Model 4: Slovenia, Model 5: Slovakia

Table 12: Regional employment gradients in CEECs (Banking and Insurance)

	Dependent Variable: $\ln(l_i/\text{pop}_i)$				
Model :	(1)	(2)	(3)	(4)	(5)
ln dist. to capital	-0.015	0.032	-0.185	0.238	0.079
	(-0.22)	(0.37)	(-1.33)	(4.72)	(1.31)
capital	1.810	2.360	0.982	1.072	1.950
	(10.92)	(4.16)	(7.23)	(20.73)	(31.09)
ln dist. to Brussels	-0.421	0.815	-0.486	-2.063	0.125
	(-1.24)	(0.93)	(-1.65)	(-2.64)	(0.18)
Land border with EU,N,CH	0.179	0.240	0.105	-0.040	-0.063
	(3.53)	(1.06)	(1.07)	(-0.78)	(-1.30)
Land border with CEEC	0.248	-0.205	0.040	-0.158	0.000
	(4.04)	(-2.69)	(0.61)	(-1.97)	(0.0)
Access to sea	0.000	0.000	0.065	0.451	0.000
	(0.0)	(0.0)	(0.73)	(8.55)	(0.0)
Yrdum	Yes	Yes	Yes	Yes	Yes
N	56	80	32	48	24
R^2	0.932	0.872	0.898	0.822	0.953

Note: t-statistics in parentheses.
Model 1: Czech Republic, Model 2: Hungary
Model 3: Poland, Model 4: Slovenia, Model 5: Slovakia

Table 13: Regional employment gradients in CEECs (Other market services)

	Dependent Variable: $\ln(l_i/\text{pop}_i)$				
Model :	(1)	(2)	(3)	(4)	(5)
ln dist. to capital	0.055	0.235	-0.154	0.097	-0.246
	(1.11)	(5.49)	(-0.98)	(0.92)	(-6.66)
Capital	1.775	1.963	1.170	1.413	1.169
	(15.08)	(13.46)	(8.92)	(14.32)	(21.54)
ln dist. to Brussels	0.171	-2.012	-1.809	-0.048	2.570
	(0.81)	(-7.08)	(-3.48)	(-0.03)	(4.20)
Land border with EU,N,CH	0.324	-0.037	-0.20	0.395	-0.159
	(6.60)	(-0.44)	(-1.21)	(3.94)	(-3.98)
Land border with CEEC	0.131	-0.066	0.290	-0.596	0.000
	(1.91)	(-1.29)	(2.34)	(-5.59)	(0.0)
Access to sea	0.000	0.000	0.191	0.633	0.000
	(0.0)	(0.0)	(2.34)	(6.85)	(0.0)
Yrdum	Yes	Yes	Yes	Yes	Yes
N	56	80	32	48	24
R^2	0.933	0.797	0.779	0.839	0.942

Note: t-statistics in parentheses.
Model 1: Czech Republic, Model 2: Hungary
Model 3: Poland, Model 4: Slovenia, Model 5: Slovakia

Table 14: Regional employment gradients in CEECs (Non-market services)

	Dependent Variable: $\ln(l_i/\text{pop}_i)$				
Model :	(1)	(2)	(3)	(4)	(5)
ln dist. to capital	0.153	0.186	-0.018	0.138	0.070
	(7.47)	(10.13)	(-0.49)	(6.30)	(2.66)
capital	0.765	1.391	0.123	0.619	0.593
	(19.19)	(29.43)	(4.26)	(10.07)	(33.03)
ln dist. to Brussels	-0.705	0.121	0.206	-0.307	0.212
	(-5.96)	(1.40)	(2.57)	(-0.55)	(0.72)
land border with EU,N,CH	0.022	-0.006	0.110	0.021	0.074
	(0.79)	(-0.23)	(5.83)	(0.41)	(4.87)
land border with CEEC	0.066	-0.027	0.002	-0.192	0.000
	(2.54)	(-1.95)	(0.08)	(-4.71)	(0.0)
access to sea	0.000	0.000	-0.004	0.107	0.000
	(0.0)	(0.0)	(-0.16)	(3.64)	(0.0)
Yrdum	Yes	Yes	Yes	Yes	Yes
N	56	80	32	48	24
R^2	0.839	0.950	0.707	0.73	0.894

Note: t-statistics in parentheses.
Model 1: Czech Republic, Model 2: Hungary
Model 3: Poland, Model 4: Slovenia, Model 5: Slovakia