Peter Mayerhofer

A Change in Location Advantages in Austria since the Opening of Eastern Europe?

On Developments of the Austrian Location Pattern since 1990

For decades, Austria's location pattern has been characterised by a distinct west-east divide in economic dynamics that had its origins in the geopolitical position of the country along the "Iron Curtain". With the opening of Eastern Europe the general conditions changed radically; trade and investment flows with the new democracies in Central and Eastern Europe intensified noticeably. The article examines the question of how far the new market potentials accessible since the opening up of the East have improved the location advantage of eastern and southern Austria in general, and the border areas in particular in the first stage of integration (1989-2003). The results show a limited growth impact that diminishes with increasing distance from the now open border. However, a fundamental change of location advantages in Austria has not yet occurred.

For a long period of time after World War II the regional patterns of growth in Austria were characterised by a distinct west-east divide in employment and value added growth. In the early post-war period the eastern part of the country was already at a disadvantage as a part of the Soviet zone of occupation, because the absence of ERP funds and the dismantling of industrial firms delayed reconstruction. As a result, economic development in eastern and southern Austria lagged behind due to its position on the "Iron Curtain" (*Butschek,* 1987, *Mayerhofer – Palme,* 1994, *Mayerhofer – Geldner,* 1996): direct restrictions on the transport of goods and passengers, but also the gradual economic decline of the Comecon countries drastically constricted trade between the Austrian border regions and their "economic hinterland" in the CEECs. A strongly centralised trade system in Comecon, which granted local authorities and businesses no autonomy whatsoever, largely excluded trade with the neighbours, and literally created a "dead border"[1]. Unlike western Austria, which, due to its geographic location, could integrate its economy early on into the competitive component supply and sales markets of Western Europe (particularly in southern Germany and northern Italy), eastern and southern Austria, therefore, directed their interest increasingly towards the (small and partly protected) domestic market. This constrained opportunities to make use of returns to scale or to modernise and restructure. As a result, there was a steady lag of eastern and southern Austria in economic dynamics for decades.

With the collapse of Comecon and the transformation of the countries of Central and Eastern Europe (CEEC) into market economies in the early 1990s, the basic conditions changed dramatically. The opening of the commodity markets and steps liberalising the movement of capital clearly brought about an intensification of the flow of trade and investment with the new democracies in Central and Eastern

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[1] Trade with the East in the early post-war period made up a large part of Austria's foreign trade (in 1947 imports from Eastern and Central Europe were 21.3 percent of all imports), but it nearly came to a standstill during the "Cold War". A recovery in the 1970s ended with the debt crisis in the early 1980s. In 1988 far less trade was conducted with all CEECs than with Italy.

Europe (*Wolfmayr,* 2004). It can be demonstrated empirically that, due to their proximity, the Laender (federal states) in eastern and southern Austria were particularly affected (*Mayerhofer – Palme,* 2002A, *Mayerhofer,* 2006).

In principle, the expectation of a dramatic change in the location structure in Austria as a result of integration with the East has a solid basis in traditional Location Theory as well as in newer approaches of Integration Theory[2].

In *Weber's* (1909) model the location decision of an individual firm, assuming a fixed proportion of factor inputs and given prices, is determined by simple transport cost minimisation; the availability of new input resources and output markets as a result of the border opening brings about a shift of the optimal production location closer to the now open border. If one revokes the unrealistic assumption of a fixed factor input ratio, and therewith combines the business location decision with that of the optimal production technology (*Moses,* 1958), this effect is further increased because the input mix in production shifts to offers of the new integration partner, so that the proximity to these supply sources becomes a more important argument in the location decision.

Early on, *Lösch* (1962) pointed out the negative effects of a closed border on the supply portfolio of border areas. In his model every firm works in a circular distribution area, the minimum size (and a similarly formed population distribution) of which is determined by fixed costs of the respective product. If the market area is segmented by a (closed) border, then the amount of achievable sales will not be enough to cover the fixed costs, and the firm will be knocked out of the market. Therefore, in border regions, only goods with low fix costs ("low centrality") can be offered cost effectively, whereas goods of higher centrality need a larger market area. When borders are open, the latter can also be offered cost effectively in the integrated market area, and as a result the region would be upgraded as a production location[3].

More recently, the approaches of New Economic Geography (*Krugman,* 1991, *Fujita – Krugman – Venables,* 1999) emphasise the influence of market accessibility and market potential on spatial production patterns. In a framework of monopolistic competition, economies of scale and transport costs create an incentive for firms to concentrate their production facilities in a small number of locations and to orientate these locations on the achievable market potential. In this respect, integration processes influence the choice of location, because they expand the spectrum of accessible markets; this is even more important for smaller economies. When integration occurs the domestic market orientation of a closed economy gives way to a stronger outward orientation; national centres tend to lose their importance in determining locational choice. In our case changes in market potential as a result of the opening up of the eastern border should trigger effects on the Austrian location pattern, as companies that work in the new markets or offer inputs across the border, concentrate their production in locations with lower market entry costs. Stronger impacts on immediate border regions could thereby be expected[4]. Therefore, integration with Eastern Europe should theoretically bring about a change in location advantages in Austria. The west-east divide in regional development, which can be explained by market access, should dissolve in the course of eastern integration.

Theory predicts changes in location pattern

Traditional location theory as well as modern integration theory anticipates a shift of the economic centre of gravity towards the now "open" border. The west-east divide in Austrian regional development, which can be explained by market access, should therefore dissolve in the course of eastern integration.

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[2] For a detailed discussion on the spatial effects of the integration of unequal partners in theory see *Niebuhr – Stiller* (2004) or *Mayerhofer* (2006).

[3] However, *Palander* (1935; described in *McCann,* 2001) points out that borders also establish spatial monopolies and therefore perform a protective function for those suppliers in the border region, who are disadvantaged in costs. This argument played an important role in legitimising transitional restrictions in trade in services in the negotiations preparing eastern enlargement of the EU.

[4] Immediate border regions, as gateways, should profit particularly from additional demand for transportation and distribution services as trade intensifies (*Hanson,* 2001). In addition, impacts in border regions could be the result of an increased use of imported intermediary inputs (*Hanson,* 1996B). This can in turn be traced back to increasing returns to scale (*Krugman,* 1981) or to outsourcing processes (*Feenstra – Hanson,* 1996).

The (negative) effects of border barriers on the size (for instance, *McCallum,* 1995, *Helliwell,* 1998, *Anderson – Van Wincoop,* 2003, *Chen,* 2004) and composition (*Hillberry,* 2002) of border-crossing trade have since been empirically verified in international studies, as have those on factor migration (*Helliwell,* 1997) and interregional price equalisation (*Engel – Rogers,* 1996). Newer studies clearly show the importance of market access for regional development (*Hanson,* 1998B, *Roos,* 2001, *Niebuhr,* 2004) so that spatial integration effects can be calculated from changes in market potential (*Brülhart – Crozet – Koenig,* 2004, *Niebuhr,* 2005).

Less clear, however, is the case-study evidence on the effects of border openings in concrete integration areas so far. In a series of studies on the regional effects of North American integration, Hanson can show the influence of the creation of NAFTA on the location of Mexican manufacturing (*Hanson,* 1996B), but – with the exception of the reciprocal influence of twin cities in the border area between Mexico and the USA (*Hanson,* 1996A, 2001) – finds little evidence for changes in the location pattern of US manufacturing (Hans*on,* 1998A).

In an analysis of the regional dynamics of firm entry in connection with the opening of Eastern Europe on the German eastern border region, *Engel* (1999) only found weak (positive) impacts on Polish border regions, while in the German-Czech border region firm entry rates declined after the opening. *Barjak – Heimpold* (2000) supplement this evidence by referring to the weak export and investment activity in the German border region adjacent to Poland. Structural problems, more than anything else, are blamed for this (*Heimpold,* 2004).

For German unification, *Huber – Palme* (2000) find no clear effects on the location advantage of the regions near the border, while *Buettner – Rincke* (2004) even identify negative economic impacts for the region on the former German-German border, based on data on wage levels and unemployment.

With a view to earlier EU integration processes, *Huber* (2005B) finds only weak and heterogeneous effects of southern enlargement on regional production structures, and no significant effects of the northern enlargement in 1995.

Engel (1990) shows the reasons for this, in all, rather weak evidence for spatial effects of an integration between unequal trade partners, on the basis of a market-orientated model of firm location choice in the tradition of Lösch (*Guo,* 1996). According to this, the profit-maximising location of a firm shifts towards the increasingly porous border, but in this process, the increase in income abroad is accompanied by a decline in profits domestically, so that the optimal location is determined by the maximum of the revenues at home and abroad. However, a point of discontinuity in the revenue function, as a result of the segmentation effect of the border, causes a profit maximising firm to work on the foreign market (and therefore choose a location closer to the border) only if the achievable demand abroad exceeds a critical value (that is, a critical degree of integration is exceeded)[5].

Increased integration, therefore, causes, ceteris paribus, a higher propensity of production in regions near the border, but only if a particular degree of integration (i.e., a critical – additional – market potential) is exceeded[6]. The analyses of possible changes in the regional location structure after the opening of the East therefore is reduced to the question of whether the additional market potential created by this opening was large enough to trigger a (in the long run, in any case, expected) change of location advantages in Austria.

Empirically spatial effects of integrating unequal trading partners are ambiguous

The negative effects of border barriers on trade flows and factor migration as well as the importance of market access for regional development are empirically proven. The concrete location effects of establishing NAFTA, German reunification and previous EU enlargements, in contrast, have been less clear so far.

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[5] The critical integration level is itself also a function of being close to the border: the further from the border, the greater the porosity on the border needs to be in order to balance out the loss in internal demand resulting from the relocation to the border.

[6] A delay of the adjustment of location patterns to the new situation seems possible also in the approaches of New Economic Geography, as effects of "market crowding" work against the pull effects of new market potential. In addition, increasing returns to scale may cause "log-in" effects in location patterns.

First evidence on this topic can be obtained from a comparison of the regional dynamics before and after the opening of the East, which is possible in a rudimentary way by concatenating fragmented time series on nominal gross value added at the regional level in Austria (Table 1)[7].

Table 1: Value added growth in the Austrian regions				
	Nominal gross value added		Gross regional product per capita	
	1975-1990	1990-2003	1995	2003
	Average year-to-year percentage change		Austria = 100	
NUTS-1 regions				
Eastern Austria	+6.7	+4.1	109.0	107.8
Southern Austria	+6.4	+4.2	82.9	84.8
Western Austria	+7.1	+4.1	99.9	100.0
NUTS-2 regions				
Vienna	+6.7	+4.1	143.9	141.4
Lower Austria	+6.6	+4.0	82.1	80.1
Burgenland	+6.7	+4.8	63.2	70.1
Styria	+6.3	+4.3	82.4	85.0
Carinthia	+6.6	+3.9	84.1	84.4
Upper Austria	+6.9	+4.0	92.6	93.3
Salzburg	+7.3	+4.1	113.1	110.3
Tyrol	+7.2	+4.2	103.2	102.8
Vorarlberg	+7.1	+4.5	102.7	105.4
Austria	+6.8	+4.1	100.0	100.0
Source: Statistics Austria, WIFO calculations.				

First of all, this comparison depicts a decrease in value added dynamics after 1990, which cannot be interpreted as an indication of a lack of positive impacts from the opening of Eastern Europe on the Austrian economy: economic growth in the 1990s has remained significantly behind that of the 1970s and 1980s in nearly all industrial countries.

The slow-down in growth took place in all Austrian regions, but was somewhat stronger in the western part of the country, so that the (slight) advantage in the west that was observed in the 1970s and 1980s was replaced after the opening of Eastern Europe by a rather balanced development at the level of macro-regions (NUTS I). Also on the level of the regions (NUTS II) differences in development remained small. Positional gains are discernable for the regions near the eastern border, Burgenland and Styria, but also for Vorarlberg at the outermost west of the country. In eastern Austria value added developed at above average rates (only) in the first years after the border opening. After 1995 the relative development position of eastern Austria, measured by gross regional product per capita, deteriorated further compared to southern Austria, while it remained unchanged in western Austria.

Altogether, regional differences in growth remained marginal after the opening, so that at any rate no major changes in the location advantage can be identified – particularly in view of the long period of adverse developments in German industry, which due to intensive component supplier linkages impacted negatively on western Austria's economy.

Regional dynamics after the opening of Eastern Europe seem to be more strongly determined by the structural characteristics of the regions than by their geographical location: The (wider) eastern border region built up less employment, due to the weak development of their urbanised areas, than the regions more distant from the border. Rural border areas, on the other hand, showed significant gains in employment in 1989-2003.

Large regional differences can be seen in the evolutions of dependent employment (Table 2). Here, long-term data are available at a disaggregated regional level (the 99 Austrian districts or "Bezirke")[8], so that developments can be analysed by the

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[7] Data for nominal value added in Austrian regions are available for the years 1975 to 1990, 1988 to 1995, as well as 1995 to 2003, however, they are based on different national accounting systems (SNA 68, ESA 79, ESA 95). In the course of extensive work on a multi-regional input-output-model for Austria (*Fritz – Streicher – Zakarias,* 2005) an attempt to integrate these data sources in a consistent way was made, the results of which are being used here.

[8] Employment data at the district level refer to dependent employment relationships, but not part-time employment or independent contractors, in July.

economic type of a region ("Wirtschaftsregionen"; *Palme,* 1995) and for the Austrian border regions in particular.

Table 2: Regional development in Austria in the 1990s

	Dependent employment		Nominal gross value added per capita
	1983-1989	1990-2003	1995-2003
	Average year-to-year percentage change		
NUTS-1 regions			
Eastern Austria	+0.6	+0.4	+3.1
Southern Austria	+0.6	+0.7	+3.2
Western Austria	+1.1	+0.9	+3.0
Type of economic region			
Human-capital intensive	+0.8	+0.3	+2.8
Vienna	+0.4	–0.0	+2.7
Cities	+1.0	+0.5	.
Suburban regions	+1.6	+1.8	.
Medium-sized towns	+0.4	+0.6	.
Real-capital intensive	+0.3	+0.6	+3.1
Intensive industrial regions	+0.3	+0.7	.
Intensive tourism regions	+0.3	+0.9	.
Rural	+0.8	+1.0	+3.4
Extensive industrial regions	+0.7	+1.2	.
Touristic peripheries	+0.6	+1.3	.
Industrial peripheries	+0.9	+1.5	.
Border regions			
Total	+0.6	+0.3	+3.0
Urbanised	+0.6	+0.2	+2.9
Rural	+0.6	+1.0	+3.5
Non-border regions	+0.8	+0.7	+3.2
Immediate border districts	+0.5	+1.1	.
Austria	+0.8	+0.6	+3.0

Source: Federation of Austrian Social Security Institutions, Statistics Austria, WIFO calculations.

According to this, employment growth significantly deviates from value added growth both by region and over time. Altogether, employment dynamics hardly weakened in the 1990s, which implicitly points to a slowdown of productivity growth. On the level of macro-regions (NUTS I), employment in western Austria (in contrast to value added) clearly grew at a higher rate than the Austrian average even after the opening of Eastern Europe, while eastern Austria was the only macro-region that fell back compared to the 1980s. Therefore, decisive productivity gains emerged in the east of the country, above all in human-capital intensive locations (the centres), in particular Vienna[9].

The human-capital intensive central areas have exhibited a generally unfavourable employment performance since 1990. Due to weak dynamics in the large cities (and despite much higher growth in the surrounding regions), employment, at +0.3 percent p.a., barely grew half as fast as the Austrian average. Vienna and the other large cities were, therefore, the only regional type where employment growth slowed down after the opening of Eastern Europe. In contrast, in the real-capital intensive regions (intensive industrial and tourism areas) employment growth accelerated and reached the average Austrian level. In rural areas, employment developments have proceeded even more favourably since 1990; at +1.0 percent p.a. clearly more job growth was achieved than in Austria as a whole.

In general, regional employment dynamics after the opening of Eastern Europe seem to be determined more by structural characteristics of the regions than by their geographical position: employment development was clearly weaker in the

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[9] For Vienna a combination of high productivity gains and a (consequentially) low employment intensity of output growth was confirmed by recent detailed analyses (*Huber – Mayerhofer,* 2005).

districts of the (wider) eastern border region[10] in 1989-2003 (+0.3 percent) than in the regions further from the border (+0.7 percent) – though solely due to weaker dynamics in the urbanised border region (+0.2 percent). In contrast to that, rural areas in the border region, and also immediate border districts, registered significant gains in employment after the opening. However, these were partly a consequence of the more elastic supply of labour after the opening and were thus accompanied by muted productivity growth[11]. In any case, the opening of the East seems to have improved location advantages only in the rural areas near the border. In the wider eastern border region labour market has not become more dynamic since the opening of the East, but rather more unfavourable, due to the weakness of its urban areas.

Figure 1: Employment growth in Austria before and after the opening of Eastern Europe

Dependent employment, average year-to-year percentage change
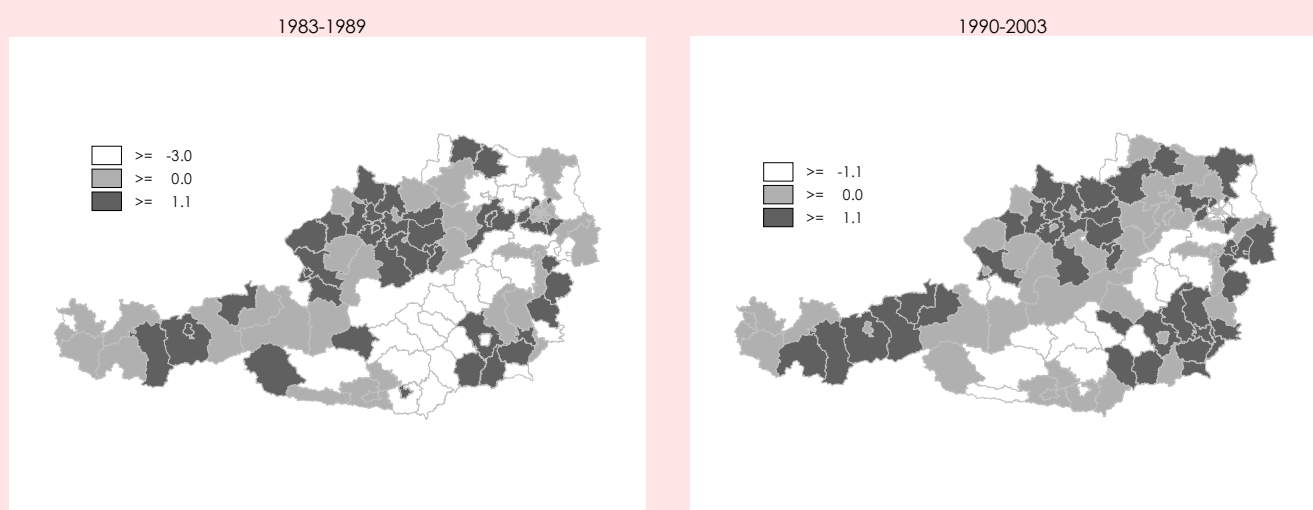
Source: Federation of Austrian Social Security Institutions, WIFO calculations.

The descriptive evidence thus shows a picture of moderate, but visible changes in the regional employment patterns after the opening of the East (Figure 1). Also in the 1990s, in the regions on the border to the main trading partner Germany a belt of growth remains visible (despite partly unfavourable developments there). New growth can be seen in regions (immediately) on the border to the new market economies. The rural border regions apparently profited to a great extent from that. Exceptions can only be found in the upper Waldviertel, in Marchfeld and in lower Carinthia. Also, the economies of the regions surrounding the major cities gained momentum, mostly at the expense of the urban core areas[12].

A descriptive analysis of regional growth differentials, however, cannot deliver statistically sound results on the changes in location advantage after the opening of Eastern Europe. In the following, we therefore precede to a more formal test on the developments in different regional types before and after the border opening. We apply a "difference-in-difference" test, an analytical method that stems from ex-

No fundamental change in regional location advantages

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[10] According to the definition developed in *Mayerhofer – Palme* (2002B), the "eastern border region" comprises all districts in which the district capital town can be reached by car (individual motorised traffic) from the nearest centre of the bordering transition countries within 90 minutes (large parts of northern, eastern and southern Austria including the urban centres Vienna, Linz and Graz, with a total of around 4.7 million inhabitants).

[11] In fact, the increase in employment in the rural border regions in the first half of the 1990s came about through the influx of foreign workers (1989-1995 +10.4 percent p.a.); after entry restrictions on foreign workers were tightened in 1994, the main area of growth shifted to (part time) female employment. For a more detailed analysis on the development in the rural border regions after 1990 see *Mayerhofer – Palme* (2002A) or *Mayerhofer* (2004).

[12] *Mayerhofer* (2006) examines the relationships between urban cores and their wider surroundings using methods of spatial econometrics.

perimental psychology (*Campbell,* 1969). In economics, this test was initially deployed in labour market analysis (e.g., *Card,* 1990, *Card – Krueger,* 1994), but also in subsidy evaluation (e.g., *Baumgartner,* 2000, for Austria). It is particularly suitable for an impact analysis of unexpected regime changes, when a priori it can be assumed that individual groups of subjects will be affected to different extents[13].

Table 3: Difference-in-difference test on regional value added dynamics before and after the opening of Eastern Europe

Unweighted median of nominal gross value added change for NUTS-1 regions, 1975-2003

	Median GDP rate of change				Difference of median before and after 1990		Difference-in-difference
	Region tested		Rest of Austria		Region tested	Rest of Austria	
	Before 1990	After 1990	Before 1990	After 1990			
	(1)	(2)	(3)	(4)	(5) [(2)–(1)]	(6) [(4)–(3)]	(7) [(5)–(6)]
	Average year-to-year percentage change				Percentage points p.a.		
Eastern Austria	+6.8630 (2.604)	+4.6911 (2.2818)	+7.1058 (2.7996)	+4.4321 (2.122)	–2.1719	–2.6737	+0.5018
Southern Austria	+6.6332 (2.805)	+4.3642 (1.988)	+7.1368 (2.709)	+4.5625 (2.228)	–2.2690	–2.5743	+0.3053
Western Austria	+7.3421 (2.791)	+4.4660 (2.203)	+6.7710 (2.669)	+4.5600 (2.160)	–2.8761	–2.2106	–0.6655

Source: Statistics Austria, WIFO calculations. – Italic numbers in parentheses . . . standard deviation.

In simple form – using as an example value added in the Austrian macro-regions (Table°3) – the (unweighted) median of the rates of change for Austrian districts before and after the opening of Eastern Europe for the type of region to be tested (columns 1 and 2) and for the rest of Austria (columns 3 and 4) are shown, and their respective change in the course of the opening of the East is calculated (columns 5 and 6). The differences between these changes (column 7) are then interpreted as possible evidence[14] of the specific influence of the opening of the East on the regional type tested[15].

For the necessary statistical corroboration of the thus gained findings, it is essential that this difference-in-difference, as well as it's statistical inference, can also be derived from a panel econometrics estimation in the form $Y_{rt}^R = \alpha_0 + \alpha_t d_t + \alpha_R d^R + \beta d_t^R + \varepsilon_{rt}^R$ [16]. In this regression model Y is the dependent variable (growth of employment or gross value added), r the district, R the type of region, d a

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[13] A detailed description of the method and its characteristics is given by *Meyer* (1995) and *Angrist – Krueger* (1999).

[14] Naturally, a particular development in a type of regions after the opening of Eastern Europe can result from factors that have nothing to do with eastern integration. However, only in the case of such a specific development can the hypothesis of spatial structural change due to integration reasonably be raised. A positive test result in the following analysis is therefore not a sufficient, but to be sure a necessary sign of a change of location advantage due to the border opening.

[15] The use of rates of change in the analysis corresponds to the findings sought here, to identify changes in the (long-term) spatial growth divide in Austria. One-time effects from the opening, in contrast, should be taken out of an analysis of changes in value added and employment levels.

[16] The difference-in-difference can also be determined by estimating a panel regression with a time and a space dimension: when Y_{r0} and Y_{r1} represent growth in a district before and after the opening of the East, then the expected value of growth in the region type R in the year t is $E[Y_{r0} I R, t]$ before the opening of the East, and $E[Y_{r1} I R, t]$ afterwards (the latter is only valid when R equals the tested region type and $t \geq 1990$).

Under the assumption that the expected value of regional growth without integration is determined by fixed time and regional effects $(E[Y_{r0} I R, t] = \alpha_t + \alpha_R)$ and that the opening of Eastern Europe generates a constant growth impact in the form of $E[Y_{r1} I R, t] = E[Y_{r0} I R, t] + \beta$, then growth at the district level can be determined by $Y_{rt}^R = \alpha_0 + \alpha_t d_t + \alpha_R d^R + \beta d_t^R + \varepsilon_{rt}^R$, whereas $E[\varepsilon_r I R, t] = 0$ and d_t^R is a dummy variable (1 if r is exposed to the opening of the East and is in the type of region to be analysed, otherwise 0). A differentiation of the rates of change over region type and time results in
$\{E[Y_r I R = \text{regional type tested}, t = 1991] - E[Y_r I R = \text{rest of Austria}, t = 1991]\} - $
$\{E[Y_r I R = \text{regional type tested}, t = 1989] - E[Y_r I R = \text{rest of Austria}, t = 1989]\} = \beta$.

dummy for time (1 when $t \geq 1990$, 0 when $t < 1990$), d^R a dummy for the region (1 when $R = 1$, 0 for the rest of Austria) and d_t^R an interaction term between d_t and d^R (1 when $t = 1$ and $R = 1$, otherwise 0).

In the results α_t denotes the size of the joint time effect, which equally affects both the type of region tested as well as the rest of Austria, while α_R represents the (time independent) mean differences between these two groups of regions. Of particular interest here is the coefficient $ß$ of the interaction term between the two variables: it delivers, in line with column (7) in Table 3, an estimate of the effect of the border opening on the type of region considered.

Table 4: Changes in the spatial production patterns in the opening of Eastern Europe

Panel regressions for the difference-in-difference test, nominal gross value added, OLS estimator

	Constant term	Dummy integration phase	Dummy type of region	Interaction term
	α_t	α_R	$ß$	
NUTS-1 regions				
Eastern Austria	+0.071058***	−0.026737***	−0.002429	+0.005019
	(26.35)	(−7.01)	(−0.52)	(0.76)
Southern Austria	+0.071368***	−0.025743***	−0.005036	+0.003053
	(28.61)	(−7.30)	(−0.95)	(0.41)
Western Austria	+0.067710***	−0.022107***	+0.005711	−0.006654
	(22.97)	(−5.30)	(1.29)	(−1.06)
NUTS-2 regions				
Vienna	+0.070603***	−0.025326***	−0.003190	+0.002358
	(30.21)	(−7.66)	(−0.45)	(0.24)
Lower Austria	+0.070575***	−0.025292***	−0.002942	+0.002052
	(30.19)	(−7.65)	(−0.42)	(0.21)
Burgenland	+0.070174***	−0.025829***	+0.000668	+0.006882
	(30.08)	(−7.83)	(0.10)	(0.70)
Styria	+0.070879***	−0.025791***	−0.005672	+0.006545
	(30.35)	(−7.81)	(−0.81)	(−0.66)
Carinthia	+0.070598***	−0.024931***	−0.003141	−0.001202
	(30.23)	(−7.55)	(−0.45)	(−0.12)
Upper Austria	+0.070115***	−0.024584***	+0.001204	−0.004317
	(30.0)	(−7.44)	(0.17)	(−0.44)
Salzburg	+0.069584***	−0.024152***	+0.005978	−0.008213
	(29.81)	(7.32)	(0.85)	(−0.83)
Tirol	+0.070023***	−0.024842***	+0.002035	−0.002002
	(29.94)	(−7.51)	(0.29)	(−0.20)
Vorarlberg	+0.069686***	−0.024830***	+0.005060	−0.002103
	(29.84)	(−7.52)	(0.72)	(−0.21)

Source: Statistics Austria, WIFO calculations. Panels for the Laender and the period 1975-2003, 252 observations. Italic numbers in parentheses . . . t values. Significance level: ***. . .1 percent, ** . . . 5 percent, * . . . 10 percent.

The calculations for the development of nominal value added tend to confirm the conclusions drawn in the descriptive analysis (Table 3): after 1990, output growth in western Austria really did slow down more than in eastern and (to a lesser extent) southern Austria. After the opening of the East, the dynamics in western Austria were at –0.67 percentage point p.a. clearly worse than in the rest of Austria, while the regions of eastern and southern Austria, at +0.50 and +0.31 percentage point, respectively, performed clearly better.

However, the panel econometric examination of these stylised facts (Table 4) shows that the result indicating an improvement of the location advantage of the regions

near the border does not pass our statistical test. The coefficient of the interaction term between time and the region dummies (ß), which corresponds to the difference-in-difference calculated in Table 3, takes on different values in the individual estimates for the macro-regions and the individual regions according to sign and size, but it is in no case significantly different from 0. A specific regional growth impact from the opening of Eastern Europe therefore cannot be statistically derived for any of the regions tested.

The use of the difference-in-difference method for employment developments conveys a similar picture (Table 5). Here, the parameter values on the level of macro-regions also show a small relative growth impulse for eastern and southern Austria after 1990. This impact (at +0.37 and 0.15 percentage point, respectively) is smaller in dimension than that in value added, pointing to relative productivity gains. In contrast, western Austria lost some ground after the border opening, after employment in the long term had essentially developed more favourably (significant positive coefficient α_r). The change in employment growth was about 0.44 percentage point p.a. less than in the rest of Austria in this phase. However, also here the statistical inference shows that this fact, until now, cannot be seen as a major shift in location advantages in Austrian regions: statistically, the coefficients of the interaction term (ß) are not different from 0 for all three macro-regions.

Table 5: Changes in the spatial employment pattern after the opening of Eastern Europe

Panel regressions for the difference-in-difference test, dependent employees, OLS estimator

	Constant term	Dummy integration phase α_t	Dummy type of region α_r	Interaction term β
NUTS-1 regions[1]				
Eastern Austria	+0.008986*** (6.55)	+0.000006 (0.03)	–0.003019 (1.27)	+0.003697 (1.10)
Southern Austria	+0.008960*** (7.09)	+0.000954 (0.53)	–0.004413* (1.65)	+0.001524 (0.40)
Western Austria	+0.005399** (3.63)	+0.003246 (1.54)	+0.005806*** (2.61)	–0.004394 (1.39)
Type of economic region[2]				
Human-capital intensive	+0.005550*** (3.80)	+0.004566*** (2.61)	+0.005970** (2.24)	–0.005928* (–1.86)
Real-capital intensive	+0.009061*** (6.31)	+0.002228 (1.30)	–0.006129** (–2.26)	+0.001978 (0.61)
Rural	+0.007680*** (4.65)	+0.001101 (0.56)	–0.000738 (–0.30)	+0.003721 (1.27)
Border regions[2]				
Total	+0.006782*** (3.82)	+0.001718 (0.81)	+0.001073 (0.44)	+0.002019 (0.69)
Urbanised border region	+0.006806*** (4.86)	+0.003527** (2.11)	+0.002289 (0.80)	–0.003152 (–0.92)
Rural border region	+0.007553*** (5.21)	+0.001270 (0.73)	–0.000708 (0.26)	+0.005205 (1.62)
Immediate border districts	+0.007891*** (5.53)	+0.001130 (0.66)	–0.002022 (–0.73)	+0.006143* (1.87)

Source: Federation of Austrian Social Security Institutions, WIFO-calculations. Italic numbers in parentheses . . . *t* values. Significance level: *** . . . 1 percent, ** . . . 5 percent, * . . . 10 percent. – [1] Panels for the regions and the period 1975-2003, 252 observations. – [2] Panels for the districts and the period 1983-2003, 1,860 observations.

Interestingly, even the (wider) eastern border region, as defined at the district (Bezirk) level, has demonstrated no specific employment impacts as a result of the opening of Eastern Europe. Further subdividing this regional category into densely populated and rural areas shows that this can be traced back to very different developments within this heterogeneous regional entity. While the urbanised parts of the eastern border region tended to loose ground after 1990, the rural districts experienced higher economic growth after the border opening by about +½ percentage point p.a. compared to the rest of the country. Consistent with that is a more favourable employment development in the districts adjacent to the CEECs (eastern border districts) after 1990 (significant at the 10 percent level). With only a few exceptions, these regions all have a rural-peripheral character.

These tendencies are embedded in a parallel change in the development pattern of centre and periphery in all of Austria. In a test for (broader) regional types, a clear (and at the 10 percent level significant) relative loss of growth in the human-capital intensive regions after 1990 is apparent (–0.59 percentage point p.a.). The cities and their surroundings lost ground after 1990 to the advantage of real-capital intensive and (above all) rural regions all across Austria – a development that took place in a similar way within the eastern border region.

Until now, forces that could dissolve the west-east divide have been (too) weak. A difference-in-difference analysis reveals neither a significant improvement of the location advantages of the regions near the border, nor a significant economic revaluation of the (wider) eastern border region in total. Only in the districts immediately adjacent to the border the situation has improved. Urbanised areas have lost ground in general.

Thus, after the opening of Eastern Europe, value added and employment developed quite differently in the individual regions of Austria. The results of the analysis are also plausible with respect to the theoretical ideas set out in the beginning. There is a tendency for growth impacts to decline with distance to the now open border that affects value added in particular, and (partly) acts to level out the west-(south-)east divide in regional dynamics.

However, in employment development this effect is overlapped by a fundamental catching-up process of the rural regions. Since 1990 the demand for labour in this regional type increased more strongly than in urbanised areas both in the eastern border region as well as in the rest of Austria.

This might seem paradox, in view of the empirically verified disadvantages in economic structure and location facilities for the periphery close to the border, but can be explained by a broad decentralisation process in Austria (*Mayerhofer – Palme,* 2002A, 2002B, *Mayerhofer,* 2004): the suburbanisation of the large cities is expanding as transport and communication infrastructure improves, so that increasingly also rural (border) areas close to larger centres profit from the migration of economic activity out of the city cores (e.g., *Mayerhofer,* 1999).

At the same time, a broad decentralisation process in the service sector through a diffusion of service functions of higher centrality also to lower ranked towns in peripheral regions can be seen (*Tödtling – Traxsler,* 1995, *Mayerhofer,* 1999). Due to the above-mentioned improvements in transport networks, service providers in rural areas can increasingly expand their market radius to service demand in urbanised areas (*Mayerhofer – Palme,* 2002A).

All these mechanisms strengthen the growth potential of the rural (border) areas (independently of influences of the integration with Eastern Europe). Altogether it is therefore the opening of Eastern Europe *and* suburbanisation as well as decentralisation, an international integration process *and* an intra-national revaluation of micro-locations, which have promoted the changes in Austria's spatial structure after 1990.

Until now, the opening of Eastern Europe has, therefore, not triggered a fundamental and far-reaching change in location advantages in Austria. Consistent with other studies using different methodical bases[17], neither a complete dissolution of the

General decentralisation processes overlap effects of integration

The opening of Eastern European markets has not yet decisively changed the location behaviour of firms within Austria. A complete dissolution of the west-east divide in growth can only be expected once the catching up of the new EU member states progresses further. How much peripheral border areas profit from that will be determined by their geographical position with respect to the larger central areas.

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[17] Structural break tests on the time series used largely confirm the results presented here. In addition, *Mayerhofer* (2006) shows by means of a Barro-type growth model for value added in the Austrian districts and the early phase of the opening of the East (1988-1995), that neither the integration of dummy variables for a location at the eastern border, nor a modelling of different "spatial regimes" for the border regions and their sub-parts improve the explanatory power of the model. Ultimately, *Huber* (2005A) finds, on the basis of indi-

west-east divide in growth after the opening of the East, nor a significant revaluation of the (wider) border region next to the new EU member states can be shown. At most an improvement of the location advantage in the immediate border region can be identified, but it has (also) been caused by a clear periphery-centre growth pattern in all of Austria.

The degree of economic liberalisation reached in the first phase of integration with the East (1989-2003) apparently does not suffice to decisively change the location behaviour of firms within Austria. This is understandable considering that even 15 years after the opening of the East, there are still considerable purchasing power differences between the EU 15 and the new EU member states[18], and trade barriers for cross-border service transactions remain.

To the extent that the catching-up process of the neighbouring new EU member states progresses, and after the expiration of the transition period for labour mobility and the exchange of services, the traditional west-east dichotomy in Austria's economic dynamics should largely dissipate. To what extent the peripheral border regions benefit from it will depend not least on their geographical position with respect to the larger centres in Austria and the potential for spillover effects that are connected to it.

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vidual data for employment, with the exception of a one-time impact in the immediate border area in 1990, no effects of integration on employment growth, job creation or loss, as well as firm entry or exit.

[18] In 2002, gross domestic product (at market prices) in the four neighbouring CEECs (Slovakia, Slovenia, the Czech Republic and Hungary) was only slightly more than half of that of Bavaria in common currency. Also, at purchasing power parities the GDP of these countries only slightly exceeded that of this German region.

A Change in Location Advantages in Austria since the Opening of Eastern Europe?

On Developments of the Austrian Location Pattern since 1990 – Summary

The intensification of bilateral relationships with the new democracies of Central and Eastern Europe following the fall of the Iron Curtain has tended to erode the traditional west-east divide in Austrian regional growth patterns. However, a basic change in location advantages in Austria did not occur within the framework of the first phase of eastern integration (1989-2003). The effects of integration on location have so far remained overlaid by general suburbanisation and decentralisation phenomena. Within the border region developments have therefore been quite different.

For decades, Austria's business location pattern has been characterised by a marked west-east divide in economic dynamics, which had its origins in the geo-political position of the country along the Iron Curtain. However, with the fall of the Iron Curtain the framework conditions have changed. Theoretically, a shift of economic focus towards the newly "open" borders was to be expected. In fact, value added growth in Austria's large regions (western, southern and eastern Austria) proceeded remarkably homogeneously, whereas in employment growth western Austria remained ahead even after 1990.

Nevertheless, the results of a "difference-in-difference" analysis, which comparatively analyses the differences in growth between the phase before and after the fall of the Iron Curtain, do not yet show any basic and significant changes in location advantage in Austria. Growth impulses from integration do tend to decrease with distance from the border, but after the fall of the Iron Curtain, neither a fundamental economic revaluation of the traditional west-east divide in growth, nor any significant improvement in the location advantage of either the Laender (federal states) close to the border or the (extended) eastern border region can be demonstrated statistically. In contrast, an employment impulse in the direct border area is statistically only weakly verifiable; it was, however, (partly) caused by a clear periphery-centre growth divide throughout Austria.

As a whole, against the background of remaining differences in purchasing power and trade barriers, the impulses from the opening of Eastern Europe have not yet been sufficient to make a lasting change to the location behaviour of businesses in Austria. The complete dissolution of the west-east divide in growth can only be expected once the new EU member states gradually catch-up. To what extent peripheral border areas also profit from this, will be determined not least by their position with regard to larger central areas.

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