

Serie Research Memoranda

Border Regions and Infrastructure Networks in the European Integration Process

P. Nijkamp

Research-Memorandum 1992-82
December 1992





**BORDER REGIONS AND INFRASTRUCTURE NETWORKS
IN THE EUROPEAN INTEGRATION PROCESS**

Peter Nijkamp

Dept of Economics
Free University of Amsterdam
De Boelelaan 1105
1081 HV Amsterdam
The Netherlands

Acknowledgement:

The author wishes to thank Eddy Blaas, Katerina Fotiadou and Maurice Voskuilen for their contribution to this study

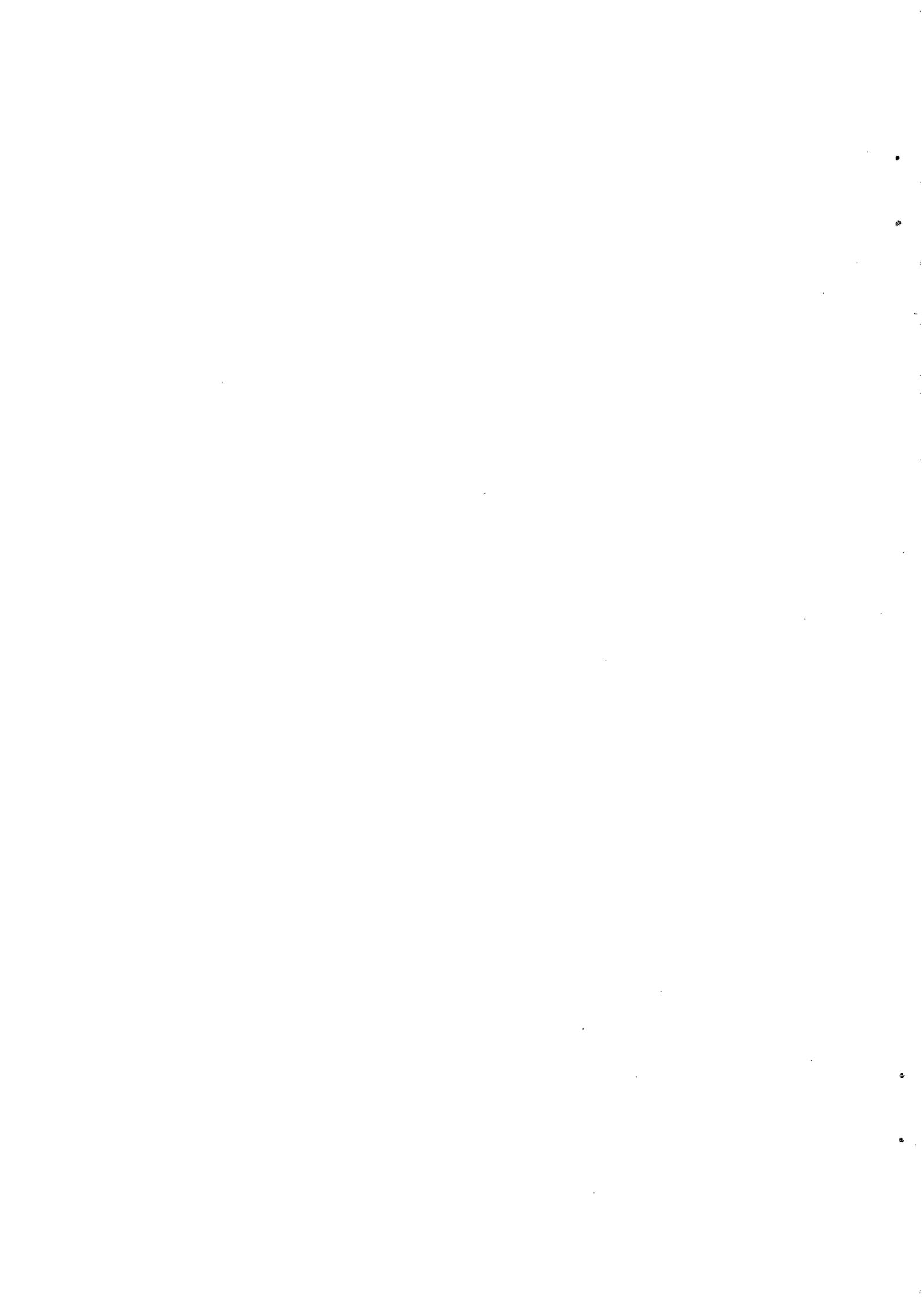
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*Dr. Fotiadou
region!*



Abstract

This paper focuses attention on development strategies of peripheral areas. In particular, it addresses the issue of integration effects for (internal) border regions after the completion of the internal European market. After a review of recent EC policies, it is claimed that there is an urgent need for designing and evaluating active development strategies for former internal border areas. A case study on two Dutch (peripheral) border provinces is described with a particular view on exploiting the indigenous development potential of such areas as a strategic vehicle for international competitiveness. A multiple criteria analysis is used to identify the most plausible and desirable development scenarios for these regions.



1. Regional Development and Border Areas: A Changing Scene

The international economic scene has manifested drastic changes in the recent past. Economic integration - or at least a break-down of former trade barriers instigated by political, cultural or socio-economic motives - is likely to become one of the most prominent stimuli for shifts in international trade flows, labour migration and knowledge transfer. The completion of the internal market in the European Community (EC), the converging East-West developments on the European continent and the economic integration - or at least cooperation - efforts in North-America (NAFTA) or South-East Asia (ASEAN) offer all the same picture for the 1990s, viz. an unprecedented elimination of unnecessary economic barriers between nations (cf. Fukuyama 1992, Pinder 1991, Robson 1987, Yannopoulos 1989).

At a global scale we witness the emergence of large scale trade blocks with world-wide impacts in terms of political power, economic concentration, technological dominance or strategic knowledge. Former fierce economic competition between nations and sectors seems to have shifted towards a global level of supra-national powers, while regional and national economies have become part of an (internally open) international economic network system (Porter 1989, Quévrit 1991).

Especially the European countries are increasingly showing clear signs of a development towards an integrated (or at least open) network economy, in which trade barriers are increasingly removed and spatial interactions (goods, people, information) are increasing (Bonnafoos 1989, Simons and Wansink 1990, Vickerman 1991, 1992, Violland 1988). This development is fuelled by the recognition that a full exploitation of a nation's (or a region's) competitive advantage in an open international economic system is a critical key force for maximising economic growth, an idea strongly advocated in the White Paper of the European Commission in 1987. Favouring free international trade pre-supposes also the existence of an accessible and cohesive network infrastructure that would induce further development and integration of the European economy. Thus a necessary consequence of European integration policies is a strict emphasis on sophisticated network infrastructures related to all relevant modes. The drastic increase in the budget of the European Regional Development Fund (ERDF) and the plans to create a European Infrastructure Fund demonstrate the awareness of infrastructure as a critical success factor for the restructuring of the European economies (see also Camagni 1992).

In this context it is noteworthy that Andersson and Strömquist (1989) claimed that each new stage in the history of Europe was accompanied by a so-called logistic or infrastructure revolution. They distinguish four such revolutions: (i) the end of the Middle Ages when new banking and trade systems emerged together with the development of new transport systems (e.g., the Hanseatic League); (ii) the Golden Age when new navigation techniques and trade agreements allowed a rapid expansion of the European economy; (iii) the Industrial Revolution when new industrial mechanics had a decisive impact on transport systems (railways, steamships, cars); (iv) the Informatics revolution

when the new information technology and telecommunications exerted a profound influence on the development of modern logistic systems.

The 'new infrastructure debate' in the past years has indeed demonstrated the strategic importance of connectivity infrastructure as a sine qua non for regional development and competitiveness (see Bruinsma et al. 1991 or Nijkamp 1993 for arguments). At the same time it should be recognized that economic integration presupposes the gradual elimination of trade barriers between nations (such as customs regulations, border check formalities etc.). In such a 'border-less' network economy the position of former border regions is likely to change dramatically as a result of a profound change in position and potential of their locational profile. Hence, different kinds of border problems still have to be solved in Europe's unification policy. The development of new competitive strategies for such areas necessitates such border regions to develop sufficient linkages to accessible network infrastructure, both national and international (see also Ratti and Reichman 1993).

These observations bring us to the aim of this paper: the design and evaluation of regional economic development strategies of border areas whose position and potential will be affected by transnational integration policies. The paper will - by way of illustration - present results from a case study on some Dutch border areas whose economic position will drastically alter after Europe 1992. The paper is organized as follows. In Section 2 some observations will be made on regional disparities in relation to economic restructuring and economic integration. Next, in Section 3 a concise review will be given of some recent EC initiatives to ensure the implementation of a real Common Market. Section 4 will then focus on particular problem areas which are in need of specific development policies after the European integration, viz. the border areas. In Section 5 the case study dealt with in this paper will be introduced, viz. the Eastern provinces in the Netherlands which are adjacent to the German border. Section 6 will describe various possible development strategies from the viewpoint of their spatial-economic potential, while Section 7 will offer an evaluation framework based on a nested multiple criteria analysis (in particular the regime method) for identifying promising policy strategies. The paper will be concluded with some retrospective and prospective remarks.

2. Economic Integration and Regional Disparities

Economic integration is not an aim in itself, but it seeks to enhance efficiency and competitiveness among nations or regions. In various cases, economic integration in combination with policy devolution may also be a response to both market and government failures which have caused sometimes an unnecessary inertia in the economic performance of nations or regions. Especially in an era of economic restructuring it makes sense to open new markets without protectionist policies (cf. Braga de Macedo and Bliss 1990, and Wistirch 1990).

The integration benefits do in general not only accrue from static allocation effects, but also from dynamic relocation effects related to a higher production possibility frontier (see also Hansen 1983 and House 1980). Furthermore, a drive

towards a network economy will also generate various externality benefits emerging from 'club' behaviour of actors in such a network, especially in case of knowledge and telecommunications networks (see Capello and Nijkamp 1992).

It should be recognized however, that the expected financial benefits of an open market in Europe (up to some 300 to 400 billion ECU annually) may partly be offset by high initial transaction costs caused by much uncertainty in business life, decline in employment in weak economic sectors, and widening gaps between welfare positions of regions.

In this context one often refers to the well-known Williamson hypothesis, which takes for granted increasing interregional disparities as a first result of economic integration, followed in a later stage by more converging regional welfare positions (see Williamson 1965, 1977). Although this hypothesis seems to be plausible, it should also be recognized that divergence and convergence phenomena are strongly determined by sectoral compositions, technological captivity, infrastructural provisions, labour migration willingness and anticipatory entrepreneurial spirits (cf. Davelaar 1991).

The main question regarding border areas can easily be summarized as follows: does a frontier form an impediment to a regional development potential (the traditional view) or does a frontier generate a specific entrepreneurial spirit which makes border areas potential success cases after a relaxation of frontier bottlenecks?

In general, there is still quite some disagreement among economists on the spatial-economic implications (income, productivity, employment, migration) of integration policies. The neoclassical convergence paradigm based on stylized assumptions on market clearing, information and mobility forms often a strong contrast with disequilibrium economics emphasizing the role of geographical factors, socio-political power concentration, externalities and economies of scale in shaping structural imbalances and disparities among regions (cf. Richardson 1973). Despite major contributions to growth pole theory, cumulative causation theory and polarisation theory, the empirical results on integration effects and distributive impacts in an open economy are still largely inconclusive (cf. Cuadrado Roura and Suarez-Villa 1992; Norton 1990).

Clearly, the convergence issue is also a matter of multitemporal spread effects, in a competitive open system the primate cities are often the most favourable candidates for absorbing the integration benefits, while backward and peripheral areas may follow at a later stage. The indigenous growth potential of non-central areas is often insufficient to generate strong competitive forces in the first stages of an integration process (cf. Hansen 1988, and Meyer-Krahmer 1985). On the other hand, we sometimes also observe surprising dynamics in former lagging areas which suddenly appeared to have found a way toward economic maturity. Thus the regional scene is one of fluctuating dynamics. This means that a transition towards a network economy may have far reaching implications for the regions belonging to such a network. Consequently, it seems plausible to assume that the completion of the internal market in Europe may have various unanticipated implications for former less favoured regions. In order to offer a framework for investigating these questions (with particular

emphasis on border areas), we will provide in Section 3 some relevant insights and observations on recent EC initiatives on economic integration and regional development.

3. Economic Integration and Regional Policy in Europe

Despite many institutional frictions and public resistance, there is an inevitable drive towards an integrated and open European market which by 1993 will have become the largest trade block of the world. The availability of efficient network infrastructure is here a prerequisite for reaping the fruits of integration. Three interesting phenomena are currently taking place in parallel to this integration process:

- a shift of the economic heartland of Europe towards the East and the South.
- a policy trend of deregulation and devolution in many countries caused by serious doubts on the social welfare gains of public interventions.
- a strong growth in physical movements of people and goods, accompanied by an equally strong growth in the information/telecommunications sector.

In light of these developments, the EC has tried to build up new initiatives so as to pave the road towards global competitiveness while at the same time safeguarding the economic interest of less favoured regions. These policies will very concisely be pointed out here.

Over the past decades the EC has developed a succession of agreements and trading associations which have attempted to remove (or at least to alleviate) the distorting effects of various tariff, quota and subsidy systems which have been introduced in various periods by national governments in furtherance of their economic growth. The problem of regional disparities in and between the EC member states was already recognized in the Treaty of Rome (1957), and since the 1970s the Community has accepted a greater responsibility for structural and regional problems. This main concern is also reflected in the creation of the three major Structural Funds (European Regional Development Fund, European Social Fund and European Agricultural Guidance and Guarantee Fund). After the third enlargement of the EC (with Spain and Portugal) the importance of structural and regional policy increased even further. And in the Single European Act (1987) which heralded the completion of the internal market by the end of 1992, both a strengthening of the Community's economic and social cohesion and a reduction of interregional disparities were called for. In the reform of the structural funds (1988), five major objectives on promoting social and economic cohesion and on reducing regional disparities were formulated:

- promoting the development and structural adjustment of lagging regions
- converting regions (including border regions) seriously affected by industrial decline
- combatting long-term unemployment
- facilitating the occupational integration of young people
- promoting the development of rural areas and speeding up the adjustment of agricultural structures.

Institutionally, the assistance from the funds is incorporated in the Community Support Frameworks operating now for the first period (1989-1993) in various forms (e.g., operational programmes, national aid schemes, global grants and large projects). The recent entry of East Germany with its extremely weak industrial and agricultural structure has led to a major bifurcation in the EC which could only be coped with by increasing the Structural Funds' resources with an additional 2 billion ECU.

The "Fourth Periodic Report on the Social and Economic Situation and Development of the Regions of the Community" (1991) contains interesting information on regional disparities in the EC. Spatial disparities (in terms of GDP per capita) are still remarkably high (with the Hamburg area in the most favourable position and some Portuguese and Greek regions in the lowest position, the difference between the highest and lowest ranking regions being at least a factor six!). After a slight increase in regional disparities in the beginning of the 1980s (the period of the recession), a marginal convergence has taken place in more recent years (as a result of economic growth in Ireland, Spain and Portugal). One country had a structural downward trend, viz. Greece. In general however, the absolute differences among various EC regions are still alarmingly high. A similar pattern can be observed for regional disparities in unemployment rates: some central regions have an unemployment rate of less than 3%, while others (e.g., the Mezzogiorno) exceed 20%. It seems plausible to assume that in the near future international labour migration in the EC will be determined by the spatial disparities, although the estimates on the order of magnitude of such flows show tremendous ranges of uncertainty.

In a recent document of the European Commission ("An Empirical Assessment of Factors Shaping Regional Competitiveness in Problem Regions", 1990) the persistent existence of regional disparities in the EC is traced to differences in three background factors:

- infrastructure: infrastructure endowment is a decisive factor for regional economic performance and competitiveness (see Biehl 1986, Bruinsma et al. 1991, Nijkamp 1986)
- innovation: technological innovation and industrial restructuring are the neo-Schumpeterian responses to a structural downswing of the economy (see Cappellin and Nijkamp 1991, Davelaar 1991)
- education: labour education and training is one of the most effective ways of ensuring an upgrading of a region's production 'milieu' (cf. Aydalot and Keeble 1988).

Thus, accessibility, innovative climate and skilled labour force are to be regarded as focal points in regional development policy (cf. Albrechts et al. 1989). In most lagging regions these pivotal features of indigenous dynamics are lacking, and therefore the above mentioned Community Support Frameworks aim to promote initiatives, plans and programmes that serve to modernize weak regional structures, to reduce regional inequalities and to raise regional productivity. The increased competition in an open European economy would otherwise be detrimental to the weaker regions. Therefore, diminishing current regional disparities in the EC is a sine qua non for enjoying the full integration benefits from 1993 onwards.

There is clearly an important dilemma in the above sketch of development and policy strategies. The European integration needs a rigorous regional policy in order to avoid a situation where unacceptable regional disparities would erode the emerging integration. However, a drastic restructuring of historically developed regional conditions will not become effective as a result of European top-down policies, but only as a result of indigenous regional bottom-up forces.

Thus here we observe a clear case where the subsidiarity principle is at odds with the necessary speed of effective regional/sectoral policies in an integrated European economy. Nevertheless, it seems to be of strategic importance for peripheral and border areas to take for granted that the Maastricht Treaty on the European Union will become effective in the near future and to develop in the meantime creative strategies that would provide these areas with proper competitive conditions needed after the European economic unification. In the next section we will briefly address the issue of border regions in Europe.

4. The Position of Border Regions in Europe

Europe is a continent of independent nation states. Crossing Europe means crossing a border. The EC itself has already approximately 10.000 Km of land frontier, 60 percent of which consists of internal borders between EC members. Border regions located at two sides of the frontier between nation states have often big differences in language, culture and socio-economic conditions (see for a classification of barriers between regions Nijkamp et al. 1990). Border regions are often a typical example of peripheral regions which are hampered in their development by their isolated location. Such frontier regions had usually only an orientation towards the central areas of a country and ignored their back-to-back neighbours. In the document of the European commission on "Europe 2000, Outlook for the Development of the Community's Territory" (1991) the position of border areas is phrased as follows: "Changing borders have been a feature of Europe's political history, but most of the borders of the community have been in place for a century or more. Their experience has shaped the economic, social and cultural development of border regions and cities for even longer than that" (p. 169).

After the completion of the single European Market the frontier obstacles will be eliminated, so that by then the border areas will assume a new position

in the EC, as they represent both a potential impediment to and a potential model for the integrated development of the economic and physical space of the European territory. In the latter case new 'transborder' regions may emerge with a strong growth potential, given their transfrontier contact orientation (see Ratti and Reichman 1993).

The current regional-economic profile of European frontier regions is far from favourable. They have in general a poor economic performance as a result of:

- a peripheral location and an isolated position with respect to the economic and political heartland of their country
- a separation between the economic centres of a frontier region and their natural hinterland thus leading to a distortion in patterns of trade and service provision
- a relatively poor infrastructure endowment because of their geographical location on extreme arteries of transport and communication networks
- (often) a poor natural resource endowment, a low agricultural productivity and a less developed social and business service provision
- large differences in legal, administrative and social welfare systems as well as in language and cultural traditions which altogether hamper communication and cooperation with regions across the border.

In general, the present EC border areas have a lower income level per capita and a higher unemployment rate than the other regions of their countries. It is evident that regions along the (disappearing) European frontiers will be strongly affected by the increasing integration of the Community. The degree to which they will be influenced depends on the question whether these regions are internal or external border areas.

Internal border regions will face three major changes:

- economic integration effects leading to an increase in cross-border trade and service flows and in international labour movement (cross-border community, e.g.)
- transnational infrastructure investment leading to an expansion of transportation networks, public utilities and services and new economic activity patterns.
- uniformity of legal and administrative procedures leading to closer cooperation with neighbouring cross-border areas and to cross-border development initiatives.

External border areas will still be facing major development bottlenecks, although the trade agreement with many countries outside the EC (e.g., the EFTA-countries and the former COMECON countries) will alleviate their disadvantageous position. A major problem to be expected in these external

border areas is the foreseeable flow of immigrants from non-EC countries. At present, initiatives are developed by the EC to ensure a sufficient linkage of these areas to wider Community networks and to let them play a pivotal role in economic cooperation with adjacent non-EC countries (an example in LACE, an observatory on matters relating to cross-border cooperation).

5. Description of the Dutch Case Study

In our case study, we will focus attention on the design and assessment of development strategies of two Dutch border regions, viz. the provinces of Gelderland and Overijssel, which are adjacent to the frontier with Germany (see Figure 1). These two provinces are internal border areas in the above mentioned EC typology. Together with the Northern provinces (Friesland, Groningen, Drenthe) and the South-Eastern provinces (Noord-Brabant, Limburg) they belong to the national periphery of the Netherlands. Both Gelderland and Overijssel are typical examples of internal border areas: a poorly developed transportation and connectivity infrastructure with respect to adjacent German regions, (until recently) a declining industrial sector, a strong agricultural dominance in the rural areas, a large labour pool of low skilled workers, and (until recently) a relatively high unemployment rate. In this Section we will only give a sketch of the main picture of these two provinces; more details and a large amount of data can be found in Blaas and Voskuilen (1992).

Legend

- Gr = Groningen
- Fr = Friesland
- Dr = Drenthe
- Ov = Overijssel
- Fl = Flevoland
- NH = Noord-Holland
- ZH = Zuid-Holland
- Ge = Gelderland
- Ut = Utrecht
- Zl = Zeeland
- NB = Noord-Brabant
- Li = Limburg



Figure 1. Map of provinces of the Netherlands

These border regions form a clear contrast with the Dutch economic and geographical heartland, the Randstad, which hosts most core activities in the Dutch economy, like head offices of international firms, business services, high-tech firms, and physical distribution activities. Approximately 80 percent of foreign service and trading firms is located in the Randstad, while this region is also an attractive area for (headquarters of) foreign industrial companies. The centrality and extremely good (inter)national accessibility of the Randstad (by air, rail, water) explains to a large extent its current strong position.

The border provinces Gelderland and Overijssel have historically a completely different economic-geographical profile. They are characterized by a relatively lower development level - a situation caused by both peripherality and their position as frontier areas - which manifests itself in a declining primary sector, the presence of traditional manufacturing industries with a relatively low competitiveness, and a relatively underrepresented position of the tertiary sector. Thus these regions may historically be regarded as less favoured areas in the country and in the Community.

In recent years, the economic performance of these two border provinces has improved, partly as a result of the general economic progress in the country as a whole, partly as a result of regional policy in the 1970s and 1980, and partly as a result of the indigenous development effort of these areas themselves. The production structure has become more diversified after the loss of one of the core industries (textiles) in the past decades. The primary and secondary sector is still overrepresented in comparison to the national average. Both provinces have a strong orientation towards the transportation, distributional and trade sector. The province of Gelderland is in recent years also showing a rapid progress in the business service sector, while Overijssel is specializing in advanced agriculture/biotechnology, industrial R&D, and small and medium size activities. Both provinces appear to have a favourable production 'milieu', a relatively high labour productivity, favourable policy support mechanisms, an uncongested transportation infrastructure, good infrastructure connections with the Randstad (road, rail), and an extremely attractive quality of life.

After the recession in the beginning of the 1980s the economic development of both provinces has shown a remarkable recovery, with growth figures for investments and employment slightly above the national average. It should be recognized that this relatively favourable situation is also caused by the geographical expansion of the sphere of influence of the Randstad: several firms appear to move from the heartland towards intermediate areas around the Randstad (see Davelaar 1991).

In view of the forthcoming open European market, these provinces have decided to design active development strategies in order to exploit the opportunities offered by the European integration. This means that their position as a frontier area has to be critically reviewed, while next from a set of viable development strategies the most promising ones have to be selected, initiated and implemented.

Before identifying such development strategies for these border regions, it is important to investigate and list the various forces at work which will impact on these regions. The following megatrends may be distinguished:

- economic growth: according to EC estimates the average growth of GNP in EC countries will be approximately 3 to 4 percent in the 1990s (excluding the dynamic integration effects and the effects of a possible integration of EFTA-countries); this will mean a significant rise in international trade.
- industrial organisation: the industrial organisation is going through a rapid transformation process, such as: back-to-core-business tendencies, farming out of non-essential product components, increased international cooperation and mergers, rise in advanced small and medium size firms.
- transportation: European transport will rapidly increase in the near future; estimates of transport growth range from 3 to 7 percent annually. A rise of 100 percent in freight transport by the year 2010 is regarded as a plausible scenario by the European Commission. Logistics and telematics will have to play a decisive role in the transportation sector (see Nijkamp 1993).
- European space-economy: the European space-economy will probably also drastically alter: the emergence of large-scale internationally competitive metropolitan areas (London, Paris, Frankfurt, Milano, the Randstad, e.g.) connected by advanced infrastructure corridors. Clearly, the precise shape of the European map is fraught with many uncertainties (see for details Masser et al. 1992).
- Europe of the regions: after the elimination of frontiers in the European network economy, regional identity (and perhaps autonomy) will become more important. Regions will have to fight for their own economic position in an integrated Europe. This necessitates of course an active development strategy of the former border areas.

It is noteworthy (see the map of Figure 1) that both provinces (Gelderland and Overijssel) have a strategic position as a geographical transit area for commodity (and person) flows to the hinterland, a situation which may be of critical importance after the future revival of Berlin as the new German administrative centre and after the opening up of the East European countries.

6. Development Scenarios for Dutch Border Areas

In light of the observations made in Section 5 we will present now a set of strategic development scenarios which may be conceived of as basic orientations for the two Dutch border regions under consideration. These scenarios form to a large extent contrasting options for the development potential of these areas, in which certain key features or opportunities are deliberately emphasized. For both provinces we will use the same scenarios, but their scope and content will

differ for each individual province. The following scenarios positioning these border regions are considered here:

- (1) backyard area: in this scenario it is assumed that an increasing number of economic activities will relocate from the Dutch Randstad to the Eastern regions Gelderland and Overijssel. This scenario takes also for granted that the production 'milieu' in these border regions is sufficiently favourable to attract new activities in a nationally and internationally competitive economic system. In this scenario a selective filtering down of manufacturing industries from the Randstad to the intermediate and peripheral areas is foreseen, thus leaving more space for advanced international producer services in the Randstad.
- (2) corridor area: this scenario is based on the favourable geographical location of the two border areas alongside major transport arteries between the Randstad and major European metropolitan areas (e.g., Ruhr Area, Milano, Hamburg/Berlin). Thus many commodity and person flows will pass through this transit area without generating significant benefits from these transitional flows for these areas. These regions would only face a higher burden caused by congestion and pollution.
- (3) green-tech area: the green-tech scenario employs the strong industrial tradition in these regions as a core for new technologically sophisticated activities which would be at the same time compatible with strict environmental constraints. This industrial sustainability scenario aims to reconcile industrial efficiency with environmental interests and interregional equity objectives. It assumes clear technologies for both product and process industries which are not detrimental to the favourable environmental conditions in the area.
- (4) gate-keeper area: this scenario is also based on an extension of European transport, but aims to generate extra benefits from transportation growth by offering sophisticated distributional functions (e.g., logistic platforms, container terminals, telematics centres, transportation broker functions) with a high value added. In that case permeability phenomena will make such areas more competitive (see, for instance, Biucchi and Gaudard 1981, Di Tella 1982, Guichonnet and Raffestin 1974 and Jeanneret 1985). Thus the two border regions will then act as a highly qualified multi-modal logistic centre in Europe.

It should once more be noticed that the above scenarios serve only as policy orientations: once a certain policy orientation (or a combination of orientations) would have been selected, then its implementation would require the development of operational plans which are custom-made with respect to the areas concerned, based on public-private initiatives.

It should also be added that the above scenarios have of course region-specific implications for each of these two border areas. For instance, the 'green-tech' scenario would imply for Overijssel much emphasis on new R&D-based industrial technologies (re-industrialisation) in some of the older industrial areas, whereas in Gelderland this would imply amongst others an expansion of fiber and related high-tech activities in existing industrial centers. Detailed information on all these regional specificities can be found in background documents (see Blaas and Voskuilen 1992, and Fotiadou, 1992). Here we will now mainly focus on the methodology for identifying the most promising and plausible development strategies for each of these two border regions. This will be the subject of the next section.

7. A Nested Multiple Criteria Analysis for Evaluating Development Strategies for Border Regions

The previous expositions have demonstrated that border areas have a spectrum of choice options regarding their geographical-economic profile in the emerging European network economy. Exploitation of all relevant opportunities seems to be a plausible development strategy, but this requires a selection of a meaningful customized profile which would provide these regions with the highest growth potentials, given relevant constraints imposed by special regional interests or concerns (e.g., environmental conditions, landscape quality). The identification of a desirable development strategy requires an assessment of all relevant options by means of proper regional policy objectives. Based on detailed field work, interviews with experts and consultations of policy makers, the following general policy objectives have been identified for our case study:

- A. production 'milieu': this broad policy objective refers to the aim of a maximum compatibility between the available regional production conditions (e.g., infrastructure, labour market) and the needs originating from new economic activities related to a specific scenario.
- B. quality of life: this generic concept concerns the need to have a maximum compatibility of new economic activities with the prevailing regional environmental quality conditions.
- C. production structure: this policy objective refers to the aim of a maximum complementarity between new economic activities and the existing regional sectoral composition.

It is clear that the above three policy objectives are in fact only denoted as latent variables whose values have to be measured in the form of manifest (or measurable) indicators. Therefore, we will now list these indicators in the form

of policy criteria which can be gauged by means of empirical research based on statistical data, interviews etc. (see Table 1).

A. Production' milieu

-
1. Availability of (access to) national infrastructure
 2. Availability of (access to) international infrastructure
 3. Availability of office space
 4. Availability of land for industrial development
 5. Presence of satisfactory innovation profile
 6. Qualitative situation on labour market
 7. Quantitative situation on labour market
 8. International image and position of region

B. Quality of life

-
1. Attractiveness of living environment
 2. Situation on housing market
 3. Quality of cultural 'milieu'

C. Production structure

-
1. Gross regional product in secondary sector
 2. Gross regional product in tertiary sector
 3. Employment in secondary sector
 4. Employment in tertiary sector
 5. Investments in secondary sector
 6. Investments in tertiary sector
 7. Number of firms in secondary sector
 8. Number of firms in tertiary sector
-

Table 1. Judgement criteria for evaluating alternative development strategies for Dutch border regions

Each of these indicators reflects the degree of impact of a given choice alternative (i.e., development scenario) on the criterion concerned. In other words, these indicators represent the (estimated) difference between the present situation of the region (the 'policy-off' case) and the future situation after the implementation of the scenario concerned (the 'policy-on' case).

The data for these policy criteria are partly qualitative (e.g., for A and B) and partly quantitative (e.g., for C). Given the mixed level of precision of the criteria measured, the outcomes of the field work - in the form of impact matrices - are only presented here in comparable qualitative (i.e., ordinal) terms (see Table 2 and 3).

Province of Gelderland

development scenarios	<u>production 'milieu'</u>	<u>quality of life</u>	<u>production structure</u>
	1 2 3 4 5 6 7 8	1 2 3	1 2 3 4 5 6 7 8
backyard	3 2 4 3 2 2 4 2	2 2 2	2 2 3 2 2 2 3 2
corridor	2 3 1 1 1 1 1 1	1 1 1	1 1 1 1 1 1 1 1
green-tech	1 1 2 4 4 4 3 3	4 4 4	4 3 2 4 4 3 2 4
gate-keeper	4 4 4 2 3 3 2 4	2 2 3	3 4 3 4 2 2 2 4

Table 2. Impact matrix of development scenarios for province of Gelderland

Province of Overijssel

development scenarios	<u>production 'milieu'</u>	<u>quality of life</u>	<u>production structure</u>
	1 2 3 4 5 6 7 8	1 2 3	1 2 3 4 5 6 7 8
backyard	3 2 2 3 2 2 4 2	4 2 3	2 2 4 3 4 4 3 2
corridor	2 3 1 1 1 1 1 1	1 1 1	1 1 1 1 1 1 1 1
green-tech	1 1 3 4 4 4 3 3	4 3 4	4 3 2 2 3 3 4 3
gate-keeper	4 4 4 2 3 3 2 4	2 2 3	3 4 3 4 2 2 2 4

Table 3. Impact matrix of development scenarios for province of Overijssel

The ordinal information gives a ranking of development strategies for each criterion and should be integrated as 'the higher the better'. As mentioned before, these impact tables are specific for each of the two regions investigated, so that we obtain two different matrices, one for Gelderland and one for Overijssel.

Now the next question is how the most plausible or desirable development

strategy for each of the two provinces can be identified. In view of the large set of different evaluation criteria and the ordinal information involved, a multiple criteria analysis may be regarded here as the appropriate analytical tool. The literature on multiple criteria analysis is abundant (see for a review Nijkamp et al. 1990 and Rietveld 1980). Multiple criteria analysis serves to identify the best choice possibility (option, alternative) out of a finite set of possibilities. Each of these choice possibilities is normally characterized by means of various indicators in the form of relevant policy evaluation criteria. The information is normally contained in an impact matrix of the type of Table 2 or 3.

Multiple criteria analysis is able to encapsulate different policy weights for each of the relevant evaluation criteria. Thus, in Table 2 for instance, it is possible to specify (qualitative) weights - in the form of a rank order - for each of the different criteria. Multiple criteria analysis is then able to select the 'best' choice possibility, given the information incorporated in the impact matrix and the weight set.

In practice, there is a great variety of multiple criteria evaluation methods. We will use here a special multiple criteria technique which is particularly suitable for qualitative (or ordinal) information, viz. the regime method. Details on the regime method can be found among others in Hinloopen and Nijkamp (1990) and Nijkamp et al.(1990). The principles of this method can in simple non-mathematical terms be described as follows.

Regime analysis is a flexible multiple criteria method, which is able to handle both quantitative and qualitative information. It is based on a pairwise comparison of alternatives or scenarios. The central concept in the regime analysis is the so-called concordance index C_{AB} . This index represents the extent to which alternative A is better than alternative B. This index may be defined as the sum of the weights attached to the criteria (objectives) included in the so-called concordance set C_{AB} (i.e., the set of all evaluation criteria for which alternative A in the multi-objective matrix is at least equally attractive as alternative B). Clearly, this set can be determined irrespective of the level of information on the impact matrix. Regime analysis focuses on the sign of this index rather than on its size. It can be shown that in certain cases, ordinal information on weights is sufficient to determine this sign, so that a final ranking of alternatives can be derived from the pairwise comparison matrix, consisting of values +1 and -1. In other cases, this sign cannot be determined unambiguously. It can be shown that in such cases a partitioning of the set of cardinal weights can be derived, that is in agreement with the ordinal information on the weights (see for details Nijkamp et al. 1990). The final result of this method is a complete and transitive ranking of all alternatives, for each set of weights. This method will now be applied to our case study area.

A major question in the use of multiple criteria analysis is the assessment of weights. In our empirical application we have assumed that no unambiguous information is available on the ranking of any of the policy weights concerned. This implies technically that we assume that all possible rankings of weights are equally probably. The regime method is able to handle this combinatorial problem. In this paper the various technicalities of multiple criteria analysis and

of the regime method will not be presented; these can be found in the relevant literature referred to above (the software is also available on floppy). We only present the final results here (see Tables 4 and 5); various numerical experiments can be found in Fotiadou (1992). These tables give the rankings of the four development scenarios for the border provinces of Gelderland and Overijssel, respectively.

Province of Gelderland

development scenarios

backyard	corridor	green-tech	gate-keeper
2	1	3/4	4/3

Table 4. Ranking of development scenarios for province of Gelderland

Province of Overijssel

development scenarios

backyard	corridor	green-tech	gate-keeper
2	1	4	3

Table 5. Ranking of development scenarios for province of Overijssel

The results from Table 4 and 5 can be interpreted in a rather straightforward way:

- the corridor scenario is in all cases inferior and not an attractive development option for the two border regions after the completion of the internal European market
- the backyard scenario is more appealing to these border regions, but is nevertheless superseded by the other scenarios, viz. the green-tech and the gate-keeper scenario
- the green-tech scenario is the most favourable one for the province of Overijssel. This is a plausible result, given the economic geographical profile of the province. The gatekeeper strategy ranks somewhat lower, but is definitely not a bad option, as it complies with the regional production 'milieu'
- both the gate-keeper and the green-tech scenario are plausible and desirable development strategies for the province of Gelderland, with a slight prefer-

ence for the gate-keeper strategy. Also these results are in agreement with the above description of the profile of this border regions.

In conclusion, the results from the multiple criteria analysis seem to suggest rather unambiguous regional development strategies for the two border areas. Gelderland would have to focus on gate-keeper (distributional and logistic) strategies supported by green-tech (clean technology) activities and to a lesser extent by backyard (spillover) activities. The policy for Overijssel would have to focus on environmentally clean high-tech activities, with some emphasis on physical distribution (gate-keeper) and to a lesser extent on backyard activities.

It goes without saying that the implementation of such strategies would need careful follow-up research, in particular regarding the suitability and carrying capacity of various sub-regions in each of these two provinces regarding the proposed development strategies.

8. Retrospect and Prospect

In the previous sections a methodology has been developed for evaluating the most appropriate development strategies for border regions after the economic integration process in Europe. The case study for two Dutch regions revealed that these regions need new strategic orientations in order to be internationally competitive. Although the scenarios presented here are to be regarded as contrast scenarios, one may nevertheless draw the conclusion that for former border areas an exclusive transit function or - to a lesser extent - an exclusive industrial backyard orientations not the most suitable development policy is. The use of indigenous resources (e.g., distributional position) linked with technologically advanced and environment-friendly activities seems to offer the best perspectives. Clearly, for each individual border region the degree of emphasis on each of these strategies may differ. In all cases, the provision of accessible trans-national network infrastructure (physical and non-physical) is a sine qua non for economic restructuring processes in such border areas; otherwise they would still continue to orient themselves to their previous product specialisation which was just reflecting their weak frontier position. Furthermore, another necessary condition for new development strategies (be it either distribution-logistic or high-tech oriented) is no doubt an upgrading of educational systems, or otherwise the lack of skilled labour would immediately form a new bottleneck for regional development initiatives.

Finally, the drastic restructuring phenomena of internal border areas in EC Europe would need an intensified effort by the ERDF to support realistic promising regional development strategies. Good examples can be found in transnational regional development cooperation programmes which recently have begun to emerge (e.g., the Alpe-Adria area, the Rhone-Alpe area and the Eu-regio area). In light of these experiences, one may conclude that many former internal border regions will - after the completion of the internal EC market - have in principle promising perspectives, provided their development strategies -

built up in a bottom-up fashion - are actively supported by private sector initiatives and active regional policy support from both regional national and supranational agencies.

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