

Niebuhr, Annekatriin; Stiller, Silvia

Conference Paper

Integration effects in border regions - a survey of economic theory and empirical studies

42nd Congress of the European Regional Science Association: "From Industry to Advanced Services - Perspectives of European Metropolitan Regions", August 27th - 31st, 2002, Dortmund, Germany

Provided in Cooperation with:

European Regional Science Association (ERSA)

Suggested Citation: Niebuhr, Annekatriin; Stiller, Silvia (2002) : Integration effects in border regions - a survey of economic theory and empirical studies, 42nd Congress of the European Regional Science Association: "From Industry to Advanced Services - Perspectives of European Metropolitan Regions", August 27th - 31st, 2002, Dortmund, Germany, European Regional Science Association (ERSA), Louvain-la-Neuve

This Version is available at:

<http://hdl.handle.net/10419/115582>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

42nd Congress of the European Regional Science Association "From Industry
to Advanced Services - Perspectives of European Metropolitan Regions"
August 27th – 31st, 2002, Dortmund

**Integration Effects in Border Regions –
A Survey of Economic Theory and Empirical Studies**

Annekatriin Niebuhr, Silvia Stiller

Abstract

Border regions and border effects currently attract a lot of attention in political practice and economic research. Substantial interest in regions located along the frontiers of integrating countries is predominantly inspired by the presumption that their specific geographic position might cause peculiarities in economic adjustments to integration. This survey explores whether economic theory and empirical studies support the assessment that integration effects concentrate in border regions. Economic theory alone allows only very vague conclusions about the spatial effects of integration. Depending on specific circumstances, border regions might benefit, lose or not be affected by integration. Empirical research on border regions – undertaken so far - does not allow to draw clear-cut conclusions as well. At present, there is neither a direct test for integration effects in border regions, nor a comprehensive study on the development of border regions. To sum up, the survey suggests that rigorous theoretical and empirical analysis is needed to foster the understanding of integration effects in border regions.

Hamburg Institute of International Economics
Department of European Integration
Neuer Jungfernstieg 21
D 20347 Hamburg
Germany
e-mail: niebuhr@hwwa.de, stiller@hwwa.de

1 INTRODUCTION

Recently, border regions attract a lot of interest in political practice and economic research. Substantial interest in regions located along the frontiers of integrating countries is predominantly inspired by the opinion that their specific geographic position might cause peculiarities in economic adjustments to integration. 'Central' frontier regions are the focal point of integration. Hence, the most rapid and direct impact of integration might probably be felt there. Plenty of such EU internal border regions will emerge in the course of eastern enlargement. It is a controversially discussed question whether these regions will economically profit or lose by EU enlargement.

Indeed, studies by HANSON (1996, 1998b) and KRUGMAN and HANSON (1993) suggest that trade liberalisation might strongly affect the economy of border regions. Those studies show that tariff reductions and resulting trade intensification among the United States and Mexico attracted numerous firms from Mexico City towards regions close to the border with the United States. KRUGMAN and HANSON (1993) argue that, since Mexico is a comparatively small economy, free trade with the large US market effectively turned the Mexican economy inside out in the sense that firms shifted their focus from domestic markets towards export markets in a literal geographic sense. Altogether, the economic upswing of Mexico's border regions results from the fact that the NAFTA gave Mexico access to the large US market.

This conclusion is highly interesting against the background of the forthcoming EU enlargement as there are some striking parallels to the NAFTA case. As the EU expands eastwards it will give the new member states access to the large EU market which currently comprises 376 million residents. Simultaneously the markets of the acceding countries gain importance for the EU. Large markets will integrate. In the course of such a process, strong spatial effects are likely. This raises fears that border regions might benefit from the east expansion while other regions lose economic activities. This paper investigates whether such economic developments in border regions are likely from the perspective of economic theory and existing empirical studies. Knowledge about the impact of integration on border regions is required, especially with regard to regional policy. Are there any reasons for a specific regional policy directed towards border regions along the opening eastern border of the EU?

The paper proceeds along the following lines. Section 2 explores what trade theory, traditional location theory and the new economic geography imply for integration effects in border regions. Section 3 provides an overview of selected empirical studies on this

topic. In section 4 empirical and theoretical results are combined in order to draw conclusions for the economic consequences of integration in border regions.

2 BORDER REGIONS IN ECONOMIC THEORY

2.1 Trade Theory

A spatial impact of integration might be released by factor movement or trade. Trade theory is an essential element of integration theory which focuses on the economic impact of trade liberalisation. Integration theory as a separate string of economic theory goes back to VINER (1950) and was originally based on the neo-classical trade model. At the beginning of the 1980s, new trade theory has emerged and strongly influenced integration theory. Unlike traditional models more recent trade models incorporate economies of scale and monopolistic competition. In trade models national borders constitute tariff or non-tariff hindrances to trade.

It is a basic result of traditional and recent trade models that integration, via the reduction of trade impediments, raises international trade which affects the international pattern of specialisation. Economic adjustments are driven by an intra-country reallocation of production factors among sectors. Production factors are usually assumed to be perfectly mobile within countries and among sectors while they are completely immobile on an international scale. Thus countries have fixed factor endowments and trade serves as a substitute for factor mobility. Furthermore, transportation costs do neither exist on a national nor on an international level. Therefore, each country is effectively treated as a single geographic location.

Since international trade models regard nations as dimensionless points in space, they are not suited for dealing with spatial effects of integration. Moreover, the assumption that spatial distance is irrelevant for the intensity of trade relations strongly contrasts empirical results of gravity models. Thus, for adding more realism to trade models it is self-evident to incorporate per-unit distance costs and a spatial structure. Furthermore, as long as trade models neglect international factor mobility they omit an inherent factor of integration.

An early attempt to overcome the non-spatial structure of trade models, by integrating theories of location and international trade, goes back to OHLIN (1967).¹ He concludes that altogether essential results on international trade can be applied to interregional trade relations as well. A more recent approach that integrates spatial aspects in trade models is RAUCH (1991) who combines elements from urban economics and trade theory. In that model intra- and inter-country transportation costs determine the volume of trade within and between countries. Port cities attract economic activities since they have low access costs to foreign markets. In the equilibrium population size, wage rates and residential rental rates of cities decline monotonically as one moves inland from a coastal port. It is relevant for our subject that a region's geographic position is important regarding regional adjustments to international trade since location is decisive for access costs to foreign markets. In reality trade does not only take place via ports, but goods are also directly transported across national borders. Thus, border regions could also have a geographic advantage in attracting exporting firms due to their proximity to foreign markets. Based on that model one might argue that frontier regions with relatively low access costs to foreign markets are natural production sites.²

Altogether, the relevance for a theoretical analysis of regional integration effects is limited within trade models in the above-mentioned tradition. Yet those models are relevant for integration issues since they deal with the impact of trade liberalisation on national production patterns. It is very likely that the reallocation of production factors among sectors will have spatially differing effects within countries. How corresponding changes affect the regions within a country is not analysed. Therefore, conclusions cannot be drawn on how trade liberalisation affects border regions. But we should not forget to mention that plenty elements of new trade theory are relevant in new economic geography models which have an explicit spatial dimension and will be discussed in section 2.3.

2.2 Traditional Location Theory

Economic integration was already an issue for classical regional economists and economic geographers. Especially LÖSCH (1944) developed a consistent but rather unfamiliar model dealing with spatial effects of economic integration.³ Lösch assumes that consumers and production factors are immobile and equally distributed in space. Like

1 E. g. OHLIN (1967), Chapter 12: Interregional Trade Theory and Location Theory.

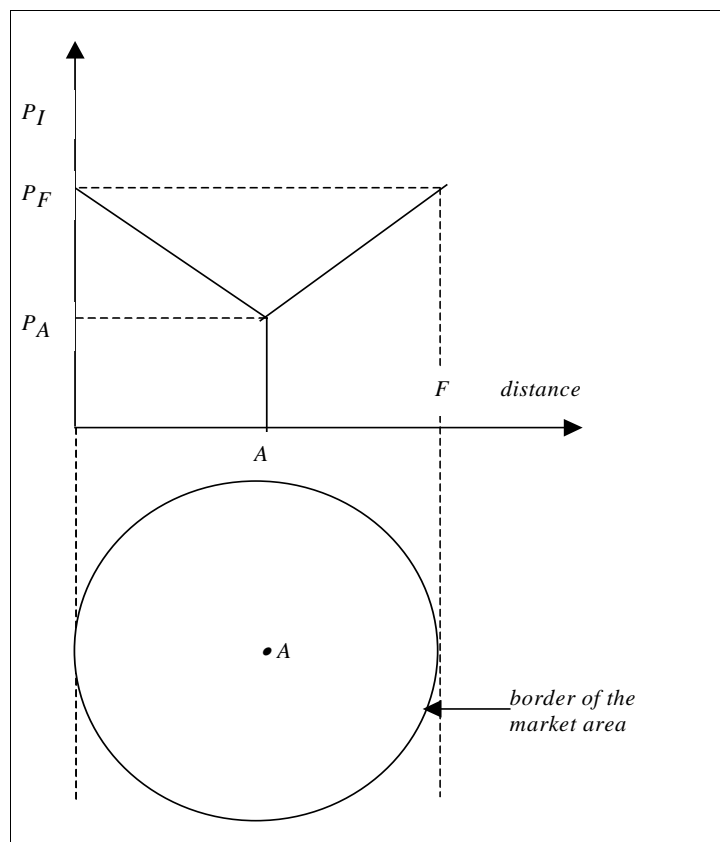
2 See HANSON (1996).

3 See BRÖCKER (1990), p. 50.

new trade theory Lössch considers economies of scale and imperfect competition. Firms settle down where spatially dispersed demand can be served best while profits are maximised. There are transportation costs for goods which are proportional to the distance between consumers and producers. Thus, the market area served from a certain location is spatially determined as illustrated by Figure 1.

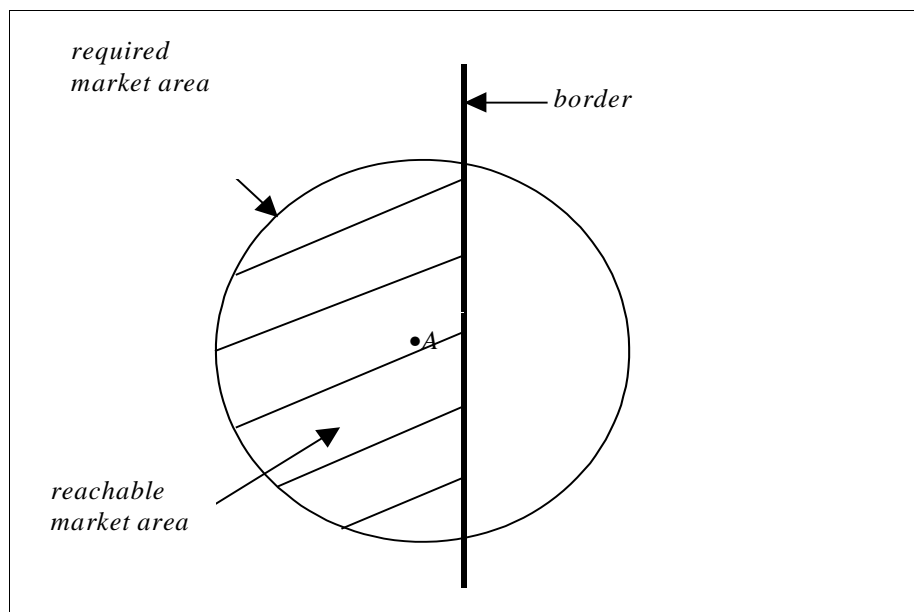
P_I is the price at location I and consumers' demand is d with $\partial d / \partial P_I < 0$ and $d(P_F) = 0$. Suppose a firm is located in A where the consumer price is P_A . For consumers which live in F the price is P_F including transportation costs from A to F . Thus the firm does not sell any products in F and in locations more distant from A than location F . As a result the maximum market radius is given by the distance between A and F . The same relation holds for all directions of the market area and hence the market area takes the form of a circle. The size of the market area and thus the accessible number of consumers, i. e. a firm's market potential, differs among products due to product specific supply and demand functions.

Figure 1: Spatial Demand



LÖSCH (1944) shows that the economic landscape, which is a system of different spatial market areas, is affected by introducing national borders. Borders are distortions in the market networks and divide the market area (see Figure 2). Lower sales force a firm *A* to withdraw from the market. Therefore firms are discouraged from locating near to a border, i. e. within a border region. Furthermore, firms will be the more distant from the border and the nearer to a nation's geographical centre the larger their required market area is. Consequently, border regions will have only a few economic activities and only firms requiring a small market area. Lössch describes a border region as a desert, a wasteland in which many products can only be obtained from a distance or not at all.⁴

Figure 2: Border as a Distortion in a Market Area



HOOVER (1963)⁵ summarises the significance of borders in traditional location theory by pointing out that tariffs and other restraints on international trade increase transportation costs, distort market areas and supply networks, and increase the costs of producers located near borders. Consequently, "... producers are likely to shun the territory near a trade barrier which would curtail their market or supply area ...". Due to this border effect firms orientate towards the interior of an area enclosed by borders. Reversing

4 Cited according to VAN HOUTUM (1999), p. 113.

5 HOOVER (1963), Part three: The locational significance of borders.

these arguments suggests that the reduction of barriers to international trade may change the economic situation of border regions dramatically. The opening of the border rises a border region's accessible market area, i. e. its market potential, and might foster settlement of firms near the border. New products for which the national market was too small can be supplied profitably in the integrated market area, in case a firm is located near the centre of it. Thus, border regions at the interface of the domestic and the foreign market might attract firms within the process of integration. In his location model GIERSCH (1949/50) explicitly deals with the spatial impact of an economic union. He expects a favourable evolution of central border regions within the European Community.

“The abolition of barriers to inter-European trade and to inter-European movement of factors will weaken the deglomeration effect of national agglomeration and will thus enforce international, or more precisely, inter-European, agglomeration. [...] particular regions, which have suffered under the depressing influence of national borders, will gain instead.” (GIERSCH (1949/50), p. 91).

To sum up, traditional location theory implies that border regions are weakly developed within a closed economy. Concerning spatial effects of an economic union several location models imply a positive impact of integration in border regions close to foreign markets. Hence, location theory provides some valuable hypotheses on how central border regions might be affected by a reduction of border impediments.

2.3 New Economic Geography

The new economic geography (NEG) deals with the distribution of economic activities across space and explains regional disparities by endogenous location decisions. The seminal NEG model goes back to KRUGMAN (1991). Up to now a wide variety of NEG models has been developed.⁶ These models have in common a combination of elements of traditional regional science and new trade theory. NEG models incorporate an explicit spatial structure, interregional trade costs, economies of scale in production and monopolistic competition. Spatial equilibrium results from the location decisions of firms and workers (consumers). The balanced distribution of workers and firms across space depends on the relative strength of centripetal forces (promoting geographic concentration of economic activities) and centrifugal forces (promoting geographic dispersion of economic activities). If centripetal forces dominate workers and firms will be

⁶ For a comprehensive summary see FUJITA et. al. (1999).

unevenly distributed across space. In this case there are agglomerations with a high density of economic activities as well as regions which have only a few firms or no industry at all.

Significant centrifugal effects can base on a relative scarcity of immobile production factors and non-tradable goods (e. g. housing) as well as on pure external diseconomies of agglomeration. Centripetal forces, which attract firms and consumers to a region, arise from the fact that a relatively large home market has a positive impact on a firm's profit and a consumer's utility. This goes back to numerous backward and forward linkages related to production and consumption. Workers prefer large markets due to the availability of a large number of locally produced consumption goods, which increases real income of workers (forward linkage). Near to a large market, firms have good access to buyers of intermediate and finished goods which positively affects profits (backward linkage). Furthermore, firms spatially agglomerate for having good access to suppliers of intermediate inputs which saves transportation and production costs (forward linkage).

Backward and forward linkages might induce a self-reinforcing process of agglomeration because the larger market is where already an agglomeration of firms and workers exists. As a consequence possibly large disparities in terms of real wages and the density of economic activities will arise among the industrial centre and the less developed hinterland. Whether industries spatially agglomerate is ambiguous since economic geography models generally exhibit multiple equilibria. The configuration of a spatial equilibrium depends on the variables included in the model and the chosen parameter.

The level of interregional trade costs as well as the assumed mobility of firms and workers strongly influence the relation among centripetal and centrifugal forces. Since integration affects international transportation costs and eases cross-border factor movements, it might alter the spatial equilibrium. With regard to the spatial impact of integration two results are highly relevant:

- (1) Reduction of international trade costs as well as liberalisation of cross-border labour movement affect the balance of centripetal and centrifugal forces on an international level. Thus integration might alter the distribution of population and economic activities **among countries**.⁷

7 E.g. in LUDEMA and WOOTON (1999).

(2) Reduction of international trade costs affects the balance of centripetal and centrifugal forces on a national level since foreign markets gain importance for buyers and suppliers. Thus integration might alter the distribution of population and economic activities **within countries**.⁸

These results imply that integration might alter the spatial allocation of economic activities. The spatial impact of integration subsumed by (1) results from the fact that decreasing trade costs and liberalisation of factor movement might induce labour migration among countries. The international migration of labour alters the national factor endowments and as a consequence the international location of industrial activities.

Result (2) refers to intra-country location effects of integration as analysed by KRUGMAN and LIVAS (1996) and FUJITA et al. (1999).⁹ They argue that while the location of economic activities within a closed economy is strongly inward-oriented, it partly changes to an outward orientation in an open economy. The domestic market becomes less important and the attractiveness of the domestic centre decreases. This might cause a reallocation of economic resources within a country away from previous centres to new locations. The question whether the re-organisation of the internal geography is likely to benefit border regions is not formally addressed. The models assume identical external trade costs for all locations within a country such that no region has a cost advantage in trade. Nevertheless, current literature refers to this model as implying positive feed-backs of integration in border regions.¹⁰

Indeed, market size considerations based on NEG models support the assessment that central border regions should have a geographic advantage within an economic union since their relative geographical position is immensely altered by integration: It changes from a peripheral position on a national scale to a central one in the common market. Central border regions' market potential strongly improves. The home market of border regions will increase if market areas at both sides of the border merge to one market. This requires effective cross-border backward and forward linkages that are probable, at least at advanced stages of integration. Increasing cross-border trade might attract consumers and firms to regions with good access to foreign markets such as 'central' border regions. The attractiveness of border regions will be stronger if domestic and foreign firms are vertically linked as in VENABLES (1996). In this case cross-border related industries have an incentive to agglomerate, probably in border regions. Supply and

8 See KRUGMAN and LIVAS (1996) and FUJITA et al. (1999).

9 Both approaches do not include cross-border factor mobility.

10 For instance HANSON (1996).

demand considerations taken together suggest that border regions at the core of the EU would be very favourable locations for exploiting backward and forward linkages emphasised by the new economic geography.¹¹ Thus, integration might induce the rise of new economic centres in border regions.

Altogether, the new economic geography suggests that a favourable economic development of central border regions could be initiated by integration due to an increase in their market potential. However, a positive impact of integration on border regions is not the only plausible outcome of NEG models. If transport costs are extremely low, firms will not care whether they are close to markets and suppliers. Furthermore, whether integration indeed affects the economic geography crucially depends on the strength of agglomeration forces which preserve the pre-integration pattern of industrial location.¹² Indeed, the above-mentioned models are merely static and the amount of economic activities is given. Integration only affects the distribution of economic activities across space but not its total amount. Thus, according to these models border regions can only gain economic activities if other regions lose them. But probably dynamic integration effects are more important. For first approaches which link growth and economic geography see e.g. MARTIN and OTTAVIANO (1999). In dynamic NEG models the spatial outcome of integration is still inexplicit. Like their static versions, dynamic new economic geography models developed so far have no direct implications for the development of border regions. Ultimately it depends on the level of international trade costs, the degree of labour mobility and the mobility of firms whether integration might break up the existing spatial pattern within the EU.

2.4 Implications of Economic Theory

We investigated from the perspective of economic theory how integration might affect border regions located along the border between integrating countries. Altogether, if economic models deal with the spatial impact of integration at all they will focus on regional adjustments to decreasing trade costs. The impact of international factor mobility on the spatial distribution of economic activities within countries is more or less ignored. Traditional location models and new economic geography models imply that external trade might alter the internal economic geography and new industrial centres might arise. Causal for spatial changes is that outward orientation of economic activities partly replaces inward orientation since integration changes relevant markets. There are

11 See EUROPEAN COMMISSION (2000), p. 68.

12 See HANSON (1998b), p. 420.

several arguments suggesting that related reallocations of resources might be for the benefit of border regions.

Due to spatial proximity to integration partners, central border regions might have cost advantages in trading with neighbouring countries. Based on market access considerations the new economic geography and traditional location theory suggest that a reduction of border impediments could attract consumers, production factors and firms to central border regions. This originates from the fact that integration strongly raises the market potential of border regions. Therefore, within an economic union cross-border backward and forward linkages might initiate a self-reinforcing process of agglomeration in border regions.

However, theoretical approaches do not allow clear-cut conclusions on the economic perspective of border regions. Altogether, it is already uncertain whether integration at all alters the economic geography. It is even more vague to guess which regions might profit from a reallocation of resources within an economic union. Ultimately it is an issue of empirical research how integration affects the economic development of border regions. Therefore, we review subsequently empirical studies dealing with the economics of borders and border regions.

3 EMPIRICAL EVIDENCE ON BORDER REGIONS AND BORDER EFFECTS

Numerous studies, as e.g. CECCHINI (1989) or BALDWIN (1989), deal with the effects of European integration. But only some of these investigate the spatial impact of integration, focusing usually on the development of regional disparities. However, the corresponding results do not allow to draw precise conclusions regarding the effects of European integration on border regions. Up to now, there is no comprehensive study on integration effects in European border regions. Contrary, a vast number of very specialised studies analyses specific aspects of border regions, such as cross-border networks or the development of specific border regions. Considering all those various analyses is far beyond the scope of the present survey.

In the following, we, therefore, concentrate on three groups of studies on the economics of borders and border regions. The first group of studies deals with the significance of border effects and their evolution in the course of integration (section 3.1). This is currently a subject of intense empirical research. A second group of analyses evaluates the spatial effects of economic integration by investigating changes in the market potential of regions (section 3.2). Some of these studies also provide a more or less direct test of new economic geography models, that can be applied to derive conclusions regarding the integration effects in border regions. Finally, we consider recent investigations of selected border regions where due to considerable integration efforts significant effects of economic adjustment can be expected, i.e. the U.S.-Mexico border area and the region along the German border with the EU candidate countries Poland and the Czech Republic (section 3.3).

3.1 Intensity of Border Impediments

The intensity of border effects is currently a subject of intense empirical research. Corresponding studies estimate the intensity of border effects by comparing the intensity of intra-national and international trade flows in the framework of a gravity model. The border effect measures the extent to which domestic regions interact more intensely than interacting with foreign regions. The analysis of McCALLUM (1995) is frequently mentioned as establishing the literature on border effects. However, already BRÖCKER (1984) analysed border effects in the EC. His results point to significant trade impeding effects of borders. On the average crossing of a national border reduces trade flows to one sixth of the value of domestic flows. Using the concept of market access, BRÖCKER (1984) also estimates the spatial impact of integration. The resulting pattern

supports the hypotheses of GIERSCH (1949/50), i.e. regions along intra-EC borders benefit from a European integration.

Starting with the study of McCALLUM (1995), the literature on border effects rapidly increased in recent years (e.g. McCALLUM 1995, HELLIWELL 1998 or BRÖCKER 1998). All investigations point to significant border effects. But the size of detected border impediments varies considerably. The results of McCALLUM (1995), HELLIWELL (1998) and BRÖCKER (1998) imply a reduction of international trade by a factor around 20 as compared to intranational trade flows. Contrary, WEI (1996) estimates a much smaller border effect of about 2.5 for OECD countries. Whereas evidence concerning the size of the border effect is mixed, corresponding results consistently point to a more or less pronounced reduction of border impediments in the course of integration. The findings of NITSCH (2000) for EU countries suggest a significant decline of border impediments in the early 1980s and a gradual decrease thereafter. This is confirmed by the study of HEAD and MAYER (2000). Their results also suggest that the still high relevance of border impediments in Europe is due to consumers having a bias towards domestic goods rather than to non-tariff barriers. However, if border effects are first of all due to such “natural” factors, as e.g. different preferences, a perfect integration with no border effects is unlikely ever to be achieved (see BRENTON and VANCAUTEREN 2001). Integration policy can hardly reduce border effects if the origins of border impediments are not policy related. According to a recent analysis by ROSE and VAN WINCOOP (2001), national currencies seem to be significant barriers to trade as well. Their estimates imply that joining a currency union halves the trade barriers associated with national borders.

To summarise, the presence of border effects is a robust result of empirical research. Even among highly integrated countries, as e.g. the EU countries, there are still significant border impediments. Nevertheless, the intensity of border effects seems to decline in the course of integration. However, some barriers to international trade might not be affected by integration policy. So, border regions could still suffer from disadvantages caused by border effects.

3.2 Market Potential

Another group of relevant studies deals with integration effects by analysing changes in market access that arises in the course of integration. These investigations apply the concept of the market potential as proposed by HARRIS (1954). Whereas early studies,

such as CLARK et al. (1969), have no rigorous theoretical foundation, recent analyses, such as HANSON (1998b), provide a direct test of new economic geography models. CLARK et al. (1969) and KEEBLE et al. (1982) investigate the effects of European integration by analysing the change in regional market potentials induced by a reduction of tariff barriers. The market potential is a weighted sum of purchasing power across locations, with the weights depending inversely on distance between the areas or on transport costs including tariff barriers. This combination of income and accessibility is used as a measure of advantage of location. The analysis assumes that accessibility is important for investment decisions and, therefore, regional growth. A high market potential is rated as a decisive advantage of location. Thus, the densely populated, central locations in Europe should realise the highest integration benefits.

According to the results of KEEBLE et al. (1982), Europe is marked by a wide disparity in regional accessibility and market potential. Regions marked by low market potentials are located in the geographical periphery. In contrast, high accessibilities and market potentials are estimated for regions in the north-east of Europe, covering large parts of the Netherlands, Belgium and West Germany. Corresponding border regions in the core of Europe achieve high market potentials as well. Moreover, enlargement as well as faster growth of more accessible regions tended to favour the central areas in Europe.

Concerning the evidence with respect to border regions several issues have to be mentioned. Firstly, the market potential analysis of KEEBLE et al. (1982) only considers distance costs and tariff barriers. The effects of other border impediments, such as cultural differences, are not taken into account. Secondly, the findings indicate that European border regions have not generally been characterised by a low accessibility and market potential in the past. As KEEBLE et al. (1982) point out, the basic pattern of the market potential reflects historic processes, e.g. industrialisation and urbanisation. Integration induces only slight changes in the market potential. This suggests that border regions in the core of Europe already possessed a high potential before integration started. Finally, the positive effect ascribed to the change of the market potential is not based on a well defined theoretical approach. As mentioned by PESCHEL (1989), the significance of the market potential for regional development remains an unclear matter – from a theoretical as well as from an empirical point of view. CLARK et al. (1969) and KEEBLE et al. (1982) do not investigate the growth effects of the market potential and of its change in the course of integration.¹³ Whereas there is clearly a positive correla-

13 According to CHESHIRE (1994), there is a positive relation between regional development and the change in market potential. The results suggest that the process of European integration tended to reinforce the advantages of more central regions and to penalise peripheral regions. In contrast, the

tion between level of development (e.g. measured by income per capita) and market potential, there is no such evidence concerning the relationship between change in market potential and change in income per capita (BRÖCKER 1990).

New economic geography remedied at least theoretical deficiencies of the market potential analyses. Moreover, some recent studies investigate the empirical significance of the market potential, based on tests of corresponding theoretical approaches. New economic geography led to a revival of the concept since the approach allows to derive the market potential from formal models. According to these models, market access matters for the spatial distribution of economic activity because of increasing returns to scale in production and transport costs (HANSON 1998b).

Corresponding empirical studies aim first of all at testing the relevance of new economic geography models. The analyses deal with the issue whether, consistent with theoretical models, wages decline with increasing distance from the centres of economic activity and, consequently, demand (BRAKMAN et al. 2002). A common approach is to use HARRIS' (1954) market potential function to approximate the nominal wage equation of the model by KRUGMAN (1991), i.e. the relationship between regional wage and market potential.

To our knowledge, empirical evidence on the market potential function is, up to now, only provided for the U.S. and Germany. The seminal analysis of HANSON (1998b) provides support for the existence of a spatial wage structure in the U.S., i.e. regions that are remote from markets are *ceteris paribus* characterised by lower nominal wages. According to the estimates, demand linkages between regions in the U.S. are strong, but limited in geographic scope. Thus, changes in consumer demand have considerable effects on neighbouring regions and minor effects on distant areas (HANSON 1998b). These results are more or less confirmed by the findings of ROOS (2001) and BRAKMAN et al. (2002) who apply the same method to German county data. Moreover, HANSON (1994) provides consistent evidence for trade liberalisation in Mexico. He detects a negative, but declining correlation between relative wages in the Mexican textiles industry and distance from the capital Mexico City. This result points to the existence of a regional wage gradient that partially broke down in the course of economic integration with the U.S.

findings of BRÖCKER et al. (1983) indicate that the market potential is not a crucial determinant of regional growth.

The results of studies that analyse the significance of the market potential suggest that market access, a factor stressed by location theory and new economic geography, could indeed be a decisive factor of regional development. However, empirical evidence is still scarce since estimates exist only for a few countries. Moreover, some assumptions made in the regression analyses are highly unrealistic and, therefore, it is unlikely that the estimated relationship provides a comprehensive explanation of regional wage differences. Thus, it is still unclear whether the empirical evidence on the market potential is robust. The findings leave open the issue whether a rise of the market potential in border regions caused by economic integration can actually establish the starting point of a favourable development.

3.3 Selected Case Studies

Numerous studies deal with the development of selected border regions. Especially the studies on the U.S.-Mexico border region by HANSON (1996, 1998a) are well known. Based on theoretical analyses like KRUGMAN (1991) or VENABLES (1996), Hanson derives the hypothesis that border regions benefit from regional trade agreements. He analyses how the integration process between the U.S. and Mexico has affected the location of economic activity within the integrating countries. Since Mexico's trade liberalisation in the 1980s, the location of manufacturing activities has shifted northward towards the U.S.-Mexican border. As firms relocated to regions with a better access to the U.S. market, the importance of the manufacturing belt in Mexico City declined. Trade between the United States and Mexico increased considerably and much of this trade is intraindustry trade. The intensified trade relations were associated with an expansion of export assembly plants in the Mexican border region. The empirical evidence suggests that growth of export manufacturing in the Mexican border regions has also contributed to expansion of economic activity in the U.S. border area.

The findings of HANSON (1996, 1998a) are consistent with the idea that integration results in a relocation of economic activity towards the common border of the integrating countries. More precisely, the analyses confirm the presumption on the role of transport cost, i.e. firms tend to choose a location with relatively good access to foreign markets. Furthermore, the results point to the importance of backward-forward linkages among firms as emphasised e.g. by VENABLES (1996). Employment growth is higher in regional industries that locate in the proximity of buyers and suppliers. According to the results, the North American Free Trade Agreement (NAFTA) is a decisive force regarding the process of relocation towards the U.S.-Mexico border.

The studies of HANSON (1996, 1998a) point to mechanisms that might also mark the spatial impact of EU enlargement. In the course of enlargement the external borders with Eastern European countries will become internal borders of the EU. As BARJAK and HEIMPOLD (1999) and HEIMPOLD (2000) note, the effects of integration presumably concentrate in the regions along these borders. However, the question whether these effects will be positive or negative is still subject of a controversial discussion. On one hand, benefits for border regions accruing from an increased international division of labour are emphasised. On the other hand, there is fear that especially border regions of present EU member countries will suffer from a relocation of jobs.

BARJAK and HEIMPOLD (1999) and HEIMPOLD (2000) focus on the German-Polish border area. They analyse the consequences of a gradual removal of the border for investment activity and foreign trade in the border region. The proximity of the foreign market is presumably an advantage of location affecting existing firms in the regions and, moreover, increasing the attractiveness of the border area as a location for investment. The results point to a poor performance of the German border regions regarding export activities. Taking into account that probably foreign regions belong to the market area of East German border regions, we could, *ceteris paribus*, rather expect an above average export rate. However, in the mid of the 1990s, most of the border regions were marked by export rates below the East German average, possibly indicating still significant trade impeding effects of the border.

Furthermore, the East German border regions have not become a preferred location for investment. According to HEIMPOLD (2000) the modest development of investment in the East German border area is partly due to disadvantages of location that persist despite the removal of border impediments. The unfavourable development of most East German border regions is not primarily caused by border location but rather by the transformation process. Structural change induced by transformation and infrastructure deficits mark especially the regions at the German-Polish border. In contrast, the Polish border regions show a quite favourable development of investment. The empirical evidence suggests that the Polish border regions could improve their position regarding the regional competition for investment due to opening the border. This is not the case for the corresponding German regions.

A study of ENGEL (1999) focuses on the impact of the border respectively of decreasing border impediments on firm foundations in East German border regions. Engel investigates the question whether the declining significance of the border increases the

rate of firm start-ups in East German districts close to the borders with the candidate countries Poland and the Czech Republic. The empirical evidence is rather mixed. Whereas the decreasing border impediments seem to affect the number of firm foundations in the regions along the German-Polish border, no significant effect can be detected along the Czech-German border.

Summarising, the evidence provided by these selected case studies allows no clear cut conclusions regarding the effects of integration in border regions. The results of HANSON (1996, 1998a) stress the effectiveness of mechanisms in border regions that are discussed in traditional location theory and the new economic geography. But the findings concerning the development along the German border with EU candidate countries shows that the effects described by Hanson are far from being systematic processes in integration areas. Border regions within an integration area form a quite heterogeneous group with respect to their economic development.

3.4 Results of Empirical Studies

Up to now, there is no systematic and comprehensive analysis of the evolution of border regions in the course of integration. Studies on border effects and on the significance of the market potential point to processes that might result in an above average development of border regions. Significant border effects decline in the course of integration and this decline should be associated with an increase of the market potential of border regions that might be the starting point of a favourable development.

However, even the small number of case studies surveyed above reveals the heterogeneity of border regions and their development. Removing border impediments alone is no guarantee for economic growth in border regions. There are a number of preconditions for a favourable economic development of border regions, such as a sufficient potential for an intensified division of labour, traffic and communication infrastructure. Corresponding deficits may prevent the realisation of integration benefits in border regions. Altogether, empirical research on border regions is far from providing clear and consistent evidence on the integration effects in border regions.

4 CONCLUSIONS

The question whether there are any specific effects of integration in central border regions is of utmost importance in view of the forthcoming EU enlargement. This paper investigates whether economic theory and empirical research on border regions offer clear-cut answers regarding integration effects in border regions.

It is an important result of economic theory that integration might alter the allocation of resources within a country as well as between countries. Moreover, there are theory-based arguments suggesting that border regions might have an advantage in attracting resources due to their specific location in the centre of the integration area. Spatial proximity of border regions to foreign markets improves their location conditions. Integration has a positive impact on their market potential and the development of cross-border backward and forward linkages. But these developments in favour of an economic upswing of border regions are countered by forces which tend to preserve the pre-integration geography of economic activities. The relative weight of these counteracting forces is ambiguous from the theoretical perspective, and, thus, remains a task of empirical research. Hence, economic theory alone allows only very vague conclusions about the spatial effects of integration. Depending on specific circumstances, border regions might benefit, lose or not be affected by integration.

Empirical research on border regions – undertaken so far - does not allow to draw clear-cut conclusions as well. At present, there is neither a direct test for integration effects in border regions, nor a comprehensive study on the development of border regions. However, a number of analyses provides evidence on specific aspects of relevant theoretical approaches. Firstly, the estimates of border effects point to still significant, but declining border impediments among highly integrated countries. These findings show that national borders are indeed important barriers for economic relationships as traditional location theory assumes. Furthermore, we might expect increasing trade and factor mobility between foreign regions since the magnitude of border impediments seems to decline. Secondly, recent empirical research on new economic geography stresses the importance of the market potential for regional development. The findings suggest that an increase in the market potential positively affects regional wages and employment. As some theoretical approaches suggest, especially the market potential of border regions should rise when national borders lose significance. Combining theoretical presumptions and empirical evidence, one could conclude that border regions realise above-average benefits from integration.

However, numerous case studies point to a rather diverse development of border regions. On the one hand, the U.S.-Mexico border region represents a perfect example for positive integration effects in border areas, as suggested already by LÖSCH (1944) and GIERSCH (1949/50). On the other hand, no corresponding evidence can be provided for one of the most recent cases of economic integration – the regions along the German-Polish and the Czech-German border. The findings of these empirical investigations do not point to a uniform development pattern of border regions. When evaluating those results we should keep in mind that border regions are far from being a homogeneous group. For example, European border regions include both rural peripheral regions such as Galicia and capital regions like København.

To sum up, the survey suggests that rigorous theoretical and empirical analysis is needed to foster understanding of integration effects in border regions. Thus, it remains to be analysed how the forthcoming enlargement of the EU will alter the EU's present economic geography. Indeed, we should attentively observe what is going on in the border regions along the present external EU border. That area offers an excellent opportunity for studying how integration might affect the economy of border regions.

Acknowledgements

We are grateful to Anne-Célia Disdier, Harry Garretsen and Martin Hallet for helpful comments on an earlier version of this paper.

References

- Baldwin R. (1989) The Growth Effects of 1992, *Economic Policy* 4, 247-281.
- Barjak F., Heimpold G. (1999) Development Problems and Policies at the German Border with Poland – Regional Aspects of Trade and Investment, Discussion Paper, No. 101, Institute for Economic Research, Halle.
- Brakman S., Garretsen H., Schramm M. (2002) New Economic Geography in Germany: Testing the Helpman-Hanson Model, HWWA Discussion Paper No. 172.
- Brenton P., Vancauteren M. (2001) The Extent of Economic Integration in Europe: Border Effects, Technical Barriers to Trade and Home Bias in Consumption, CEPS Working Document, No. 171.
- Bröcker J. (1984) How do international trade barriers affect interregional trade?, in: *Regional and Industrial Development Theories, Models and Empirical Evidence*, A.E. Andersson; W. Isard; T. Puu (ed.), pp. 219-239.
- Bröcker J. (1990) Räumliche Wirkungen der europäischen Integration – ein Survey, *Jahrbuch für Regionalwissenschaft* 11, 43-63.
- Bröcker J. (1997) Economic Integration and the Space Economy: Lessons from New Theory, in: Peschel, K. (Ed.), *Regional Growth and Regional Policy within the Framework of European Integration*, Physica, Heidelberg, pp. 20-35.
- Bröcker J. (1998) How would an EU-membership of the Visegrád-countries affect Europe's economic geography?, *Annals of Regional Science* 32, 91-114.
- Bröcker J., Peschel K., Reimers W. (1983) *Regionales Wachstum und ökonomische Integration*, Florentz, München.
- Cecchini P. (1989) *The European Challenge 1992: the benefits of a single market*, Luxembourg, European Commission.
- Cheshire P.C. (1994) *European Integration and Regional Response, Territorial Competition and the Single European Market*, Working Paper, No. 2, University of Reading.
- Clark C., Wilson F., Bradley J. (1969) Industrial Location and Economic Potential in Western Europe, *Regional Studies* 3, 197-212
- Engel D. (1999) Der Einfluß der Grenznahe auf die Standortwahl von Unternehmen: Eine theoretische Analyse und empirische Befunde für Ostdeutschland, *Zentrum für Europäische Wirtschaftsforschung, Discussion Paper*, No. 99-18.
- European Commission (2000) *The impact of economic and monetary union on cohesion*, European Union, Regional Policy, Study 35.
- Fujita M., Krugman P., Venables A.J. (1999) *The Spatial Economy: Cities, Regions, and International Trade*, MIT Press, Cambridge, Massachusetts.

- Giersch H. (1949/50) Economic Union between Nations and the Location of Industries, *Review of Economic Studies* 17, 87-97.
- Hanson G.H. (1994) Localization Economies, Vertical Organization, and Trade, NBER Working Paper No. 4744, Massachusetts.
- Hanson G.H. (1996) Integration and the location of activities – Economic integration, intraindustry trade, and frontier regions, *European Economic Review* 40, 941-949.
- Hanson G.H. (1998a) Market Potential, Increasing Returns, and Geographic Concentration, NBER Working Paper, No. 6429.
- Hanson G.H. (1998b) Regional adjustment to trade liberalisation, *Regional Science and Urban Economics* 28, 419-444.
- Harris C. (1954) The Market as a Factor in the Localization of industry in the United States, *Annals of the Association of American Geographers* 44, 315-348.
- Head K., Mayer T. (2000) Non-Europe: The Magnitude and Causes of Market Fragmentation in the EU, *Weltwirtschaftliches Archiv* 136, 284-314.
- Heimpold G. (2000) Consequences of an opening border for the regional policy in a border region – the case of the German border with Poland, Discussion Paper, No. 25, Institute for Economic Research, Halle.
- Helliwell J.F. (1998) How Much do National Borders Matter, The Brookings Institution, Washington.
- Houtum van H. (1999) What is the Influence of Borders on Economic Internationalisation?, in: *Understanding European Cross-Border Labour Markets*, P. de Gijssel; M. Jansen; H.-J. Wenzel; M. Woltering (ed.), pp. 107-141.
- Hoover E.M. (1963) *The Location of Economic Activity*, 2nd edition, McGraw-Hill.
- Keeble D., Owens P.L., Thompson Ch. (1982) Regional Accessibility and Economic Potential in the European Community, *Regional Studies* 16, 419-432.
- Krugman P. (1991) Increasing Returns and Economic Geography, *Journal of Political Economy* 99, 483-499.
- Krugman P., Hanson G.H. (1993) Mexico-US free trade and the location of production, in: *The Mexico-US Free Trade Agreement*, P.M. Mark (ed.), pp. 163-168.
- Krugman P., Livas E.R. (1996) Trade Policy and Third World Metropolis, *Journal of Development Economics* 49, 137-150.
- Ludema R.D., Wooton I. (1999) Regional Integration, Trade, and Migration: Are Demand Linkages relevant in Europe?, in: R. Faini; J. de Melo; K.-F. Zimmermann (ed.), *Migration – The controversies and the evidence*.
- Lösch A. (1944) *Die räumliche Ordnung der Wirtschaft*, 2. Edition.
- Martin P., Ottaviano G.M. (1999) Growing Locations: Industry location in a model of endogenous growth, *European Economic Review* 43, 281-302.
- Mc Callum J. (1995) National Borders Matter: Canada – U.S. Regional Trade Patterns, *AER* 85, 615-623.

- Nitsch V. (2000) National borders and international trade: evidence from the European Union, *Canadian Journal of Economics* 22, 1091-1105.
- Ohlin B. (1967) *Interregional and International Trade*, 3rd edition, Harvard University Press, Cambridge, Massachusetts.
- Peschel K. (1989) Die Wirkungen der europäischen Integration auf die Regionalentwicklung. Lehren aus der Vergangenheit, *Informationen zur Raumentwicklung*, No. 8/9, pp. 549-565.
- Rauch J.E. (1991) Comparative Advantage, Geographic Advantage and the Volume of Trade, *Economic Journal* 101, 1230-1244.
- Roos M. (2001) Wages and Market Potential in Germany, *Jahrbuch für Regionalwissenschaft* 21, 171-195.
- Rose A. K., van Wincoop E. (2001) National Money as a Barrier to International Trade: The Real Case for Currency Union, *AER* 91, 386-390.
- Sander B., Schmidt K.-D. (1998) Wirtschaftliche Perspektiven von Grenzregionen - Ein internationaler Vergleich, *Die Weltwirtschaft* 1998/4, 443-461.
- Venables A.J. (1996) Equilibrium Locations of Vertically Linked Industries, *International Economic Review* 37, 341-359.
- Viner J. (1950) *The Customs Union Issue*, New York.
- Wei S.-J. (1996) Intra-National versus International Trade: How Stubborn are Nations in Global Integration?, NBER Working Paper, No. 5531.