

An Empirical Analysis of the Regional Effects of European Integration

Peter Huber

Austrian Institute of Economic Research (WIFO)

Arsenal Objekt 20

1030 Wien

e-mail: huber@wifo.ac.at

Abstract This paper analyses the effects of three previous enlargements of the European Union on newly joining and old member states. We find that overall the effects of enlargements on regional employment, wage and population growth, as well as investment rates were small. We also find substantial heterogeneity between different accession episodes, stronger effects on wages than on employment and differences in long-term and medium term effects.

** Financial support from the fifth framework programme project AccessLab is grateful acknowledged. The Author would like to thank Thiess Büttner, Peter Mayerhofer, Gerhard Palme and Johannes Rincke for helpful comments. Andea Grabmayer, Andrea Hartmann and Maria Thalhammer provided valuable research assistance*

Introduction

In the public debate the net effects of integration on the regional distribution of economic activity remain disputed. This applies in particular to border regions. On the one hand, concerns are often voiced about potential negative wage and employment effects due to increased competitive pressures as well as capital and labour mobility. On the other hand, it has been repeatedly argued that integration alleviates the disadvantages of limited market access in border regions and should thus have particularly favourable effects on these regions.

Recent economic theories analysing the effects of integration on regional economies provide some basis for both arguments. Starting from the assumption that the economic geography of a country is shaped by centripetal and centrifugal forces, where centripetal forces may arise from the interaction of (internal or external) economies of scale and the aim of producers to economize on transport costs, while centrifugal forces arise from increasing costs of immobile factors in central locations, non-pecuniary negative externalities and/or higher competition and thus lower mark-ups among producers in the centre, these "new economic geography models" (see: Fujita et al, 1999) suggest that integration and trade liberalisation have two countervailing effects on regional economies.

On the one hand, as cross border transport costs fall, – which is a synonym for integration in these models, – market access to regions across the border improves. As a consequence of this "market access effect" (see: Otaviano and Robert-Nicoud, 2004), incentives to locate production in regions remote from the country's centre increase

even when regions are equidistant from the border. The reason for this is that as the foreign market becomes more accessible it becomes less important to locate near home market demand centres, and more attractive to serve the foreign market from a location, such as the periphery, with lower prices for immobile factors. In consequence employment, productivity and wage growth should increase in regions further away from a country's centre after integration and factor flows (i.e. investments and migration) to these regions should increase relative to the period before integration.¹

On the other hand, due to the fall in transport costs, competition from producers across the border will also increase. When regions are equidistant from the border this "market crowding" effect will *ceteris paribus* create incentives for firms to relocate to central locations in order to exploit productivity enhancing externalities in the centre. Thus increased concentration of economic activity (i.e. lower employment, wage and productivity growth as well as lower factor flows relative to the situation before integration) may be a consequence of integration.²

These issues become more involved when regions are not equidistant from the national border and thus may (as in the case of border regions) attain an advantage of market access to the foreign market relative to other regions as a consequence of integration.

¹ Krugman and Livas (1992) and Fujita et al, (1999, Chapter 18) formalize this "market access effect" by assuming that the centrifugal force arises from the immobility of land. In their model a reduction in cross border transport unambiguously increases incentives for firms to locate far from the country's centre.

² Paluzzie (2002) and Monfort and Nicolini (2000) present models, which incorporate both effects. In these the effect of integration on location is ambiguous but centralisation is predicted for a wide range of parameters.

Recently, Crozet and Koenig-Souberain (2002 and 2004) and Bruehlhart, Crozet, Koenig, (2004) present a model which treats this additional complication. The results indicate that for a large set of parameters the market access effect will dominate. This tendency may, however, be broken if the advantages of increased market access are small relative to the costs of increased competition from abroad, which may be the case when the market potential that can be reached from the external border region is small relative to the internal market potential, or if cost advantages of the border regions relative to the countries centre in accessing the foreign market is small (i.e. countries are small) or if the pre-existing centres in the countries are large in terms of relative demand.

Thus the central predictions of new economic geography models concerning the impact of integration on the regional structure of production are that depending on the relative strength of market access and market crowding effects, integration may lead to either increased concentration and a shift of production away from the border, or to increased decentralisation of production and a shift of production towards border regions.

Which of these tendencies prevails is an empirical issue. In consequence empirical estimates of regional integration effects are an important aspect of determining the relevance of these theories. Despite this insight, evidence on the effects of integration on border regions is rare.³ Among the exceptions Hanson (1996, 1998) uses the example of

³ Research concentrated on measuring border effects, on case studies of individual border regions, while there is little comparative work of regions in a country (see van Houtem, 2000 and Niebuhr and Stiller 2002 for surveys).

Mexico, to show that after trade liberalisation wages and employment increased more rapidly in Mexican regions closer to the border of the US. Hanson's analysis, however, concentrates on a particular case of integration of a developing country with one of the most highly developed countries in the world. Thus there is a need for testing the generality of these results in different institutional contexts. This has only been done in few cases only and results often contradict Hanson's. Hanson (1998a) reports much weaker effects of integration for Canada and the United States, Barjak and Heimpold (1999), Heimpold (2004) and Engel (1999) focus on investments and firm start-ups in the Polish – German border region and find no or only weak evidence of integration effects. Mayerhofer (2004) and Huber (2004) look at the effects of opening of Eastern Europe on Austrian border regions and find some evidence for small positive integration effects on employment growth, job creation and GDP per capita, but most other indicators used in these studies show no positive impact of integration. Finally, Büttner and Rincke (2005) find that German – German integration had negative effects on West German border regions.

In this paper we extend this literature to an analysis of the effects of EU integration on regional development both for existing as well as newly joining EU member states. This is important not only because it delivers additional insights on the generality of previous results, but also because with the enlargement of the European Union by 10 countries in May 2004 issues of the regional effects of integration have received renewed interest in the policy arena. The analysis of previous enlargements could help shape expectations in this debate.

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 employment, productivity, investments, as well as on wage and population growth 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 France⁴ as a neighbouring member state and in the case of Northern enlargement these are Denmark and Italy.⁵

These cases 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.⁶ In particular later entries

⁴ We exclude French overseas territories from the analysis.

⁵ 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.

⁶ The cases also differ from the US-Mexico case analysed by Hanson (1996, 1998). In contrast to this, European integration allowed for increased cross border labour mobility and new member states were often small, developed countries.

joined a successively more integrated European Union.⁷ While this would suggest more sizeable effects of integration in later accessions, Northern Enlargement also differs from previous enlargements in that the countries joining the European Union 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 that effects of integration may have been smaller.

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 have implications on results because as noted by Büttner and Rincke (2004), if cross – border migration is allowed benefits from integration could potentially concentrate on only one side of the border.

Finally, these integration cases also 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 Unions average and Finland approached this level). This implies that the market potential of the European Union was larger relative to the domestic market potential in Southern Enlargement and Enlargement by Greece than in Northern

⁷ 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.

Enlargement. 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: 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

Similar observations apply to the potential cost advantages of locating nearer to the border. Many of the acceding countries analysed in this paper were small in terms of area. Thus one would expect relatively low effects on border regions. 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 market access effect in this integration was limited.

Due to this heterogeneity we do not pool data across countries, but analyse each case separately by focusing on five variables: employment growth, productivity growth, wage growth, investments and immigration. We measure employment growth as the change of the log of average annual employment, wage growth as the change in average log compensation per employee in a region, and investment rates as investment

expenditure in % of gross value added. Furthermore as a proxy for migration we use population growth as the log change in working age population in a region.⁸ The structure of these data differ somewhat for some of these indicators. For employment and productivity growth we have available indicators for each region for a total of 14 industries, while for population, investments and wages, we only have available regional averages across all sectors.⁹

Table 2: Descriptive Statistics for dependent Variables

		T (N) ¹⁾	Employment Growth ³⁾	Productivity Growth ³⁾	Investment Rate ²⁾	Wage Growth ³⁾	Population growth ³⁾
Greece	Before	5 (13)	0.0195 (0.0586)	0.0622 (0.1026)	-1.4617 (0.0824)	0.2227 (0.0311)	0.0016 (0.0176)
	After	7 (13)	-0.0018 (0.1568)	0.0143 (0.1962)	-1.7096 (0.1010)	0.1948 (0.0523)	0.0103 (0.0064)
Southern Enlargement	Before	5 (25)	-0.0086 (0.0882)	0.0049 (0.1540)	-1.7195 (0.5360)	0.0685 (0.0670)	0.0092 (0.0097)
	After	7 (25)	0.0147 (0.1484)	0.0178 (0.1714)	-1.5587 (0.4717)	0.0945 (0.0627)	0.0053 (0.0213)
Northern Enlargement	Before	5 (23)	-0.0027 (0.0603)	0.0218 (0.1039)	-1.5953 (0.1664)	0.0272 (0.0648)	0.0051 (0.0062)
	After	7 (23)	0.0023 (0.0484)	0.0219 (0.0675)	-1.5812 (0.1189)	0.0305 (0.0374)	0.0028 (0.0069)
France	Before	5 (22)	-0.0003 (0.0433)	0.0236 (0.0709)	-1.6392 (0.0417)	0.0690 (0.0286)	0.0112 (0.0033)
	After	7 (22)	-0.0020 (0.0353)	0.0201 (0.0861)	-1.5628 (0.0465)	0.0532 (0.0176)	0.0035 (0.0037)
Italy and Denmark	Before	5 (23)	-0.0011 (0.0694)	0.0257 (0.1230)	-1.6018 (0.0715)	0.0507 (0.0420)	0.0023 (0.0044)
	After	7 (23)	0.0047 (0.0362)	0.0160 (0.0587)	-1.5518 (0.0720)	0.0463 (0.0495)	0.0003 (0.0082)

Note: Table displays unweighted means across regions, 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. 2) logged investments relative to GDP 3) Variables are measured in log differences. Excluding French overseas territories.

⁸⁾ We use first differences since prior testing suggests variables in levels are integrated but first differences are not, and because differencing removes any effects on the indicators arising from region fixed effects such as may be due to amenities or abundance of natural resources.

⁹⁾ Agriculture is omitted from the analysis, since it is not considered a mobile sector.

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 that integration did not significantly change aggregate economic growth within countries. Performing tests for the equality of means in the two periods, we cannot reject the null of equal employment, wage, population and productivity growth as well as investment rates before and after accession for any of the accessions analysed. Furthermore, the table also suggests substantial variance in the regional growth and investment rates among regions both before as well as after integration.

Empirical Framework

The central concern of this paper is with this regional variance. We want to see whether, integration either had an effect on regions nearer to the border or led to decentralisation of production in the newly joining as well as the nearby old member states. This would be the case if border regions or regions more distant from the country centre experienced higher employment, productivity and wage growth as well as higher investments and immigration, relative to other regions in the time period after integration. We thus follow Hanson (1998) and estimate regressions of the form:

$$Y_{it} = \alpha + \beta_1 * DB_i + \beta_2 * DC_i + \gamma_1 * AC_i * DB_i + \gamma_2 * AC_i * DC_i + \lambda Z_{it} + \zeta_{it} \quad (1)$$

for each accession analysed. In this regression Y_{it} is an indicator measuring factor flows or economic activity in a region, DB_i is the (log) distance to Brussels, DC_i the (log) distance to the countries capital, where both are measured as the crows fly distance to the respective NUTSII regions's capital, AC_i is a dummy variable which takes on the value 1 if the year under consideration lies after the accession of the respective country.

Z_{it} is a vector of potential further explanatory variables, which in our baseline specification are a family of industry as well as industry -time fixed effects where applicable.¹⁰

For the neighbouring countries (i.e. France, Italy, Denmark) considered we run analogous regressions, where DB_i is 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) and all other variables are defined equivalently to above.

In equation (1) a necessary condition for significant integration effects is that the parameters γ_1 and γ_2 differ significantly from zero. If γ_1 is positive, regions further away from Brussels (or the acceding country's capital) experienced an increase in employment wage, productivity and population growth or investment rates relative to regions closer to the border. This would indicate that reallocation took place away from border regions. If by contrast the coefficient is negative, this implies that border regions experienced a better development. If γ_2 is significantly negative this would indicate, that integration resulted in a decentralisation of production away from the countries centre, while in the opposite case centralisation would be indicated.

There are a number of methodological problems that may be expected to arise in the context of a regression such as shown in equation (1). First, shocks to one region or industry may have effects on other regions or industries, which would imply cross

¹⁰ The inclusion of region effects is precluded because the distance variables are time invariant. We also experimented with the inclusion of region-sector dummy variables. These proved to be jointly insignificant. Thus they were excluded to avoid overparametrisation.

sectional dependence in the error terms. Second, some of the variables in our regressions are measured at different levels of aggregation, this applies in particular to all regressions where industry-region information is utilized. In these distance is measured at the regional level only. As pointed out amongst others by Blien (1996) this will induce some cross sectional dependence in error terms by definition. Third, as recently shown by Bertrand, Duflo and Mullainathan (2004) in the context of difference-in-difference estimates, equation (1) may yield autocorrelation in error terms. In consequence we estimate variance-covariance matrices which are robust to both serial as well as spatial autocorrelation by applying the method proposed by Driscoll and Kraay (1998).¹¹

A further complication arises from the fact that significance of estimated coefficients in the regression represent a necessary but not sufficient condition for integration to have had an effect of the regional structure of production. This paired with the substantial uncertainty concerning the time period within which the integration effects may be identified¹² makes it difficult to establish causality in the specified regression. Again this point has been made in the literature on difference in difference estimation (see

¹¹) This is an extension of the variance-covariance estimator developed in Newey and West (1987) which is consistent irrespective of the form of cross-sectional dependence provided of the autocorrelation of the error term gets smaller at longer lags. It requires that the lag length for the residuals be determined ex ante. We use a lag length of one in all results below although results are robust to increasing this to two. Driscoll and Kraay (1998) present simulations, which yield reliable results for data of the size we use.

¹²) It has for instance been argued (see Boeri and Brücker, 2001) that the effects of integration may have been felt prior to enlargement as economic actors foresaw the development.

Angrist and Krueger, 1999). We tackle this problem by extensively checking on the robustness of our results. In our baseline specification we focus on a period of 5 years before integration and 7 years after and estimate both equation (1) and an additional specification, in which we interact distance to the border and distance to the capital city with year dummies to analyse to what degree there is a robust relationship between the estimated coefficients. Furthermore, we also extend the regression results to the complete observation horizon available to us (i.e. 1975 to 2000)

Results

Table 3 presents results concerning the regional effects of integration on employment growth in both acceding countries as well as nearby old member states. The top panel (entitled total employment growth) presents results when estimating equation (1) for all sectors. We find only very weak evidence to support the view that European integration had any effect on the regional distribution of employment growth in the acceding countries. The interaction of the dummy variable for the time period after accession and distance to Brussels is negative (thus indicating more rapid growth in regions closer to the border), but remains insignificant for all cases studies. The evidence on the concentration of production by contrast suggests significantly higher concentration was a result of integration in the case of Southern Enlargement only, while all other coefficients also remain insignificant.

Table 3: Regression Results for Sectoral Employment Growth

	Distance to Brussels	Distance to Capital	Accession X Distance to Brussels	Accession X Distance to Capital	Number of Observations (R ²)
Total Employment Growth					
Greece	0.0222*** (0.0034)	-0.0036*** (0.0005)	-0.0085 (0.0066)	0.0017 (0.0015)	2184 (0.592)
Southern Enlargement	-0.0002 (0.0069)	-0.0005 (0.0007)	-0.0196 (0.0205)	0.0024** (0.0012)	4200 (0.142)
Northern Enlargement	0.0019 (0.0067)	0.0008 (0.0007)	-0.0045 (0.0072)	-0.0007 (0.0008)	3864 (0.238)
France	-0.0009 (0.0006)	-0.0001 (0.0010)	0.0025 (0.0040)	-0.0003 (0.0012)	3696 (0.354)
Italy and Denmark	0.0013 (0.0020)	0.0001 (0.0003)	-0.0020 (0.0031)	0.0001 (0.0004)	3864 (0.164)
Manufacturing Employment Growth					
Greece	0.0218*** (0.0042)	-0.0030*** (0.0006)	-0.0144 (0.0105)	0.0027 (0.0024)	1248 (0.578)
Southern Enlargement	0.0035 (0.0098)	-0.0010 (0.0011)	-0.0168 (0.0271)	0.0023** (0.0012)	2400 (0.107)
Notrthern Enlargement	-0.0041 (0.0112)	0.0017 (0.0017)	-0.0031 (0.0116)	-0.0013 (0.0017)	2208 (0.203)
France	-0.0006 (0.0018)	-0.0004 (0.0019)	0.0024 (0.0077)	-0.0008 (0.0022)	2112 (0.278)
Italy and Denmark	0.0006 (0.0027)	-0.0006 (0.0005)	-0.0011 (0.0047)	0.0006 (0.0007)	2484 (0.141)
Service Employment Growth					
Greece	0.0229*** (0.0059)	-0.0044*** (0.0008)	-0.0006 (0.0062)	0.0003 (0.0010)	936 (0.571)
Southern Enlargement	-0.0052 (0.0084)	0.0000 (0.0003)	-0.0232 (0.0237)	0.0025 (0.0020)	1800 (0.195)
Northern Enlargement	0.0099*** (0.0014)	-0.0003 (0.0013)	-0.0065** (0.0035)	0.0001 (0.0013)	1656 (0.229)
France	-0.0013 (0.0017)	0.0013 (0.0002)	0.0021 (0.0035)	-0.0012*** (0.0003)	1584 (0.509)
Italy and Denmark	0.0025 (0.0038)	0.0005 (0.0009)	-0.0026 (0.0038)	-0.0005 (0.0010)	1656 (0.286)

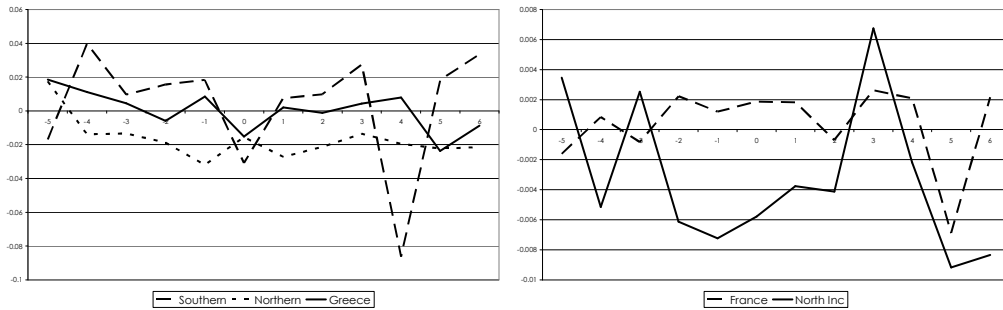
Note: All regression include sector and sector-time dummies. Values in brackets are (heteroskedasticity serial and spatial correlation robust) standard errors (see: Driscoll and Kray, 1998) *, **, *** signify significance at the 10% (5%) (1%) level. For France distance to Madrid is replaces distance to Brussels, For the nearby Member States in Northern Enlargement in Italy distance to Vienna, Denmark distance to Stockholm is used as the distance to the nearest capital of a joining country. Excluding French overseas territories

This finding is reconfirmed both when focusing exclusively on manufacturing or service employment growth. Concerning manufacturing employment growth (in the second panel of table 3), we again find that regions nearer to Brussels experienced larger manufacturing employment growth in all acceding countries and the existing member states except for France. This effect is, however, insignificant. Significant concentration

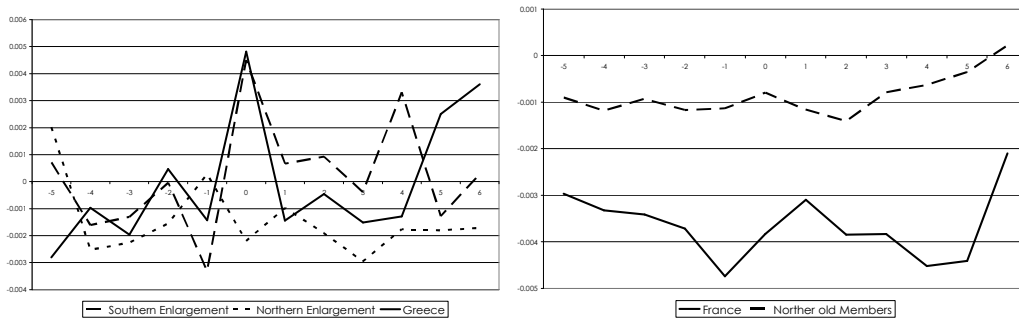
can once more only be found for Southern Enlargement. For services (see panel 3 of table 3) the coefficient for the accession and distance to Brussels interaction as well as the distance to capital interaction is insignificant in most cases. The only exceptions are Northern Enlargement where service employment grew significantly more rapidly in regions closer to the border after integration and France where regions further away from the capital experienced more rapid service employment growth after integration.

Figure 1: Coefficients of interaction terms between years and distance to Brussels and year and distance to capital in total employment growth regressions

a) Years and distance to Brussels interaction



b) Years and distance to capital interaction



Note: Figures displays coefficients of a regression as displayed in equation (1) but replacing $Act*DBi$ variable with year * distance to capital as well as the $Act*DCi$ variable with year * distance to brussels interaction dummy variables.

Finally, when considering the results of year by year regressions (in Figure 1) no general pattern emerges. Coefficients of total employment growth, fluctuate substantially over time periods, are insignificant and comparable in magnitude both before and after accessions

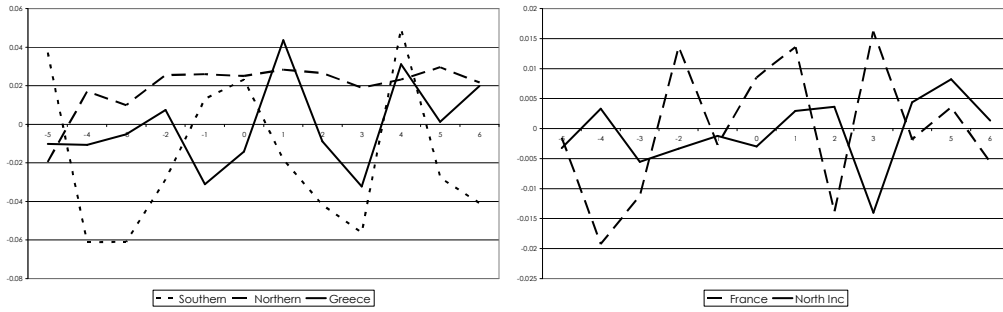
Table 4: Regression Results for Sectoral Productivity Growth

	Distance to Brussels	Distance to Capital	Accession X Distance to Brussels	Accession X Distance to Capital	Number of Observations (R ²)
Total Productivity Growth					
Greece	-0.0182***	0.0122***	0.0137	-0.0078**	2184
	0.0074	0.0028	0.0134	0.0036	0.475
Southern Enlargement	0.0096	0.0002	0.0115	-0.0019	4200
	0.0195	0.0007	0.0256	0.0025	0.235
Northern Enlargement	-0.0039	-0.0001	0.0091	-0.0015**	3864
	0.0063	0.0005	0.0065	0.0007	0.201
France	-0.0055	-0.0003	0.0069	0.0008	3696
	0.0068	0.0008	0.0082	0.0018	0.204
North inc	-0.0025	0.0004	0.0003	-0.0012	3864
	0.0014	0.0015	0.0029	0.0016	0.243
Manufacturing Productivity Growth					
Greece	-0.0182***	0.0084***	0.0020	0.0001	936
	0.0055	0.0020	0.0080	0.0036	0.656
Southern Enlargement	0.0100	0.0000	0.0085	-0.0023	1800
	0.0080	0.0007	0.0227	0.0026	0.220
Notrthern Enlargement	-0.0059	0.0011	0.0055	-0.0020	1656
	0.0042	0.0014	0.0055	0.0015	0.172
France	0.0014	0.0010	-0.0028	-0.0004	1584
	0.0033	0.0014	0.0058	0.0023	0.485
North inc	-0.0027	0.0003	0.0011	-0.0009	1656
	0.0033	0.0007	0.0036	0.0009	0.317
Service Productivity Growth					
Greece	-0.0182***	0.0150***	0.0225	-0.0136***	1248
	0.0108	0.0043	0.0234	0.0048	0.433
Southern Enlargement	0.0093	0.0004	0.0138	-0.0015	2400
	0.0338	0.0015	0.0399	0.0028	0.231
Notrthern Enlargement	-0.0024	-0.0011	0.0118	-0.0011	2208
	0.0088	0.0012	0.0091	0.0014	0.155
France	-0.0108	-0.0014	0.0126	0.0016	2112
	0.0157	0.0020	0.0173	0.0026	0.149
Italy	-0.0012	0.0003	-0.0018	-0.0009	2484
	0.0037	0.0030	0.0053	0.0031	0.224

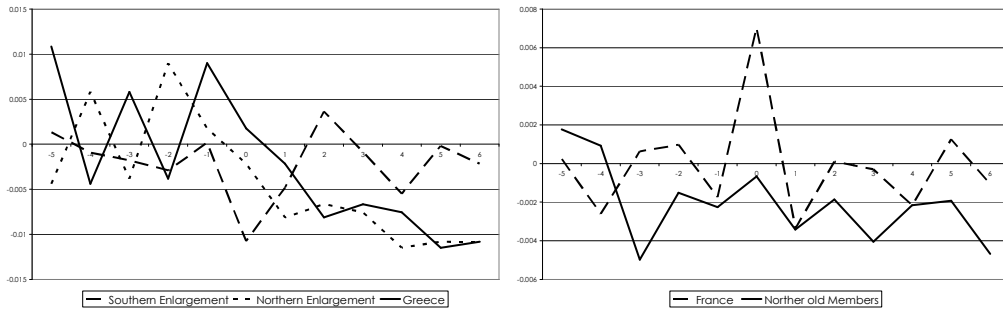
Note: All regression include period, sector and sector –time dummies. Values in brackets are (heteroskedasticity serial and spatial correlation robust) standard errors (see Driscoll and Kray, 1998) *, **, *** signify significance at the 10% (5%) (1%) level. For France distance to Madrid is replaces distance to Brussels. For the nearby Member States in Northern Enlargement in Italy distance to Vienna, Denmark distance to Stockholm is used as the distance to the nearest capital of a joining country

Figure 2: Coefficients of interaction terms between years and distance to Brusells and year and distance to capital in total productivity growth regressions

a) Years and distance to Brusells interaction



b) Years and distance to capital interaction



Note: Figures displays coefficients of a regression as displayed in equation (1) but replacing Act*DBi variable with year * distance to capital as well as the Act*DCi variable with year * distance to brussels interaction dummy variables.

Results for sectoral productivity growth (see table 4) also suggest rather mild implications of integration of on the regional structure of productivity. In particular coefficients on the interaction of the dummy variable for accession and distance to Brussels are insignificant for all cases and all sectors analysed – although they are positive in general and thus have the opposite sign as in the employment growth regressions. Furthermore, the coefficient for the interaction of the dummy for the period after accession and the distance to the capital city indicate significant deconcentration in the case of Greece and Northern Enlargement (i.e. those cases where no concentration was found in employment growth).

Year and distance to Brussels interaction terms reconfirm this result. They are highly inrobust and provide little additional insights. Year and distance to capital interaction

terms, however, show a clear pattern in the case of Northern Enlargement and Greece only (i.e. the cases where coefficients are significant in table 4). In these cases they start falling (indicating increased productivity growth in regions further away from the capital) the year (Northern Enlargement) or the year before (Southern Enlargement) integration and then settle at a lower level two years after integration.

Results this far thus suggest that the link between regional employment growth and integration has been substantially weaker in the EU than in the US-Mexico case analysed in Hanson (1998). The evidence presented in tables 3 and 4, however, also suggests that geography played only a minor role in shaping employment growth prior to accession in any of the countries analysed. Both the coefficients on the distance to Brussels as well as the distance to the capital are insignificant in the majority of the cases. Interestingly, the coefficient on distance to Brussels is significantly positive and that on the distance to the capital city negative for all regressions for the case of Greece. Thus in Greece regions further from Brussels and closer to the capital cities showed higher employment growth in both manufacturing and services throughout the period analysed.

Table 5: Regression results concerning aggregate Investments, Population Growth and Wage Growth

	Distance to Brussels	Distance to Capital	Accession X Distance to Brussels	Accession X Distance to Capital	constant	Number of Observations (R ²)
Population Growth						
Greece	0.0100*** 0.0031	- 0.0055*** 0.0003	-0.0040*** 0.0007	0.0053*** 0.0005	-0.0381 0.0241	156 0.428
Southern Enlargement	0.0014 0.0010	-0.0001 0.0000	-0.0002 0.0009	-0.0003 0.0002	-0.0020 0.0088	300 0.014
Northern Enlargement	0.0024** 0.0009	0.0003** 0.0001	0.0001 0.0001	-0.0004 0.0002	-0.0177 0.0075	276 0.094
France	0.0002 0.0002	0.0004*** 0.0001	-0.0006*** 0.0001	-0.0003 0.0001	0.0066 0.0019	264 0.546
North incumb	-0.0002 0.0005	0.0000 0.0004	-0.0002 0.0005	0.0000 0.0005	0.0036 0.0030	276 0.018
Wage Growth						
Greece	-0.0083 0.0022	0.0071 0.0004	-0.0014 0.0029	-0.0021*** 0.0009	0.2355 0.0162	156 0.157
Southern Enlargement	-0.0112 0.0118	0.0004 0.0010	0.0020 0.0051	0.0011 0.0016	0.1614 0.1051	300 0.040
Northern Enlargement	-0.0028 0.0032	0.0011 0.0008	0.0018 0.0028	-0.0016*** 0.0008	0.0427 0.0186	276 0.045
France	-0.0042** 0.0019	0.0003 0.0007	0.0003 0.0014	-0.0023*** 0.0009	0.1024 0.0175	264 0.117
North incumb	0.0013 0.0028	0.0014*** 0.0004	0.0008 0.0028	-0.0015 0.0011	0.0296 0.0289	276 0.766
Investment Rate						
Greece	-0.0133 0.0141	0.0036 0.0031	-0.0434*** 0.0086	0.0145*** 0.0030	-1.3800 0.0921	165 0.663
Southern Enlargement	0.5131*** 0.0937	0.0333*** 0.0056	0.0289 0.0205	-0.0117 0.0126	-6.3579 0.7946	300 0.321
Northern Enlargement	0.0095* 0.0055	0.0010 0.0036	0.0004 0.0073	0.0016 0.0034	-1.6841 0.0747	276 0.065
France	-0.0116*** 0.0034	0.0026*** 0.0005	0.0097*** 0.0045	-0.0010 0.0013	-1.5592 0.0178	264 0.427
North incumb	-0.0090** 0.0047	0.0043*** 0.0021	0.0140*** 0.0054	-0.0091*** 0.0025	-1.5586 0.0436	276 0.142

Note: Values in brackets are (heteroskedasticity serial and spatial correlation robust) standard errors (see Driscoll and Kray (1998) *, **, *** signify significance at the 10% (5%) (1%) level. For France distance to Madrid is replaces distance to Brussels, For the nearby Member States in Northern Enlargement in Italy distance to Vienna, Denmark distance to Stockholm is used as the distance to the nearest capital of a joining country

In Table 5 we focus on population growth - which we employ as proxy for migration flows - and regional wage growth as well as investment rates. Although these indicators are not available at a sectoral level, the results in general support the hypothesis of at most modest effects of integration on regional development in European integration.

For wage growth we find no significant effects of integration on regions closer to the border and for population growth effects are insignificant (although negatively signed) in all countries but Greece and France. This suggests that some migration in the direction of border regions occurred after integration in these two countries. We, however, find that in both cases analysed regions nearer to the borders of newly joining countries in the nearby old member states experienced a decline in relative investment rates in both cases analysed.

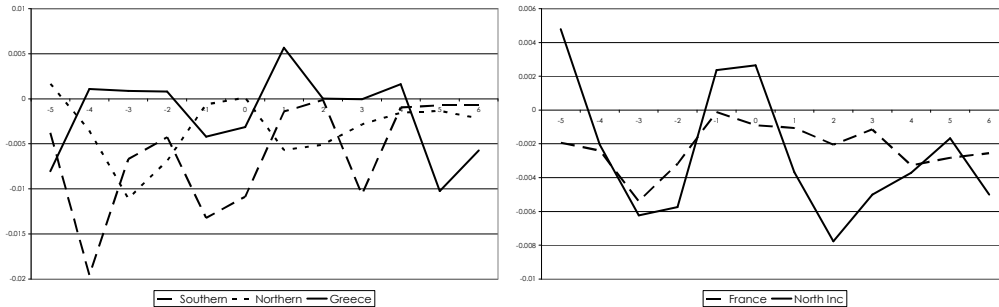
Enlargement also had a more important effect on the distribution of wages between centres and peripheral regions than on border regions. Wage growth in regions further away from the capital significantly increased in enlargement by Greece and Northern Enlargement as well as in France. Effects concerning other indicators, however, seem to be limited to individual cases. We find increased concentration of population growth after Enlargement in Greece and deconcentration in investments but increased concentration in population growth for the nearby old member states in Northern Enlargement.

Finally, in contrast to the employment growth regressions, location explains a substantial part of the variance in population growth as well as for investment rates. In particular regions both nearer to the capital city and closer to Brussels had higher wage growth already prior to enlargement. Furthermore, in Southern Enlargement regions both closer to the capital and Brussels experienced higher investment rates. With respect to other indicators analysed there seems to be substantial heterogeneity in outcomes. In Southern Enlargement regions both closer to the capital and Brussels had higher investment rates throughout, while in France regions further from the capital city experienced higher population growth and regions both closer to Madrid and further

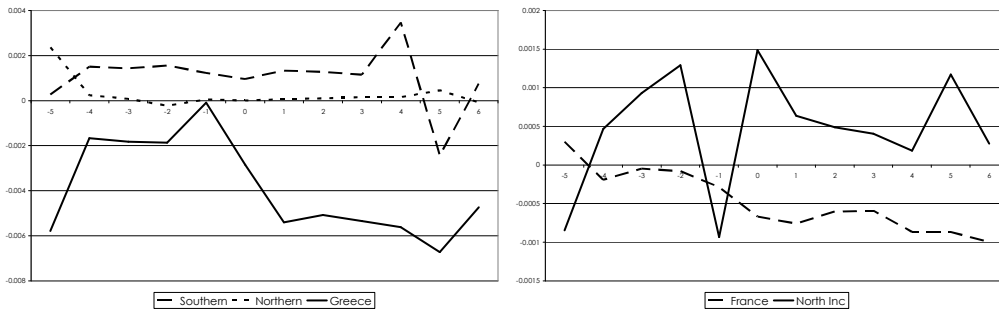
from the national capital had higher investment rates. For Northern Enlargement population growth was significantly higher in regions far from the capital.

Figure 3: Coefficients of interaction terms between years and distance to Brussels and year in wage growth, population growth and investment rate regressions

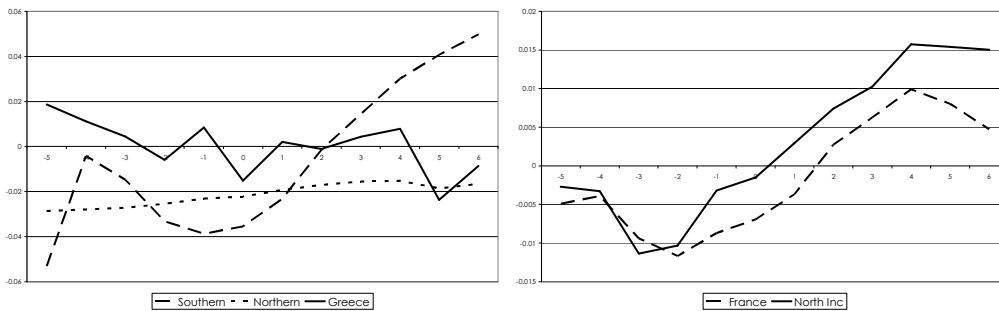
a) Wages



b) Population



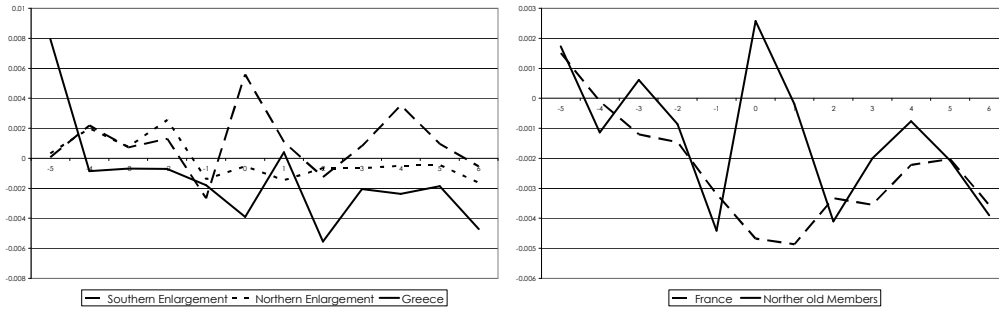
c) Investment rate



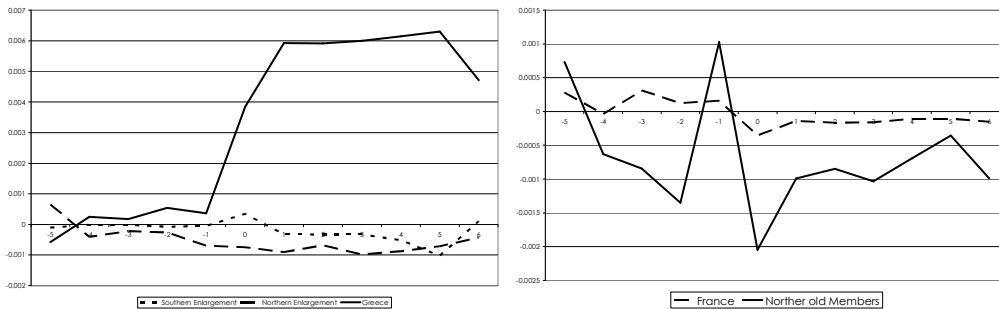
Note: Figure displays coefficients of a regression as displayed in equation (1) but replacing Act*DBi variable with year * distance to capital as well as the Act*DCi variable with year * distance to brussels interaction dummy variables.

Figure 4: Coefficients of interaction terms between years and distance to capital and year in wage growth, population growth and investment rate regressions

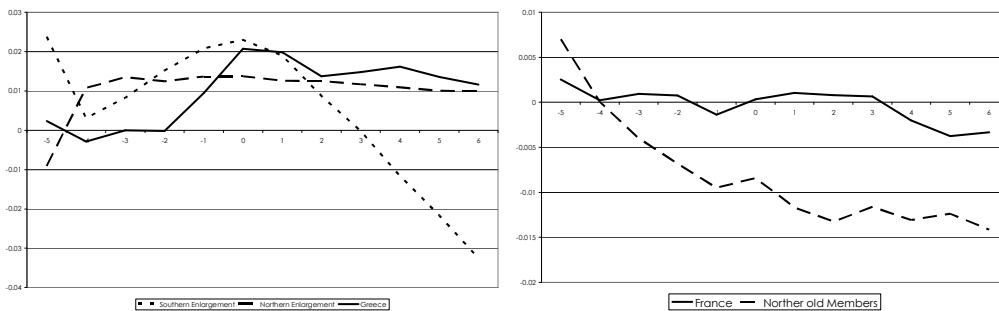
a) Wages



b) Population



c) Investment rate



Note: Figure displays coefficients of a regression as displayed in equation (1) but replacing Act*DBi variable with year * distance to capital as well as the Act*DCi variable with year * distance to brussels interaction dummy variables.

Comparing these results to the year by year development (see Figures 3 and 4) suggests that some of these effects can be attributed to enlargement. Relative investment rates started rising in regions further from the capital one year before enlargement and then increased over the complete estimation period in the nearby old member states. The evidence in Figure 3 also provides some additional insight in that similar patterns to the

nearby old member states concerning investment rates can also be found in Southern Enlargement. By contrast findings on the cases where relative population growth increased in the border regions (i.e. enlargement by Greece and old member states in Northern Enlargement), suggest a much less clear pattern in the development of coefficients.

By contrast, results on the development of the interaction of year dummies with distance to the capital indicate that in cases where coefficients are significant this effect may not be due entirely to enlargement. In particular in the case of wages both the significant effects in enlargement by Greece and in the nearby old member states in Northern Enlargement are due to a more long run increase in relative wage growth in regions further away from the border. Similar arguments apply to the development of investment rates of nearby old member states of Northern Enlargement.

Results for total period

In tables 6 to 8 we show results of specifications in which we lengthen the estimation period to the complete observation period available to us (i.e. to the time period 1975 – 2000). As previously for employment growth (table 6) integration had predominantly, insignificant effects on relative employment growth and productivity growth in regions closer to Brussels and a significant negative effect on concentration in Southern Enlargement only. Also in the case of productivity growth regressions (see table 7) we find a similar pattern of significance as when analysing the shorter time period. The only deviation from previous results is that in France a marginally significant deconcentration of service sector employment growth is found.

Table 6: Regression Results for Sectoral Employment Growth

	Distance to Brussels	Distance to Capital	Accession X Distance to Brussels	Accession X Distance to Capital	Number of Observations (R ²)
Total Employment Growth					
Greece	0.0222*** 0.0034	-0.0036*** 0.0005	-0.0120 0.0274	0.0018 0.0041	4914 0.211
Southern Enlargement	-0.0059 0.0064	-0.0002 0.0005	-0.0022 0.0113	0.0022** 0.0013	8750 0.204
Northern Enlargement	0.0001 0.0022	0.0002 0.0003	-0.0027 0.0031	-0.0001 0.0004	8694 0.254
France	0.0017 0.0013	0.0011*** 0.0003	-0.0008 0.0019	-0.0004 0.0007	8316 0.456
Italy	0.0003 0.0020	0.0004 0.0008	-0.0007 0.0033	-0.0006 0.0009	7560 0.206
Denmark	-0.0107*** 0.0042	0.0005 0.0005	0.0047 0.0072	-0.0006 0.0006	1134 0.879
Manufacturing Employment Growth					
Greece	0.0229*** 0.0059	-0.0044*** 0.0008	-0.0093 0.0213	0.0019 0.0035	2808 0.229
Southern Enlargement	-0.0106* 0.0068	0.0001 0.0003	-0.0030 0.0137	0.0008 0.0011	5000 0.189
Northern Enlargement	0.0042*** 0.0016	-0.0004 0.0004	-0.0008 0.0035	0.0001 0.0006	4968 0.252
France	0.0009 0.0020	0.0008 0.0005	0.0005 0.0034	0.0001 0.0012	4752 0.352
Italy	0.0002 0.0025	0.0007 0.0010	-0.0001 0.0048	-0.0013 0.0011	4860 0.161
Denmark	-0.0145** 0.0058	0.0004 0.0007	0.0100 0.0104	-0.0003 0.0009	729 0.801
Service Employment Growth					
Greece	0.0218*** 0.0042	-0.0030*** 0.0006	-0.0141 0.0335	0.0017 0.0048	2106 0.194
Southern Enlargement	-0.0024 0.0079	-0.0005 0.0008	-0.0016 0.0147	0.0033* 0.0025	3750 0.170
Northern Enlargement	-0.0030 0.0034	0.0006 0.0006	-0.0041 0.0043	-0.0002 0.0008	3726 0.239
France	0.0027*** 0.0003	0.0014*** 0.0002	-0.0024** 0.0013	-0.0010*** 0.0003	3564 0.586
Italy	0.0010 0.0028	0.0002 0.0009	-0.0011 0.0029	-0.0001 0.0010	3240 0.281
Denmark	-0.0058* 0.0034	0.0001 0.0004	0.0001 0.0047	-0.0009* 0.0006	486 0.897

Note: All regression include period, sector and sector-time dummies. Values in brackets are (heteroskedasticity serial and spatial correlation robust) standard errors (see Driscoll and Kray (1998) *, **, *** signify significance at the 10% (5%) (1%) level. For France distance to Madrid is replaces distance to Brussels, For the nearby Member States in Northern Enlargement in Italy distance to Vienna, Denmark distance to Stockholm is used as the distance to the nearest capital of a joining country

Table 7: Regression Results for Sectoral Productivity Growth

	Distance to Brussels	Distance to Capital	Accession X Distance to Brussels	Accession X Distance to Capital	Number of Observations (R ²)
Total Productivity Growth					
Greece	-0.0182 0.0074	0.0122 0.0028	0.0132 0.0287	-0.0111 0.0054	4914 0.339
Southern Enlargement	0.0076 0.0126	-0.0003 0.0006	0.0023 0.0150	-0.0017 0.0016	8750 0.236
Northern Enlargement	-0.0023 0.0047	-0.0012 0.0005	0.0075 0.0051	-0.0004 0.0007	8694 0.270
France	-0.0026 0.0093	0.0016 0.0013	0.0010 0.0096	-0.0018 0.0015	8316 0.300
Italy	-0.0007 0.0021	-0.0001 0.0009	-0.0023 0.0037	-0.0002 0.0012	7560 0.396
Manufacturing Productivity Growth					
Greece	-0.0182 0.0055	0.0084 0.0020	0.0124 0.0208	-0.0045 0.0043	2106 0.431
Southern Enlargement	0.0104 0.0076	-0.0003 0.0006	0.0003 0.0126	-0.0007 0.0014	3750 0.237
Notrthern Enlargement (1995)	-0.0055 0.0050	-0.0002 0.0007	0.0051 0.0060	-0.0006 0.0009	3726 0.317
France	-0.0058 0.0040	0.0004 0.0004	0.0040 0.0045	0.0002 0.0008	3564 0.566
Italy	-0.0016 0.0029	-0.0006 0.0009	0.0004 0.0033	-0.0001 0.0011	3240 0.328
Service Productivity Growth					
Greece	-0.0182 0.0108	0.0150 0.0043	0.0139 0.0369	-0.0161 0.0071	2808 0.320
Southern Enlargement	0.0056 0.0211	-0.0004 0.0011	0.0038 0.0242	-0.0025 0.0029	5000 0.234
Northern Enlargement	0.0010 0.0070	-0.0023 0.0008	0.0035 0.0083	0.0005 0.0011	4968 0.195
France	-0.0003 0.0135	0.0025 0.0021	-0.0012 0.0142	-0.0034 0.0024	4752 0.236
Italy	-0.0004 0.0027	0.0000 0.0014	-0.0039 0.0050	0.0004 0.0018	4860 0.367

Note: All regression include period, sector and sector -time dummies. Values in brackets are (heteroskedasticity serial and spatial correlation robust) standard errors (see Driscoll and Kray (1998) *, **, *** signify significance at the 10% (5%) (1%) level. For France distance to Madrid is replaces distance to Brussels, For the nearby Member States in Northern Enlargement in Italy distance to Vienna, Denmark distance to Stockholm is used as the distance to the nearest capital of a joining country

Results concerning wage growth, population growth and investment rate regressions, however, deviate somewhat from previous findings. In particular when lengthening the observation horizon to the complete time period, we find somewhat more significant effects of integration on the regions closer to Brussels concerning wage growth and investments. Regions closer to Brussels experienced significantly larger wage growth

and investments after enlargement. (The coefficients are now significant or at least on the verge of significance in all cases but that of Northern Enlargement¹³ for wage growth and all nearby member states in the case of investment rates.) This suggests that wage and investment reactions in the face of accession may be more long run than covered by our original estimation period.

For the previously old member states by contrast, our evidence suggests that the market access effect was weaker than the market crowding effect. We find significant increases in investment rates in regions further away from the border in all cases for the newly joining countries.

At the same time focusing on the more long run developments reconfirms the finding that integration aside from having long run effects on regions closer to the border also led to some effects on concentration and deconcentration. In general these effects are found for the same cases as when focusing on short run developments. The exception to this, however, investment rates in Southern and Northern enlargement.

¹³ This may however be attributed to the fact that in this accession we have a very short observation horizon after integration.

Table 8: Regression results concerning aggregate Investments, Population Growth and Wage Growth

	Distance to Brussels	Distance to Capital	Accession X Distance to Brussels	Accession X Distance to Capital	Constant	Number of Observations (R ²)
Population Growth						
Greece	0.00495*	-0.00513***	-0.00485***	0.00600***	0.00129	351
	0.00289	0.00025	0.00062	0.00046	0.02240	0.109
Southern Enlargement	0.00049	-0.00025**	-0.00031	0.00015	0.00462	625
	0.00096	0.00012	0.00043	0.00017	0.00812	0.038
Northern Enlargement	0.00221***	0.00009	0.00001	-0.00022*	-0.0151***	621
	0.00057	0.00012	0.00013	0.00015	0.00499	0.034
France	0.00020	0.00026***	-0.00007	-0.00002	0.00172	594
	0.00024	0.00005	0.00012	0.00007	0.00250	0.009
Italy	-0.00031	0.00023***	-0.00017	-0.00040***	0.00528***	540
	0.00018	0.00008	0.00027	0.00009	0.00187	0.155
Wage Growth						
Greece	-0.00178	0.00664***	-0.00882**	-0.00049	0.18492	351
	0.01090	0.00091	0.00353	0.00240	0.08410	0.128
Southern Enlargement	-0.00206	0.00063	-0.00335**	-0.00030	0.09259*	625
	0.00679	0.00087	0.00173	0.00120	0.06085	0.052
Northern Enlargement	-0.00148	0.00022	-0.00213*	-0.00084*	0.06584***	621
	0.00240	0.00040	0.00158	0.00048	0.01882	0.051
France	-0.00173	0.00112	-0.00472***	-0.00345**	0.11952***	594
	0.00297	0.00063	0.00084	0.00114	0.03007	0.414
Italy	0.00044	0.00040	-0.00253	-0.00021	0.06284**	540
	0.00187	0.00106	0.00322	0.00118	0.02671	0.029
Investment Rate						
Greece	0.01003	0.00183	-0.02821***	0.00522*	-1.5607***	531
	0.01267	0.00293	0.00925	0.00370	0.08017	0.365
Southern Enlargement	0.23141**	0.03995***	-0.05998***	-0.03851***	-3.9573***	621
	0.12761	0.00653	0.01835	0.01282	1.06441	0.036
Northern Enlargement	-0.02554**	-0.00429**	-0.00631*	0.00513**	-1.3142***	621
	0.01309	0.00274	0.00475	0.00271	0.11686	0.009
France	0.00014	0.00093**	-0.00227	0.00031	-1.5761***	594
	0.00174	0.00047	0.00279	0.00079	0.01833	0.017
Italy	0.00134	0.00107***	-0.00243	-0.00139**	-1.5586***	540
	0.00137	0.00034	0.00367	0.00046	0.01981	0.067

Note: Values in brackets are (heteroskedasticity serial and spatial correlation robust) standard errors (see Driscoll and Kray (1998) *, **, *** signify significance at the 10% (5%) (1%) level. For France distance to Madrid is replaces distance to Brussels, For the nearby Member States in Northern Enlargement in Italy distance to Vienna, Denmark distance to Stockholm is used as the distance to the nearest capital of a joining country

Conclusions

This paper analyses the regional effects of previous enlargements of the European Union 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. We find that the

effects of enlargements on regional employment wage, and population growth, as well as investments have been small. In particular focusing on regional development seven years after integration, we find very few significant effects and substantial heterogeneity among individual cases analysed which leads us to conclude regional integration effects do not materialise automatically.

We also find some evidence that effects on regional wage levels and investment rates are stronger than on employment, productivity and wage growth at least in the long run. This suggests that in the low internal migration context of European integration wage effects are more likely to materialise than employment and productivity growth effects. Finally, we find some differences in results concerning long-term developments and the 7 year post accession period. Focusing on the complete observation period we find stronger evidence of increased wage growth in border regions after accession, which concentrate mainly on the newly joining member states and, our results weakly support the view that in newly acceding countries regions closer to the border of the EU may expect higher investments and higher wage growth in the long run. In the old member states by contrast integration of new member states has weaker effects.

From these results we would argue that the likely effects of integration of the Central and Eastern European Countries into the European Union on the spatial structure of employment may be less strong than often argued. While border regions in the candidate countries may expect modestly higher increases in investments and wages than inland regions in the long run, the regional structure of existing member states should remain largely unaffected both in the short and the long run.

Literature

- Angrist, Joshua D; and Alana B. Krueger (1999) Empirical Strategies in Labor Economics, Handbook of labor economics. Volume 3A. 1999, pp. 1277-1366
- Bertrand, Marianne; Esther Duflo; Sendhil Mullainathan, (2004) How Much Should We Trust Differences-in-Differences Estimates? Quarterly Journal of Economics, vol. 119, no. 1, February 2004, pp. 249-75
- Blien, Uwe, 1996. Die Lohnkurve in den achtziger Jahren Eine Mehrebenenanalyse mit der IAB-Beschäftigtenstichprobe. Mitteilungen aus der Arbeitsmarkt und Berufsforschung 29, 471-74.
- Barjak F and G. Heimpold (1999) Development Problems and Policies at the German Border with Poland – Regional Aspects of Trade and Investment, Discussion Paper, 101 Institute of Economic Research, Halle.
- Boeri, Tito and Herbert Brücker (2001) The Impact of Eastern enlargement on Employment and Labour Markets in the EU Member States, European Commission, Brussels
- Brüllhart, Marius; Crozet, Matthieu; Koenig, Pamina (2004), Enlargement and the EU Periphery: The Impact of Changing Market Potential, Universit de Lausanne, Ecole des HEC, DEEP, Cahiers de Recherches Economiques du D partement d'Economie trie et d'Economie politique (DEEP), 2004, 26 pages pp.
- Büttner, Thiess and Johannes Rincke (2005) Labor Market Effects of Economic Integration -- The Impact of Re-Unification in German Border Regions, CESifo Working Paper, 1179, München.

- Crozet, Matthieu and Pamina Koenig-Soubeyran (2002) EU Enlargement and industrial relocation within the CEECs, Manuscript, TEAM – Paris 1 Pantheon-Sorbonne University, CNRS, Maison des Sciences Economiques, Paris
- Driscoll, John C; Kraay, Aart C 1998, Consistent Covariance Matrix Estimation with Spatially Dependent Panel Data, Review of Economics and Statistics, vol. 80, no. 4, November 1998, pp. 549-60
- Engel, Dirk (1999) Der Einfluß der Grenznähe auf die Standortwahl von Unternehmen: Eine theoretische Analyse und empirische Befunde für Ostdeutschland, Zentrum für Europäische Wirtschaftsforschung, Discussion Paper 99-18
- Fujita M, Paul Krugman and A.J. Venables (1999) The Spatial Economy, MIT-Press, Cambridge, Massachusetts
- Hansen, N. (1977) The economic Development of Border regions, Growth and Change, 8, pp 2-8
- Hanson, Gordon H. (1998) Market potential, Increasing Returns and Geographic Concentration, NBER Working Paper 6429, NBER, Cambridge, MA
- Hanson, Gordon H. (1996) Localisation Economies, Vertical Organisation and Trade, American Economic Review, 85, 1266-1278
- Hanson, Gordon H. (1997) Increasing Returns, Trade and the Regional Structure of Wages, The Economic Journal, 107, 113-133
- Hanson, Gordon H. (1998a) Regional Adjustment to Trade Liberalization, Regional Science and Urban Economics, vol. 28, no. 4, July 1998, pp. 419-44

- Heimpold, Gerhard (2004) The Economic Situation and Development in the German Regions along the Border with Poland, *Jahrbuch für Regionalwissenschaft/Review of Regional Research*, vol. 24, no. 1, 2004, pp. 51-72
- Huber (2004) The Wage and Employment Effects of Integration on Border Regions, Manuscript, WIFO, Vienna
- Krugman, Paul (1991) *Geography and Trade*, MIT-Press, Cambridge, Massachusetts
- Krugman, Paul and Raul Livas-Elizondo (1992) Trade policy and the third world metropolis, NBER Working Paper No. 4238, National Bureau of Economic research, Cambridge, MA
- Mayerhofer, Peter (2004) Austrian border regions and eastern integration. A low competitiveness - high growth paradoxon, *Jahrbücher für Regionalwissenschaft*, pp 74 - 104
- Montfort, P. and R. Nicollini (1998) Regional Convergence and International Integration, manuscript, IRES and Department of Economics Université Catholique de Louvain,
- Newey and West 1987A Simple, Positive Semi-definite, Heteroskedasticity and Autocorrelation Consistent Covariance Matrix, *Econometrica*, vol. 55, no. 3, May 1987, pp. 703-08
- Niebuhr, Annekaterin and Silvia Stiller (2002) Integration Effects in Border Regions – A Survey of Economic Theory and Empirical Studies, HWWA Discussion Paper 179, Hamburgisches Weltwirtschaftsarchiv, Hamburg

Ottaviano, Gianmarco I. and Frederic Robert-Picout (2004) The 'Genome' of NEG Models with Vertical Linkages: A Positive and Normative Synthesis, CEP Working Paper No. 4600, CEPR, London.

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

Van Houtem, H. (2000) An Overview of European Geographical Research on Borders and Border Regions, Paper presented at the Border Research Workshop in Aaberna, May

Appendix: Robustness of Results

Table A1 : Regression Results for Sectoral Employment Growth

	ginireg	rconcentr	distock	discap	_lmemX disto_1	_lmemX disca_1	Nobs (r2)
Total Prod							
Greece	0.7767	-0.3877***	0.0217	-0.0044***	-0.0067	0.0013	2184
	0.8009	0.1025	0.0034	0.0007	0.0063	0.0014	0.610
Southern Enlargement	0.2364	0.2576	-0.0015	-0.0004	-0.0192	0.0024**	4200
	2.5487	0.1956	0.0076	0.0005	0.0204	0.0012	0.144
Northern Enlargement	-2.7501	0.3278	0.0011	0.0006	-0.0044	-0.0007	3862
	5.8513	0.2728	0.0064	0.0009	0.0072	0.0008	0.243
France	9.7027	-0.0718	0.0021	0.0008	0.0025	-0.0003	3696
	3.7561	0.1343	0.0015	0.0009	0.0040	0.0012	0.362
North inc	-0.0196	-0.0004	0.0001	0.0000	0.0000	0.0000	3864
	0.0004	0.0004	0.0000	0.0000	0.0000	0.0000	0.151
Manuf Prod							
Greece	-7.0190	-1.7188***	0.0195	-0.0030***	0.0058	-0.0016	936
	0.5573	0.3047	0.0056	0.0007	0.0060	0.0008	0.667
Southern Enlargement	4.6852	0.3027	-0.0010	-0.0001	-0.0226	0.0024	1800
	2.8818	0.7079	0.0086	0.0009	0.0236	0.0020	0.203
Notrthern Enlargement (-8.1916	0.2587	0.0091	-0.0007	-0.0068	0.0001	1656
	5.2370	0.2241	0.0015	0.0012	0.0035	0.0013	0.247
France	8.9286	0.1056	0.0016	0.0023	0.0021	-0.0012	1584
	3.8025	0.1493	0.0009	0.0006	0.0036	0.0003	0.528
North inc	-3.6613	0.0034	0.0029	0.0003	-0.0026	-0.0005	1656
	2.4974	0.0679	0.0037	0.0009	0.0038	0.0010	0.295
Service Prod							
Greece	6.3574	-0.2203***	0.0230	-0.0060***	-0.0132	0.0025	1248
	1.2275	0.1014	0.0044	0.0010	0.0103	0.0023	0.621
Southern Enlargement	-3.2501	0.2048*	-0.0017	-0.0006	-0.0167	0.0023	2400
	4.2705	0.1457	0.0124	0.0009	0.0270	0.0012	0.110
Notrthern Enlargement	3.1381	0.5555	-0.0053	0.0016	-0.0021	-0.0014	2208
	11.4349	0.5637	0.0106	0.0021	0.0114	0.0017	0.208
France	9.3989	-0.0865	0.0027	0.0006	0.0023	-0.0008	2112
	7.7380	0.1236	0.0033	0.0017	0.0077	0.0022	0.2824
Italy	-0.6951	0.1164	0.0008	-0.0007	-0.0011	0.0006	2484
	2.7334	0.1756	0.0028	0.0006	0.0047	0.0007	0.1415

Note: All regression include period, sector and sector –time dummies. Values in brackets are (heteroskedasticity serial and spatial correlation robust) standard errors (see Driscoll and Kray (1998) *, **, *** signify significance at the 10% (5%) (1%) level. For France distance to Madrid is replaces distance to Brussels, For the nearby Member States in Northern Enlargement in Italy distance to Vienna, Denmark distance to Stockholm is used as the distance to the nearest capital of a joining country

While the results in the main paper are suggestive, a number of methodological criticisms could be levelled against them. In particular one could argue that measuring all effects on the regional distribution of employment, population and wage growth as well on investments through dummy variables may lead to ommitted variables

problems. For this reason Hanson 1998 suggests using a series of further proxies for the influences of regional employment. These include the share of employment of a particular industry in a region and the gini coefficient in a region (see tables 9 and 10).

Table A2: Regression Results for Sectoral Productivity Growth

	ginireg	rconcentr	distock	discap	_lmemXdisto_1	_lmemX disca_1	Nobs (r2)
Total Prod							
Greece	1.4699	0.5145***	-0.0167	0.0122	0.0113	-0.0073**	2184
	2.8045	0.1792	0.0079	0.0034	0.0132	0.0036	0.484
Southern Enlargement	-2.1821	-0.2643	0.0087	0.0002	0.0112	-0.0018	4200
	4.0885	0.3034	0.0229	0.0007	0.0257	0.0025	0.236
Northern Enlargement	-1.7872	-0.1362	-0.0037	-0.0002	0.0090*	-0.0015**	3862
	4.8786	0.2414	0.0063	0.0005	0.0065	0.0007	0.202
France	3.1498	-0.0159	-0.0054	-0.0003	0.0068	0.0008	3696
	7.7872	0.2600	0.0066	0.0011	0.0081	0.0018	0.362
North inc	5.9879	-0.2222	-0.0031	0.0007	0.0003	-0.0012	3864
	3.2710	0.1726	0.0015	0.0015	0.0029	0.0016	0.151
Manuf Prod							0.2469
Greece	5.9984	1.2876***	-0.0155	0.0070	-0.0028	0.0014	936
	2.3153	0.3379	0.0054	0.0020	0.0070	0.0034	0.695
Southern Enlargement	-2.6087	-0.3332	0.0082	-0.0002	0.0077	-0.0023	1800
	3.3674	0.5110	0.0083	0.0011	0.0232	0.0027	0.188
Notrthern Enlargement	-2.1967	0.1158	-0.0062	0.0010	0.0053	-0.0019	1656
	7.2139	0.3160	0.0048	0.0016	0.0053	0.0015	0.133
France	-2.0922	-0.0056	0.0008	0.0008	-0.0028	-0.0004	1584
	5.3029	0.2667	0.0029	0.0011	0.0058	0.0023	0.459
North inc	3.1874	-0.2844	-0.0024	0.0004	0.0012	-0.0009	1656
	2.1436	0.2345	0.0034	0.0007	0.0036	0.0009	0.323
Service Prod							
Greece	-1.7501	0.4237***	-0.0173	0.0164	0.0203	-0.0132	1248
	3.8562	0.1994	0.0117	0.0053	0.0230	0.0048	0.442
Southern Enlargement	-1.8610	-0.2624	0.0092	0.0004	0.0137	-0.0015	2400
	6.0505	0.3011	0.0393	0.0013	0.0399	0.0028	0.232
Notrthern Enlargement	-4.2328	-0.4848	-0.0015	-0.0011	0.0109	-0.0010	2208
	7.9298	0.3282	0.0085	0.0013	0.0089	0.0014	0.117
France	2.2504	0.0143	-0.0102	-0.0012	0.0126	0.0016	2112
	14.3049	0.2198	0.0154	0.0024	0.0173	0.0026	0.1492
Italy	8.7998	-0.0899	-0.0022	0.0007	-0.0018	-0.0009	2484
	3.6700	0.3767	0.0038	0.0031	0.0053	0.0031	0.2267

Note: All regression include period, sector and sector -time dummies. Values in brackets are (heteroskedasticity serial and spatial correlation robust) standard errors (see Driscoll and Kray (1998) *, **, *** signify significance at the 10% (5%) (1%) level. For France distance to Madrid is replaces distance to Brussels, For the nearby Member States in Northern Enlargement in Italy distance to Vienna, Denmark distance to Stockholm is used as the distance to the nearest capital of a joining country

In general the results change very little about the general findings. The effect of integration on regions more distant from Brussels remain insignificant for both the

employment growth as well as the productivity growth regression and a concentration of production can be found only in the case of employment growth in southern enlargement while in the case of Northern Enlargement and enlargement by Greece regions further away from the capital city showed higher productivity growth.

The results provide additional insights in so far as they suggest that both regional concentration and specialisation as measured through the gini coefficient and the regional concentration remained insignificant determinants of regional growth experiences in most countries analysed. We find that only increased regions in which an industry was more concentrated showed significantly higher productivity growth but lower employment growth.