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Did Previous EU Enlargements Change the Regional Distribution of Production? An Empirical Analysis of Three Enlargement Episodes

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Change the Regional Distribution
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Abstract

This paper analyses the effects of previous enlargements of the European Union on the regional structure of production. Focusing on regional development five years before and seven years after integration, we find relatively small and heterogeneous effects. For enlargement by Greece a robust tendency of decentralisation is found. For Southern enlargement effects on border regions are significant for wages and employment and for Northern enlargement no significant effects are found. Finally, for nearby old member states results are contradictory and are not robust to correcting from potential bias arising from serial autocorrelation of the error term.

Key Words: EU-Accession, Regional Effects of Integration

JEL-Codes: R11, F15

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Introduction

Since the 1980s the European Union (EU) has successively increased its membership from 9 countries to 25 in three rounds of enlargement. In each of these the economic effects of enlargement on both the newly joining and incumbent countries were important issues in the public debate. Among these economic effects the impacts of enlargement on the regional structure of production, regional disparities and on border regions featured prominently. On the one hand, concerns were often voiced about increasing regional disparities and potential negative wage and employment effects in regions nearer to the border as well as increased concentration of production due to increased competitive pressures and factor mobility. On the other hand, it was repeatedly argued that integration improves market access in particular in regions closer to borders and should thus have particularly favourable effects on these regions as well as favouring convergence and deconcentration of regional activities (see Bröcker, 2003, Mayerhofer and Palme, 2001).

Modern economic theories in the form of new economic geography models (see: Fujita et al, 1999) provide some basis for both arguments. These models suggest that integration has two countervailing effects on the regional distribution of economic activity: On the one hand, as cross border transport costs fall through integration, market access to regions across the border improves. As a consequence of this "market access effect" (Ottaviano and Robert-Nicoud, 2004), incentives to decentralise production (i.e. to move production to regions more distant from national demand centres) and to locate production nearer to the border increase, because as foreign

markets become more accessible it becomes less important to locate near home market demand centres, and more attractive to serve the foreign market from a location with lower prices for immobile factors as well as low transport costs to foreign demand centres.¹

On the other hand, due to the fall in transport costs, competition from foreign producers increases. This "market crowding" effect will *ceteris paribus* create incentives for firms to relocate to central locations in order to exploit productivity enhancing externalities and to move production away from borders in order to escape from the increased competition from foreign firms. This will lead to increased concentration of economic activity (i.e. lower employment, wage and GVA in the periphery as well as lower factor flows to these regions relative to the situation before integration) and an orientation of economic activity away from the border regions may be a consequence of integration.

From a theoretical perspective the impact of enlargement on the regional structure of production is thus ambiguous and depends on parameter constellations both with respect to the effects on border regions as well as with respect to the concentration of production.² Depending on the relative strength of market access and market crowding effects, integration may lead to increased concentration of production and a shift of production away from the border, or to increased decentralisation of production and a shift of production towards border regions.³ Which of these tendencies prevails is an empirical issue. Despite this insight, evidence on the effects of integration on the regional distribution of economic activity is rare (see: Niebuhr and Stiller (2002) for a survey). Among the exceptions Hanson (1996, 1998, 2001) in a series of influential

papers uses the example of Mexico, to show that after trade liberalisation wages and employment increased more rapidly in Mexican regions and cities closer to the border of the US. Hanson's analysis, however, concentrates on a rather special case of trade liberalisation between a high and a low wage country. Accessions to the EU differ from this because they allowed for increased cross border factor mobility and new member states were often small developed countries. Thus there is a need for testing the generality of these results in a European context. This has been done in few cases only and results often contradict Hanson's. Barjak and Heimpold (1999), Heimpold (2004) and Engel (1999) focus on investments and firm start-ups in the Polish – German border region after the opening of the Central and Eastern European Countries (CEEC) and find no or only weak evidence of positive integration effects; Mayerhofer (2004) looks at the effects of opening of the CEEC on Austrian border regions and finds evidence of a small positive integration effect. Büttner and Rincke (2005) find that German – German integration had negative employment effects on West German border regions.⁴

In this paper we want to find out whether previous EU enlargements had an impact on the regional distribution of economic activity both for existing as well as newly joining EU member states for three cases of enlargement: by Greece in 1981, by Spain and Portugal in 1986 and by Austria, Sweden and Finland in 1995. Our aim is to see whether in the time period after enlargement there was tendency of decentralisation of production and a more favourable development in regions closer to EU-borders or of increased concentration and a worse development in regions close to EU-borders. We thus closely follow the analysis in Hanson (1996), but aside from focusing on a different set of countries we extend on his analysis by considering a wider set of economic

indicators. In particular we argue that shifts in the regional distribution of economic activity within a country following integration should be associated with higher employment, GVA and wages as well as higher factor flows relative to the time before integration to regions favoured by integration.

After discussing methodology in the next section and data in section 3, we present results in section 4. We find that in general previous European enlargement episodes had a mild impact on the regional distribution of economic activity and find substantial heterogeneity among different episodes. This leads us to conclude (in section 5) that – as suggested by the theoretical literature - there are substantial differences between individual enlargement episodes and that making direct inferences on the effects of future enlargements based on previous experiences may be misleading when the particularities of each case are not duly considered.

Empirical Framework & Estimation Issues

Our interest is in whether integration led to a decentralisation of production and a more favourable development in regions closer to the border, as would be the case if the market access effect dominates, or to increased concentration and a worse development of regions closer to the border, as would be expected if the market crowding effect dominates. The first would be the case, if regions closer to the border and regions more distant from the country centre experienced higher employment, GVA and wage growth as well as higher investments, relative to other regions in the time period after integration. The second would be the case, if regions closer to the border as well as

regions further away from national demand centres experienced lower, employment, GVA and wages as well as lower investments.

We thus estimate baseline regressions of the form:

$$Y_{ijt} = \gamma_1 * T_t * DB_i + \gamma_2 * T_t * DC_i + \lambda_1 Z_{ijt} + \lambda_2 T_t + \zeta_{ijt} \quad (1)$$

with Y_{it} an indicator measuring factor flows or economic activity in region i and sector j at time t , DB_i the (log) distance to the foreign country, DC_i the (log) distance to the home country's demand centre, T_t a set of dummy variables which takes on the value 1 for each year and Z_{it} a vector of potential further explanatory variables, which in our baseline specification are a family of industry -region (or only region) fixed effects and the share of an industry in the region relative to the national average (which is termed specialisation) for all data disaggregated at the industrial level. ζ_{it} , finally, is an error term.

In equation (1) a necessary condition for significant integration effects is that the parameters γ_1 and γ_2 differ significantly from zero for the time period after integration. If γ_1 is positive and γ_2 is negative for the time period after integration, regions further away from the foreign country (thus the border) and regions closer to the country's demand centre experienced an increase in GVA, employment, wages and investments after enlargement relative to regions closer to the border. This would indicate a relocation of economic activity away from border regions and towards the national demand centre and would thus be consistent with a dominance of the market crowding effect. If by contrast γ_1 is negative and γ_2 is positive, this implies that regions closer to

the border and further away from a countries demand centre experienced a better development, which is consistent with a dominance of the market access effect.⁵

Furthermore, in contrast to Hanson (1996) we include dummy variables for each year interacted with DB_i and DC_i , respectively, rather than a dummy variable for the time period after accession only⁶. This deviation is due to the structure of our data (which allows annual comparisons) as well as to the nature of the enlargement process. We include annual dummies because enlargements were not surprise events, but announced well in advance. Thus anticipation effects may have caused the effects of integration to be felt even prior to accession.⁷

Finally, there are a number of concerns which may be raised with respect to this specification. In particular potential bias could arise from different specialisations of the regions and distance to the capital city and Brussels could be co-linear. Thus we checked that our results are robust to the inclusion of sectoral employment shares as well as exclusion of either DB_i or DC_i .⁸ These changes reconfirm the qualitative findings reported below.⁹

Data

We use annual Eurostat regional data at the NUTS II level provided to us by Cambridge Econometrics reaching from 1975 to 2000. These data allow us to assess the regional impact of European integration on NUTS II level for both existing and new member states for three episodes of enlargement: Enlargement by Greece, in 1981, Southern enlargement (by Spain and Portugal) in 1986 and Northern enlargement (by Austria, Finland and Sweden) in 1995. We arrange this data so as to consider the 5

years before and 7 years after accession. Furthermore, for both Southern and Northern enlargement we also focus on effects of integration on nearby member states. In the case of Southern enlargement we choose France¹⁰ as a neighbouring member state and in the case of Northern enlargement these are Denmark and Italy.¹¹ As distance measures we use the crow-fly distance of the respective region's capital to the country's capital as a measure for the variable DC_i and to Brussels to measure DB_i , for newly joining countries. For the neighbouring countries (i.e. France, Italy, Denmark) considered we measure DB_i as the distance to the capital of the nearby new member states (i.e. to Madrid for France, to Vienna for Italy and to Stockholm for Denmark) while all other variables are defined equivalently to above.

The enlargement cases analysed in this way provide substantial variance with respect to the institutional circumstances of integration, the size, geographic structure and level of development of both the integrating countries as well as the nearby old member states. In particular later entries joined a successively more integrated EU.¹² While this would suggest more sizeable effects of integration in later accessions, Northern enlargement also differs from previous enlargements because countries joining the EU in 1995 were already members of the European Economic Area since 1991, so that these countries not only joined a more deeply integrated Union, but were also more deeply integrated into the Union before accession. This suggests integration effects may have been small. Furthermore, in the case of Southern enlargement derogation periods on the freedom of movement of labour were negotiated. By contrast for Northern enlargement no such derogation periods were needed. This may be important because as

noted by Büttner and Rincke (2005), if cross – border migration is allowed, benefits from integration could potentially concentrate on one side of the border, only.

Finally, the integration cases studied in this paper, included countries of very different levels of development and sizes (see table 1). Enlargement by Greece and Southern enlargement included poorer countries (per capita GDP of Greece, Spain and Portugal ranged between 50% and 75% of the EU average when they joined the Union), while Northern enlargement included richer countries (Austrian and Swedish per capita GDP levels exceeding the Union's average and Finland approached this level). This implies that the market potential of the EU was larger relative to the domestic market potential in Southern enlargement and enlargement by Greece than in Northern enlargement. Thus as shown in column 2 of table 1 the additional market potential becoming accessible through integration remained small for the old member states and varied substantially for acceding countries. This would lead one to expect to find larger effects in the first two enlargement rounds.

{Table 1: Around here}

A large market potential, however, is not a sufficient condition for sizeable integration effects, because the additional market potential of large poor countries may exceed that of a small rich country (as evidenced by the example of Spain and Austria in table 1) and because differences in the size of countries may impact on the the potential cost advantages of locating nearer to the border relative to remaining in the centre. As shown in table 1 there is also substantial variance in the size of countries integrated in

previous enlargements; many of the acceding countries analysed in this paper were small in terms of area leading us to expect lower effects than in cases where larger countries were included. Furthermore, in the case of Greece a country was integrated, which is distant from the EU and shares no common land border with the EU, this would also suggest that the impact of the market access and crowding effects in this integration were limited.

Due to this heterogeneity we do not pool data across enlargements, but analyse each case separately by focusing on four variables: employment, GVA, wages and investments. We measure GVA as log gross value added (in 1000 Euros) employment as log average annual employment, wages as the average log compensation per employee (in Euros) in a region, and investments as the log of investment expenditure (in Euros). The structure of these data differs somewhat for some of these indicators. For employment and GVA we have available indicators for each region for a total of 14 industries, while for investments and wages, we only have available regional averages across all sectors.¹³ Table 2 presents' descriptive statistics for the indicators used and divides the observation period into a period before and after EU accession. This table suggests substantial variance in indicators among regions both before as well as after integration.

{Table 2: Around Here}

Results

Employment and GVA

The focus of this paper is on this regional variance. Tables 3 & 4 present results of estimating equation (1) for GVA and employment in both acceding countries as well as nearby member states. These results indicate that Greek regions further away from the country's centre showed significantly higher GVA starting two years before accession (i.e. 1979) and significantly higher employment starting one year after accession. For Southern enlargement we find a significant shift of employment away from the country's centre as well as significant negative coefficients on the distance to Brussels for the last two years of the observation period (i.e. 1991 and 1992). Similarly for the nearby member states in Northern enlargement (i.e. Italy & Denmark), starting from the second year after enlargement, regions which were located closer to the border of the new member state experienced a significant increase in employment. These results thus suggest a mild dominance of the market access effect.

{Tables 3 and 4: Around Here}

For France, by contrast, we find that regions further away from the border had significantly higher employment after Southern enlargement, which is consistent with a dominance of the market crowding effect. Finally, for Northern enlargement no significant effects are found.

The size of the significant parameters, however, suggests that the effects of enlargement were small in economic terms in all cases. The coefficients for GVA and

employment in the case of Greece for instance suggest that between the years 1982 and 1989 regions located 10% further from Athens (i.e. around 200km) experienced an increase in employment and GVA relative to the period before enlargement of between 0.2% and 0.6%. The significant coefficients for Southern enlargement and the nearby member states in suggest comparable effects for regions closer to Brussels which were around 0.09 for Portugal and Spain and 0.03 for Italy and Denmark and a decline in regions 1% closer to the border of 0.03% for France.

Wages and Investments

In summary these results indicate substantial heterogeneity and a rather mild impact of European integration on the regional structure of production. This is reconfirmed when moving to estimation of the regional structure of the wages and investments (reported in tables 5 and 6). For these variables coefficients also remain small and often insignificant. We, however, also find a number of significant parameters in the years following accession. In particular for wage regressions (see table 5) results suggest a dominance of the market access effect at least for Southern enlargement and enlargement by Greece, which is consistent with the results on the employment structure. Coefficients on the year – distance to capital variable and for Greece and on the year –distance to Brussels interactions in southern enlargement turn increasingly positive (respectively negative) each year after accession and become significant the year after (Southern enlargement) or the same year as (Greece) accession.

{Tables 5 & 6: Around Here}

By contrast results for France are in contradiction to those on the regional employment structure. Here coefficients on the year distance to Madrid interaction become increasingly negative after enlargement and are on the margin of significance from the third year after enlargement onwards. Furthermore, as previously we find no significant effects for northern enlargement and also the regional wage structure of Italy and Denmark seems to have remained unaffected by enlargement.

Finally, the size of the significant effects suggests that the quantitative impact of enlargements on the relative wage structure in newly joining and even more in incumbents was relatively mild. For the acceding countries the marginal effect of distance to Brussels is at around 0.1 for Southern enlargement and for both Greece and France the effect is substantially smaller.

Results for investment expenditure (see table 6), finally, also suggest some impact of enlargement by Greece and Southern enlargement on the acceding countries. In particular in the case of enlargement by Greece investments increased significantly in the year after enlargement in regions further away from Athens. In the case of Southern enlargement by contrast investments only increased significantly in regions closer to Brussels in the last year of our observation horizon. Finally, for the cases of the nearby new member states in Northern enlargement (Italy & Denmark) we find a significant increase in investments in regions closer to the capital city which once more is in contradiction to the results on the employment structure.

Thus results so far indicate substantial heterogeneity both with respect to the variables and the integration effects analysed. With the exception of Greece we find no clear association of accession with shifts in the regional structure of GVA. For

employment, wages and investments we find some regional effects in particular in the case of Southern enlargement and enlargement by Greece and for nearby old member states we find contradictory results depending on the indicator analysed.

Results obtained from heteroscedasticity robust inference including fixed group effects as above may, however, lead to an over- (under-)rejection of the null (of no effects) in the presence of positive (negative) autocorrelation of the residuals (see Bertrand et al, 2004). We thus also ran regressions in which we correct for this bias by using the two step procedure suggested in Bertrand et al (2004). This consists of first running a baseline specification excluding treatment effects (i.e. running a regression $Y_{it} = \beta_1 DB_i + \gamma_1 DC_i + \lambda Z_{it} + T_t + \zeta_{it}$, where all variables are as defined in equation 1) and in a second step using the residuals of the first step aggregated for the period before accession and the period after accession¹⁴ to perform a standard difference in difference test.¹⁵

{Table 7: Around Here}

While performing this test represents a major shift in methodology the results (see table 7) confirm many of the previous finding on the acceding countries. As in previous results integration effects in general have been small: with the exception of investments, wages and GVA in Greece none of the coefficients is significant at the five percent level and coefficients which are significant at least at the ten percent level also tend to be small in absolute terms. Furthermore, as suggested previously, for Southern enlargement and enlargement by Greece the effects – where significant - are consistent

with a predominance of the market access effect, with a decentralisation of production taking place in Greece and regions closer to the border profiting in Southern enlargement. For nearby old member states by contrast we find that only the increase in wages in regions closer to Madrid in France after Southern enlargement is robust to this change in methodology, while results for employment and investments (in the case of Italy and Denmark) attain no significance.

These results, thus, confirm the previously found heterogeneity. For enlargement by Greece we find a robust tendency of decentralisation of the regional structure of GVA, employment, investments and wages. For Southern enlargement we find some effect on wages and employment for both the newly acceding and nearby old member states (i.e. France) while for Northern enlargement we find no significant effects.

Conclusions

This paper analyses the effects of previous enlargements of the European Union on the regional structure of production for three cases of enlargement. We argue that there are a number of reasons to expect these effects to differ from cases analysed in previous literature. Focusing on regional development five years before and seven years after integration for each of the three enlargements analysed in this paper, we find that first, the effects of previous EU enlargements on regional employment, GVA and wage structure, as well as on the regional structure of investments have in general been small and second, that there has been substantial heterogeneity in the effects. For enlargement by Greece we find a robust tendency of decentralisation of the regional structure of GVA, employment, investments and wages. For Southern enlargement we find some

effect on wages and employment and for Northern enlargement we find no significant effects of integration. Finally, for the nearby old member states in both Northern and Southern enlargement our results tend to be contradictory and are not robust to correcting for potential bias arising from serial autocorrelation of the error term.

While our results are derived from a relatively simple model which tests a necessary condition for integration effects, only, and data constraints preclude analysis on both a more detailed regional grid as well as for individual industrial branches, they are by and large consistent with the view, that for regional development following previous accessions the advantages of increased market access dominated the potential disadvantages of increased competition and thus that the market access effect dominated the market crowding effect. There are, however, substantial differences between individual enlargement episodes and, in general, effects seem to be small and are only at the margin of significance when controlling for serial autocorrelation in the error term.

In particular the heterogeneity of the effects of enlargement on the regional structure of production found in this paper is consistent with the findings of the formal theoretical literature, which suggests that the regional effects of integration are highly dependent on parameter constellations. Our results are thus in general consistent with the view that European integration had a stronger impact on the regional structure of production in cases where poor and nearby countries were integrated (such as Southern enlargement) but that the additional market potential of the new entrants has mostly been too small to shift the regional structure in the nearby old member states. Again this is in line with theoretical considerations and also suggests that making direct inferences on the effects of future enlargements based on previous experiences may be misleading

if the particularities of each case (such as the additional market potential generated and size of both the incumbent and joining countries) are not duly considered.

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Table 1: Descriptive Statistics of analysed Countries

	Per capita GDP in % of EU average at accession	Total GDP of the EU in percent of the GDP of the joining country ¹⁾	Area in thousand km ²
Southern Enlargement			
Spain	69.00	1093.29	504.8
Portugal	54.00	6381.04	90.9
Greece	75.00	4109.97	131.6
Northern Enlargement			
Austria	113.00	2827.06	83.9
Sweden	101.00	2565.95	410.9
Finland	91.00	5186.92	304.5
France*	111.00	10.71	544.0
Italy**	115.00	3.54	301.3
Denmark	114.00	5.83	43.1

Notes 1) For France, Italy and Denmark this column displays the total GDP of the newly joining countries in percent of the GDP of the nearby old member state country, Source: Eurostat

Table 2: Descriptive Statistics for dependent Variables

		T(N) ¹⁾	ln(employment)	ln(GVA)	ln(investment expenditure)	ln(wages)
Greece	Before	5	1.517	4.550	6.615	5.780
		(13)	(1.647)	(1.584)	(0.923)	(0.537)
	After	7	1.582	4.824	6.539	7.034
		(13)	(1.643)	(1.558)	(0.834)	(0.526)
Southern Enlargement	Before	5	2.553	5.709	7.263	8.739
		(25)	(1.729)	(1.785)	(1.366)	(0.502)
	After	7	2.594	5.945	7.529	9.160
		(25)	(1.770)	(1.761)	(1.400)	(0.487)
Northern Enlargement	Before	5	2.474	6.304	7.931	10.148
		(23)	(1.431)	(1.437)	(0.921)	(0.151)
	After	7	2.446	6.436	8.031	10.305
		(23)	(1.467)	(1.456)	(0.940)	(0.156)
France ^{a)}	Before	5	3.495	7.130	8.609	9.506
		(22)	(1.244)	(1.337)	(0.810)	(0.154)
	After	7	3.480	7.249	8.773	9.860
		(22)	(1.243)	(1.340)	(0.838)	(0.161)
Italy & Denmark	Before	5	3.346	7.019	8.598	9.581
		(23)	(1.488)	(1.507)	(1.044)	(0.231)
	After	7	3.335	7.158	8.726	9.902
		(23)	(1.489)	(1.458)	(1.052)	(0.210)

Note: Table displays unweighted means across regions (industry region cells in the case of GVA and employment), values in brackets are standard deviations. 1) first line states number of time periods (T) second line states the number of regions (N). For employment and productivity growth there are observations on 14 sectors per region. a) Excluding French overseas territories.

Table 3: Regression Results Dependent Variable $\ln(\text{GVA})$

	Greece	South	North	France ^{a)}	Italy & Denmark
Concentration	3.185*** (1.020)	14.010*** (0.866)	7.808*** (0.749)	8.988 (0.652)	7.864*** (0.689)
Distance to Capital	-0.128*** (0.011)	-0.225 (0.424)	0.177 (0.182)	0.043** (0.008)	0.041*** (0.008)
Distance to Capital X Year 2	0.004 (0.010)	-0.307 (0.454)	0.144 (0.192)	0.003 (0.007)	0.003 (0.007)
Distance to Capital X Year 3	0.017* (0.009)	0.002 (0.006)	0.001 (0.005)	0.001 (0.007)	0.001 (0.007)
Distance to Capital X Year 4	0.022*** (0.009)	0.001 (0.006)	0.002 (0.004)	0.002 (0.006)	0.001 (0.006)
Distance to Capital X Year 5	0.040*** (0.008)	0.000 (0.006)	0.001 (0.004)	0.002 (0.006)	0.002 (0.006)
Distance to Capital X Year 6	0.056*** (0.008)	-0.001 (0.006)	0.001 (0.004)	-0.001 (0.006)	-0.001 (0.006)
Distance to Capital X Year 7	0.061*** (0.008)	-0.002 (0.005)	0.003 (0.004)	0.006 (0.006)	0.005 (0.006)
Distance to Capital X Year 8	0.061*** (0.008)	-0.007 (0.005)	0.002 (0.004)	0.002 (0.006)	0.002 (0.006)
Distance to Capital X Year 9	0.062*** (0.009)	-0.009* (0.005)	-0.001 (0.004)	0.002 (0.006)	0.001 (0.007)
Distance to Capital X Year 10	0.061*** (0.009)	-0.004 (0.006)	-0.001 (0.004)	0.001 (0.007)	0.001 (0.007)
Distance to Capital X Year 11	0.060*** (0.009)	-0.003 (0.007)	-0.004 (0.004)	-0.002 (0.007)	-0.003 (0.007)
Distance to Capital X Year 12	0.061*** (0.009)	-0.003 (0.006)	-0.006 (0.004)	-0.002 (0.008)	-0.002 (0.008)
Distance to Brussels	0.092* (0.054)	-0.002 (0.006)	-0.007 (0.004)	-0.019 (0.016)	-0.021 (0.016)
Distance to Brussels X Year 2	0.006 (0.042)	0.030 (0.047)	-0.005 (0.023)	0.000 (0.016)	-0.001 (0.016)
Distance to Brussels X Year 3	0.010 (0.038)	0.019 (0.046)	-0.004 (0.020)	-0.022 (0.016)	-0.022 (0.017)
Distance to Brussels X Year 4	0.017 (0.038)	-0.011 (0.047)	-0.010 (0.020)	-0.035** (0.016)	-0.036** (0.017)
Distance to Brussels X Year 5	0.000 (0.038)	0.002 (0.050)	-0.005 (0.019)	-0.021 (0.014)	-0.022 (0.015)
Distance to Brussels X Year 6	-0.025 (0.039)	0.055 (0.043)	-0.008 (0.019)	-0.025* (0.014)	-0.026* (0.014)
Distance to Brussels X Year 7	0.027 (0.038)	0.072 (0.041)	-0.001 (0.018)	-0.016 (0.015)	-0.017 (0.015)
Distance to Brussels X Year 8	0.022 (0.037)	0.083* (0.043)	0.000 (0.019)	-0.003 (0.016)	-0.004 (0.016)
Distance to Brussels X Year 9	0.000 (0.042)	0.079* (0.047)	0.004 (0.019)	-0.019 (0.015)	-0.020 (0.016)
Distance to Brussels X Year 10	0.045 (0.044)	0.061 (0.049)	0.006 (0.020)	-0.003 (0.016)	-0.005 (0.017)
Distance to Brussels X Year 11	0.030 (0.042)	0.070 (0.052)	0.008 (0.020)	-0.006 (0.017)	-0.007 (0.018)
Distance to Brussels X Year 12	0.049 (0.044)	0.080 (0.055)	0.014 (0.022)	-0.009 (0.019)	-0.011 (0.020)
NOBS	2016	4200	3864	3696	504
R2	0.980	0.980	0.990	0.990	0.990

Data is arranged so that period 5 is the year of accession. Specification includes a full set of regionindustry and time effects which are not reported. Values in bracket are heteroscedasticity robust standard errors of the estimate. ***(**) (*) indicate significance at the 1% (5%) (10%) level, a) France excluding overseas territories.

Table 4: Regression Results Dependent Variable $\ln(\text{Employment})$

	Greece	South	North	France ^{a)}	Italy & Denmark
Concentration	25.546*** (0.819)	24.499 (0.998)	26.233*** (0.472)	22.578*** (0.876)	28.877*** (1.249)
Distance to Capital	-0.228*** (0.003)	-0.141 (0.002)	0.207*** (0.002)	0.061*** (0.003)	-0.009* (0.005)
Distance to Brussels	0.836 (0.025)	1.133 (0.025)	0.486*** (0.011)	0.029*** (0.009)	0.154*** (0.011)
Distance to Capital X Year 2	0.001 (0.004)	0.000 (0.002)	0.001 (0.003)	0.003 (0.004)	0.003 (0.003)
Distance to Capital X Year 3	0.001 (0.004)	-0.001 (0.002)	0.001 (0.003)	0.003 (0.004)	0.005 (0.003)
Distance to Capital X Year 4	0.003 (0.004)	-0.001 (0.002)	0.001 (0.002)	0.004 (0.004)	0.002 (0.003)
Distance to Capital X Year 5	0.004 (0.003)	-0.001 (0.002)	0.002 (0.002)	0.004 (0.003)	0.002 (0.003)
Distance to Capital X Year 6	0.012*** (0.003)	-0.003 (0.002)	0.002 (0.002)	0.002 (0.003)	0.001 (0.003)
Distance to Capital X Year 7	0.012*** (0.003)	0.000 (0.002)	0.003 (0.002)	0.001 (0.003)	0.002 (0.003)
Distance to Capital X Year 8	0.011*** (0.003)	0.001 (0.002)	0.003 (0.002)	0.001 (0.003)	0.000 (0.003)
Distance to Capital X Year 9	0.010*** (0.004)	0.001 (0.002)	0.003 (0.002)	0.000 (0.003)	-0.000 (0.003)
Distance to Capital X Year 10	0.010*** (0.004)	0.002 (0.002)	0.003 (0.002)	-0.001 (0.004)	-0.002 (0.003)
Distance to Capital X Year 11	0.013*** (0.004)	0.006** (0.002)	0.004 (0.002)	-0.002 (0.004)	-0.002 (0.003)
Distance to Capital X Year 12	0.011*** (0.004)	0.006** (0.002)	0.004* (0.002)	-0.002 (0.004)	-0.002 (0.003)
Distance to Brussels X Year 2	0.007 (0.029)	-0.001 (0.029)	0.006 (0.012)	0.007 (0.010)	-0.001 (0.015)
Distance to Brussels X Year 3	0.008 (0.027)	0.007 (0.027)	0.010 (0.012)	0.006 (0.010)	-0.003 (0.013)
Distance to Brussels X Year 4	0.002 (0.026)	0.001 (0.026)	0.012 (0.011)	0.008 (0.009)	0.000 (0.013)
Distance to Brussels X Year 5	0.007 (0.025)	0.010 (0.026)	0.013 (0.010)	0.011 (0.009)	-0.008 (0.011)
Distance to Brussels X Year 6	-0.011 (0.025)	0.014 (0.027)	0.016 (0.010)	0.013 (0.008)	-0.015 (0.011)
Distance to Brussels X Year 7	-0.011 (0.024)	-0.027 (0.025)	0.018 (0.011)	0.017** (0.008)	-0.022** (0.011)
Distance to Brussels X Year 8	-0.015 (0.025)	-0.034 (0.026)	0.015 (0.011)	0.021** (0.009)	-0.022* (0.011)
Distance to Brussels X Year 9	-0.009 (0.026)	-0.027 (0.029)	0.012 (0.011)	0.023** (0.009)	-0.021* (0.011)
Distance to Brussels X Year 10	-0.006 (0.027)	-0.034 (0.029)	0.013 (0.011)	0.024** (0.009)	-0.026** (0.012)
Distance to Brussels X Year 11	-0.022 (0.030)	-0.091*** (0.032)	0.011 (0.011)	0.025*** (0.009)	-0.025** (0.012)
Distance to Brussels X Year 12	-0.020 (0.032)	-0.091*** (0.034)	0.007 (0.011)	0.025** (0.010)	-0.025** (0.012)
NOBS	2016	4200	3864	3696	504
R2	0.980	0.990	0.970	0.980	0.990

Data is arranged so that period 5 is the year of accession. Specification includes a full set of regionindustry and time effects which are not reported. Values in bracket are heteroscedasticity robust standard errors of the estimate. ***(**) (*) indicate significance at the 1% (5%) (10%) level, a) France excluding overseas territories.

Table 5: Regression Results: Dependent Variable $\ln(\text{Wages})$

	Greece	South	North	France ^{a)}	Italy & Denmark
Distance to Capital	-0.175*** (0.010)	-0.049*** (0.005)	-0.003 (0.004)	-0.020*** (0.005)	-0.065*** (0.004)
Distance to Capital X Year 2	0.008 (0.015)	0.001 (0.007)	-0.000 (0.005)	0.001 (0.007)	0.001 (0.005)
Distance to Capital X Year 3	0.015 (0.015)	0.003 (0.007)	0.002 (0.005)	0.000 (0.007)	0.002 (0.005)
Distance to Capital X Year 4	0.023 (0.015)	0.003 (0.007)	0.003 (0.005)	0.001 (0.007)	0.006 (0.005)
Distance to Capital X Year 5	0.029** (0.015)	0.003 (0.007)	0.006 (0.005)	0.002 (0.007)	0.007 (0.005)
Distance to Capital X Year 6	0.034*** (0.015)	0.001 (0.007)	0.005 (0.005)	-0.000 (0.007)	0.004 (0.005)
Distance to Capital X Year 7	0.044*** (0.015)	0.009 (0.007)	0.005 (0.005)	-0.003 (0.007)	0.008 (0.005)
Distance to Capital X Year 8	0.046*** (0.015)	0.010 (0.007)	0.004 (0.005)	-0.007 (0.007)	0.009 (0.005)
Distance to Capital X Year 9	0.052*** (0.015)	0.009 (0.007)	0.004 (0.005)	-0.007 (0.007)	0.007 (0.005)
Distance to Capital X Year 10	0.059*** (0.015)	0.010 (0.007)	0.004 (0.005)	-0.009 (0.007)	0.006 (0.005)
Distance to Capital X Year 11	0.064*** (0.015)	0.011* (0.007)	0.004 (0.005)	-0.009 (0.007)	0.007 (0.005)
Distance to Capital X Year 12	0.067*** (0.015)	0.013* (0.007)	0.003 (0.005)	-0.010 (0.007)	0.007 (0.005)
Distance to Brussels	0.229 (0.045)	0.077** (0.032)	-0.021 (0.022)	0.046*** (0.015)	-0.038*** (0.016)
Distance to Brussels X Year 2	-0.010 (0.062)	-0.031 (0.042)	-0.006 (0.030)	-0.005 (0.019)	-0.004 (0.022)
Distance to Brussels X Year 3	-0.014 (0.062)	-0.034 (0.042)	-0.007 (0.030)	-0.018 (0.019)	0.008 (0.022)
Distance to Brussels X Year 4	-0.025 (0.062)	-0.034 (0.042)	-0.019 (0.030)	-0.023 (0.019)	0.022 (0.022)
Distance to Brussels X Year 5	-0.033 (0.062)	-0.017 (0.042)	-0.024 (0.030)	-0.028 (0.019)	0.026 (0.022)
Distance to Brussels X Year 6	-0.043 (0.062)	-0.020 (0.042)	-0.019 (0.030)	-0.030 (0.019)	0.039 (0.022)
Distance to Brussels X Year 7	-0.058 (0.062)	-0.116*** (0.042)	-0.022 (0.030)	-0.031 (0.019)	0.034 (0.022)
Distance to Brussels X Year 8	-0.064 (0.062)	-0.124*** (0.042)	-0.012 (0.030)	-0.038* (0.019)	0.029 (0.022)
Distance to Brussels X Year 9	-0.071 (0.062)	-0.116*** (0.042)	-0.013 (0.030)	-0.034* (0.019)	0.030 (0.022)
Distance to Brussels X Year 10	-0.084 (0.062)	-0.135*** (0.042)	-0.013 (0.030)	-0.036* (0.019)	0.018 (0.022)
Distance to Brussels X Year 11	-0.094 (0.062)	-0.092*** (0.042)	-0.013 (0.030)	-0.035* (0.019)	0.017 (0.022)
Distance to Brussels X Year 12	-0.102 (0.062)	-0.104*** (0.042)	-0.016 (0.030)	-0.041** (0.019)	0.021 (0.022)
NOBS	156	300	276	264	276
R2	0.990	0.980	0.870	0.980	0.950

Data is arranged so that period 5 is the year of accession. Specification includes a full set of region and time effects which are not reported. Values in bracket are heteroscedasticity robust standard errors of the estimate. ***(**) (*) indicate significance at the 1% (5%) (10%) level, a) France excluding overseas territories.

Table 6: Regression Results: Dependent Variable $\ln(\text{Investments})$

	Greece	South	North	France ^{a)}	Italy & Denmark
Distance to Capital	-0.206*** (0.013)	-0.117*** (0.013)	0.133*** (0.007)	0.056*** (0.006)	-0.061*** (0.004)
Distance to Capital X Year 2	-0.000 (0.018)	0.001 (0.017)	0.009 (0.009)	0.001 (0.008)	0.004 (0.005)
Distance to Capital X Year 3	0.011 (0.018)	0.003 (0.017)	0.023** (0.009)	0.000 (0.008)	0.005 (0.005)
Distance to Capital X Year 4	0.015 (0.018)	0.007 (0.017)	0.027*** (0.009)	0.001 (0.008)	0.001 (0.005)
Distance to Capital X Year 5	0.041 (0.018)	0.013 (0.017)	0.027*** (0.009)	0.004 (0.008)	-0.003 (0.005)
Distance to Capital X Year 6	0.065 (0.018)	0.015 (0.017)	0.029*** (0.009)	-0.001 (0.008)	-0.008 (0.005)
Distance to Capital X Year 7	0.059*** (0.018)	0.014 (0.017)	0.028*** (0.009)	0.006 (0.008)	-0.007 (0.005)
Distance to Capital X Year 8	0.048*** (0.018)	0.012 (0.017)	0.025*** (0.009)	0.007 (0.008)	-0.012** (0.005)
Distance to Capital X Year 9	0.047** (0.018)	0.007 (0.017)	0.024*** (0.009)	0.000 (0.008)	-0.013*** (0.005)
Distance to Capital X Year 10	0.049*** (0.018)	0.002 (0.017)	0.023** (0.009)	0.004 (0.008)	-0.014*** (0.005)
Distance to Capital X Year 11	0.047** (0.018)	-0.004 (0.017)	0.021** (0.009)	-0.003 (0.008)	-0.016*** (0.005)
Distance to Capital X Year 12	0.040** (0.018)	-0.010 (0.017)	0.018** (0.009)	-0.004 (0.008)	-0.015*** (0.005)
Distance to Brussels	0.439*** (0.056)	1.804*** (0.081)	0.219*** (0.036)	0.061*** (0.018)	-0.030* (0.016)
Distance to Brussels X Year 2	-0.009 (0.077)	0.028 (0.108)	0.009 (0.048)	-0.019 (0.023)	0.002 (0.021)
Distance to Brussels X Year 3	-0.020 (0.077)	0.056 (0.108)	0.003 (0.048)	-0.034 (0.023)	0.006 (0.021)
Distance to Brussels X Year 4	-0.033 (0.077)	0.089 (0.108)	0.020 (0.048)	-0.056** (0.023)	0.014 (0.021)
Distance to Brussels X Year 5	-0.124 (0.077)	0.142 (0.108)	0.035 (0.048)	-0.044* (0.023)	0.014 (0.021)
Distance to Brussels X Year 6	-0.128 (0.077)	0.217** (0.108)	0.036 (0.048)	-0.042* (0.023)	0.012 (0.021)
Distance to Brussels X Year 7	-0.049 (0.077)	0.239** (0.108)	0.039 (0.048)	-0.030 (0.023)	0.005 (0.021)
Distance to Brussels X Year 8	-0.045 (0.077)	0.183* (0.108)	0.044 (0.048)	-0.024 (0.023)	0.009 (0.021)
Distance to Brussels X Year 9	-0.039 (0.077)	0.084 (0.108)	0.045 (0.048)	-0.045 (0.023)	0.012 (0.021)
Distance to Brussels X Year 10	0.011 (0.077)	-0.014 (0.108)	0.054 (0.048)	-0.022 (0.023)	0.003 (0.021)
Distance to Brussels X Year 11	-0.017 (0.077)	-0.151 (0.108)	0.066 (0.048)	-0.018 (0.023)	0.007 (0.021)
Distance to Brussels X Year 12	0.019 (0.077)	-0.265** (0.108)	0.066 (0.048)	-0.017 (0.023)	0.008 (0.021)
NOBS	156	300	276	264	276
R2	0.980	0.980	0.980	0.990	0.990

Data is arranged so that period 5 is the year of accession, Specification includes a full set of region and time effects which are not reported. Values in brackets are heteroscedasticity robust standard errors of the estimate. ***(**) (*) indicate significance at the 1% (5%) (10%) level, a) France excluding overseas territories.

Table 7: Results of difference in difference tests for integration effects

	Greece	Spain	North	France ^{a)}	Italy & Denmark
Dependent Variable: ln(wages)					
Post accession X distance to Capital	0.037** (0.017)	0.007 (0.007)	0.002 (0.004)	-0.007 (0.004)	0.004 (0.006)
Post accession X distance to Brussels	-0.057* (0.072)	-0.078* (0.042)	-0.004 (0.022)	-0.020* (0.010)	0.017 (0.024)
R2	0.36	0.16	0.04	0.28	0.07
Nobs	26	50	46	44	46
Dependent Variable: ln(Investment Expenditure)					
Post accession X distance to Capital	0.038** (0.016)	0.001 (0.015)	0.007* (0.004)	0.000 (0.007)	-0.013 (0.015)
Post accession X distance to Brussels	0.002 (0.069)	-0.021 (0.099)	0.037 (0.020)	0.002 (0.020)	0.001 (0.024)
R2	0.43	0.03	0.23	0.03	0.25
Nobs	26	50	46	44	46
Dependent Variable: ln(Employment)					
Post accession X distance to Capital	0.009 (0.006)	0.002 (0.003)	0.002 (0.002)	-0.003 (0.003)	0.001 (0.001)
Post accession X distance to Brussels	-0.016 (0.026)	-0.045** (0.018)	0.005 (0.010)	0.014 (0.009)	-0.002 (0.006)
R2	0.07	0.04	0.03	0.05	0.04
Nobs	364	700	644	616	644
Dependent Variable: ln(GVA)					
Post accession X distance to Capital	0.043*** (0.011)	-0.005 (0.007)	-0.003 (0.003)	-0.001 (0.006)	-0.003 (0.004)
Post accession X distance to Brussels	0.020 (0.046)	0.063 (0.042)	0.008 (0.017)	0.003 (0.016)	-0.020 (0.015)
R2	0.14	0.03	0.03	0.03	0.03
Nobs	364	700	644	616	644

Values in brackets are standard errors of the estimate ***(**) (*) indicate significance at the 1% (5%) (10%) level, a) France excluding overseas territories

NOTES

¹ Krugman and Livas (1992) and Fujita et al, (1999, Chapter 18) concentrate on this effect only. In their model a reduction in cross border transport costs unambiguously increases incentives for firms to locate far from the county's centre.

² Paluzie (2002) and Monfort and Nicolini (2000) present models, which incorporate both the market access and crowding effects when regions are equidistant from borders. In these models the effect of integration on location is ambiguous but centralisation is predicted for a wide range of parameters. By contrast, Crozet and Koenig-Souberain (2002 and 2004) and Brüllhart, Crozet, Koenig (2004) present models incorporating both effects when one region is closer to borders. In this model too the effect of integration on border regions is ambiguous, but a more favourable development of border regions is predicted for a wide range of parameters.

³ From a practical perspective in addition the effects of regional policy could also lead to shifts in the location of industry, unfortunately we have no data to identify the effects of regional policy, separately.

⁴ An interesting route is also followed by Redding and Sturm (2005) who find that cities closer to the border suffered population declines due to loss of market potential after the division of Germany after WWII and of a recovery after re-unification in 1990.

⁵ Aside from these two constellations both γ_1 and γ_2 could be positive or negative. These two cases represent intermediate cases, which to our knowledge have not been analysed in the theoretical literature. It is thus unclear under which parameter constellations (if

any) this situation could arise. Since none of our empirical results suggests significantly and equally signed γ_1 and γ_2 we leave this topic for further research.

⁶ Büttner and Rincke (2005) follow a similar approach by interacting period and border dummies.

⁷ For instance Boeri and Brücker (2001) analysing macro-economic indicators find significant employment and unemployment changes in accession countries starting around two years before the actual date of enlargement.

⁸ In an earlier version of this paper we also ran regressions on first differences of the variables, here too we found only small and mostly insignificant effects.

⁹ The results of these robustness checks are available from the author.

¹⁰ We exclude French overseas territories from the analysis.

¹¹ We do not include Germany because of lacking data for some indicators and because German – German integration in the 1990's may cause Germany to be a special case.

¹² Greece joined before the completion of the single European Act. Spain and Portugal joined in the year of the single European Act, and Northern enlargement occurred after treaty of Amsterdam was signed.

¹³ Agriculture is omitted from the analysis, since it is not considered a mobile sector.

¹⁴ The use of a pre- and post accession period is justified by our previous results, since we find few effects emerging before accession.

¹⁵ This second step involves defining a new set of variables ($\varpi_{i\tau}$) where $\varpi_{i1} = \sum_1^{s-1} \zeta_{is}$ and $\varpi_{i2} = \sum_s^T \zeta_{it}$ (with s the year of accession, T the last year in the observation period and ζ_{is} the residual of the first step regression) and estimating a regression of the form

$\bar{\omega}_{i\tau} = \phi_i + \varphi_\tau + \kappa_1 D * DB_i + \kappa_2 D * DB_i + v_{i\tau}$ with D a dummy for the time period after accession ϕ_i and φ_τ a set of region and time fixed effects and $v_{i\tau}$ an error term.

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