The implications of globalization for the definition of the relevant geographic market in competition and competitiveness analysis

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0 EXECUTIVE SUMMARY

The regionalization and globalization of markets and the underlying production structures make it increasingly difficult to define antitrust markets and the emergence of dominant positions. With FDI becoming more important than trade in terms of servicing foreign markets, markets are becoming increasingly regionalized or globalized and national production systems more and more integrated through the activities of transnational corporations.

An important driver facilitating industry globalization is the drastic evolution in information and communication technology (ICT). Apart from being a catalyst for globalization, the ICT evolution also has given rise to a new generation of information products and technologies and has challenged traditional economic organizations. This has been referred to as the "New Economy" or "Information Economy", a knowledge-based economy where innovative ideas and technology are constantly changing services and manufactured products that are globally supplied from the start. The extremely rapid evolution in these high-technology markets poses an additional challenge for merger control authorities to meaningfully define relevant antitrust markets.

Considering the actual antitrust practices within the European Community and the US with respect to the delineation of the relevant geographic market, regulations and guidelines at this moment almost exclusively focus on demand substitution. However, the process of globalization involves essentially global supply conditions and competition, and makes the interactions between global competitors a crucial element in defining the relevant market. Already in 1996 the US Federal Trade Commission recognized this trend and wrote a report on the implications of globalization for competition policy. Among other things the report concluded that "relevant geographic markets should be defined to include foreign supply response as appropriate, giving due regard both to actual barriers to trade and to the increasing trend towards the globalization of trade and services". However, up to now it has not been amended in the Merger Guidelines. Moreover, the actual practices lack to consider the various market delineation criteria in a structured, hierarchical way,

which sometimes leads to unclear outcomes in cases where equivocal evidence is considered.

This study suggests a methodology for delineating the relevant geographic market, which brings both demand and supply substitution better in balance and puts weights on the different market delineation criteria. In a first step, the methodology complements shipment data and price data with the examination of border effects in order to define the economic market. Such border effects are a measure indicating to what extent actual trade between two geographic markets deviates from trade volumes that would normally be expected if markets were fully integrated. Starting from this economic market definition, in a second step global supply responses and global/multimarket competition are explicitly considered as to come to a meaningful definition of the relevant geographic antitrust market. Micro-economic data on competitors' strategic market behavior are used to determine how firms actually perceive the relevant market. The methodology systematically processes information and builds up cumulative evidence to arrive at a solid delineation of the geographic market, taking into account both demand and supply substitution. The methodology is applicable both in traditional and ICT sectors.

Based on the proposed methodology, guidelines to find the appropriate data or how to obtain the necessary information from the parties involved, are provided in a separate section.

The study concludes with a discussion of the recent Volvo-Scania case in the light of the new methodology developed in the study. To make an assessment of the Volvo-Scania heavy trucks case, evidence presented by the Commission in its final decision is used in the established framework. The analysis of the case shows how the framework can provide better guidance and structure in processing the available information. It shows that for selling trucks in some EU areas strong national barriers to trade still exist, but that these barriers are mostly artificial, created by various national regulations that give rise to strong economic market fragmentation. Most truck makers are present in all EU Member States, but with a substantial variation in market shares. However, the evidence shows that supply systems are increasingly European wide organized, with a strong growth in intra-firm trade. The analysis

therefore suggests a multimarket competition outcome, implying that national markets are strategically not isolated from each other. Moreover, the advantages of a supply organization at the European level suggest substantial efficiency gains linked to the proposed merger between Volvo and Scania. However, so far efficiency gains appear not to be taken into account in EC merger control. The various elements from the analysis would favor a less drastic decision as the one adopted by the Commission. Moreover, a first best policy, stretching beyond the scope of merger control, would consist of further harmonizing national regulations, in order to fully integrate markets at the EU level.

1 INTRODUCTION

Three factors are strongly affecting the geographical dimensions of markets and the wider competitive process that characterizes European firms.

A first element is the globalization of markets through intensified trade and investment across national borders. With proper policies in place, improved market transparency and global competition should boost European industrial competitiveness.

Second, both the introduction of the EURO and the completion of the single market have a profound influence on the way companies compete within Europe. Disappearing national trading borders and vanishing national currencies make the comparison of prices much easier and ease the sales in other Member States. National or regional markets are therefore more difficult, if not impossible to separate. European firms are seeking to respond to these changes in various ways, among which, most markedly, an increasing number of large scale mergers and alliances. These concentrations enable firms to specialize in those activities and markets where they can acquire a sufficiently strong position worldwide. Consequently, companies increasingly see themselves as competing on a world scale. Yet, the "technical" competition policy analysis may still end up defining geographical markets on a more narrow scale, thus creating a tension between the market dynamics as seen by the companies and the geographical market definition used for competition policy purposes.

A third element in defining the relevant geographic market is the recent evolution in ICT. These evolutions in ICT have strongly reshaped competition and many new firms in the ICT sector operate immediately on a global scale (the so-called "born global firms"). How do these evolutions in ICT and the possibilities of e-commerce influence competition? How can the Commission in such rapidly changing environment make meaningful forecasts about the future development of those new markets?

The purpose of this project is to evaluate the implications of globalization drivers and of market integration for the definition of the relevant geographic market. The study analyzes whether the actual methods used for market delineation are still suitable in this global environment and, if necessary, proposes changes to better capture the dynamics of globalization.

The report is structured as follows. Section 2 analyzes the concept of a global industry and considers the impact of globalization on competition. It also examines to what extent competition is affected by globalization in small countries. An important driver from the globalization process is the recent ICT evolution. Section 2 therefore concludes with an assessment of the impact of ICT and the emergence of the "Information Economy". Section 3 examines to what extent actual merger regulations are suitable for dealing with these globalization and ICT evolutions. It discusses the methods actually used in antitrust analysis for delineating the relevant market. The first paragraph discusses some general methods used in antitrust. In a second paragraph the focus is on the relevant geographic market, with both EU and US practices discussed and evaluated. Throughout this section reference is made to anti-trust cases in both EU and US. Section 4 suggests a methodology to define the relevant geographic market, combining both macro- and micro-level data. Informational requirements with regard to the methodology are discussed in section 5. The study concludes with an application of the methodology to the Volvo-Scania heavy truck case.

2 GLOBAL INDUSTRIES

Before examining the global scope of markets, it appears instructive to first analyze what is understood under a 'global industry'. In his work Porter (1986) identifies a global industry as a series of linked domestic industries in which rivals compete against each other on a truly worldwide basis. The idea of intercountry links can also be found in Yip (1992). In the same line Morrison and Roth (1992) talk about global industries as distinct competitive environments that are differentially interdependent. Consequently, a global industry can be defined as "an industry in which a firm's competitive position in one country is significantly affected by its position in other countries or vice versa" (Makhija, M. et al., 1997). This definition implies that a good measure of industry globalization must be able to identify industries that have significant linkages between different countries and where there is integration of firms' value-added activities and competitive moves.

2.1 Measuring industry globalization

Morrison and Roth (1992) and Kobrin (1991) made valuable contributions in the evaluation of industry globalization through the examination of trade levels (Morrison and Roth, 1992) or the analysis of intra-firm trade flows (Kobrin, 1991). Makhija et al. (1997) tried to develop an objective measure of industry globalization by combining two trade measures. The first measure takes the proportion of international trade in relation to overall consumption within the industry to identify the level of international linkages. The second measure tries to capture the level of integration of value-added activities by the standard Grubel and Lloyd index of intra-industry trade. They consider an industry to be globally integrated when both measures exceed 0,5. However, since intra-industry trade covers more than just intra-firm trade the index of intra-industry trade does not really constitute a good measure of the integration of value-added activities. Davies and Rondi (1996) use a measure to distinguish between integrated and unintegrated industries based on the level of trade on the one hand and the level of multinationality on the other hand. They speak of an integrated industry when either trade intensity, defined as trade divided by total production plus imports exceeds 25 percent and/or multinationality, i.e. sales of subsidiaries of multinational

firms divided by total sales, exceeds 25 percent. According to the authors, one of the conditions seems to be enough to distinguish an integrated industry. However, this does not completely fit with the definition of a global industry that requires both conditions to be fulfilled. For instance, an industry showing a high level of multinationality but a low level of trade cannot be labeled an integrated industry, if high trade barriers force firms in that industry to become multinational. In such a case markets can be strongly separated and subsidiaries may act on a stand-alone basis.

In the framework of the delineation of global markets Sleuwaegen (1994) developed a more comprehensive measure combining international trade with multinational investment. The approach adopted is to focus on the national industry data. This approach can also be found in Makhija et al. (1997). The reason for this is the variation that exists among national industries within a worldwide global industry. That is, even though the worldwide industry is more or less global, specific national industries are likely to vary in the extent and manner in which they are linked to other national industries, due to domestic forces (political, economic, social and other institutional) that facilitate or hamper globalization (Chandler, 1990, North, 1990, Porter, 1990).

Within the last approach, exposure to international trade competition is measured through the value of exports X and imports M into a country. A distinction is made according to the trading partners: X and M indicate exports and imports to EC Member States, while X_{nec} and M_{nec} indicate exports and imports from non-EC countries. The trade exposure measure XM used in the analysis divides the sum of the exports and imports by the sum of all shipments (=production +imports). In order to come to a meaningful classification, a cut-off rate of 30% is used to classify transactions as domestic or international. A further division is made according to the geographic concentration of international trade transactions. Transactions are classified as European if XM is larger than 30%, without significant trade with non-EC countries (i.e. $XM_{nec}<0.30*XM$) and transactions are global if XM>0.30 and $XM_{nec}>0.30*XM$).

Multinational investment is taken into account by introducing the measure FP (foreign participation), indicating the presence of multinational firms in the country. FP is defined as sales by multinational firms (domestic- and foreign based) divided by total

sales by all firms producing in the country. A distinction is made between participation by multinationals based in EC countries (FP) and non-EC based multinationals (FP_{nec}). As with the trade data, a cut-off rate of 30% is used to distinguish European industries characterized by the presence of foreign competitors (FP>30%) from strictly national suppliers in the country (FP<30%). Similar to the trade subdivisions, foreign rivalry is further subdivided into European competition present in a country's industry (FP>0.30 and FP_{nec}<0.30*FP) or global competition (FP>0.30 and FP_{nec}>0.30*FP).

Combining both measures a distinction can be made between several types of industries following the scope of geographical competition (see figure 1).

Figure 1 - National, European and global industries

	XM<0.30	XM>0.30 and XM_{nec}<0.30*XM	XM>0.30 and XM_{nec}>0.30*XM
FP>0.30 and FP_{nec}>0.30*FP	Global investors National shipments	Global investors European shipments	Global
FP>0.30 and FP_{nec}<0.30*FP	European investors National shipments	European	European investors Global shipments
FP<0.30	National	National investors European shipments	National investors Global shipments

XM: exports plus imports as a share of production plus imports.
FP: foreign presence, measured by the share of production accounted for by foreign firms in the country.
nec: non-EU foreign firms

Source: Sleuwaegen (1994)

The industries found on the diagonal meet the definition of a national, regional or global industry. The other industries perform well on either one of the two characteristics of a global industry and are therefore partially integrated. Also Yip (1995) points out that industries are not either global or domestic, but that many variations in-between exist. Most industries have globalization potential in some aspects and not in others. Moreover, different industry globalization drivers can operate in different directions and may significantly change over time. Sleuwaegen (1994) has made classifications for Belgian industries for the year 1990 (see annex I).

2.2 The drivers of globalization

Many conditions are seen as critical in affecting the level of industry globalization. Yip (1995) groups those conditions into four groups of "industry globalization drivers": market, cost, government and competitive drivers. They are the underlying conditions in each industry that affect the industry globalization potential, i.e. the potential for firms to set a global strategy and compete worldwide. Figure 2 gives a non-exhaustive overview of recent changes in those globalization drivers worldwide. With the realization of the market integration program in the EU in 1992, especially within Europe all the globalization drivers gained momentum. The introduction of the EURO further strengthens this evolution.

Figure 2 - Recent changes in industry globalization drivers

Market drivers:
Per capita income converging among industrialized nations (e.g. Japan, Hong Kong, …)
Convergence of lifestyles and tastes
Organizations beginning to behave as global customers
Increasing travel creating global consumers
Growth of global and regional channels
Establishment of world brands
Push to develop global advertising

Cost drivers:
Continuing push for economies of scale
Accelerating technological innovation
Advances in transportation
Emergence of newly industrializing countries with productive capability and low labor costs
Increasing cost of product development relative to market life

Government drivers:
Reduction of tariff barriers
Reduction of non-tariff barriers
Creation of trading blocs
Decline in role of governments as producers and customers
Privatization in previously state-dominated economies, particularly in Latin America
Shift to open market economies from closed communist systems in Eastern Europe
Increasing participation of China and India in the global economy

Competitive drivers:
Continuing increase in level of world trade
Increased ownership of corporations by foreign acquirors
Rise of new competitors intent upon becoming global competitors
Growth of global networks making countries interdependent in particular industries (e.g. electronics)
More companies becoming globally centered rather than nationally centered
Increased formation of global strategic alliances

Other drivers:
Revolution in information and communications
Globalization of financial markets
Improvements in business travel

Source: Yip (1995), "Total global strategy", p. 9

Increasing industry globalization will most often increase the strength of competitive forces[1] across national borders. Particularly, with respect to the threat of new entrants and rivalry among existing firms, increased industry globalization increases competition by widening its geographic scope. Increased industry globalization also increases the pressure from substitutes, available by different suppliers in various parts of the world. The effects of industry globalization on the power of suppliers and the power of buyers depend on the degree of integration and concentration of buyers versus suppliers on a world scale.

2.3 Are small country markets sheltered from globalization?

Recent works on the globalization of firms emphasize essential resource requirements to expand abroad. Within the logic of these globalization models the global plant configuration of firms results from the interaction of internal forces pushing firms to extend their resources beyond national borders with the pull of external forces driving firms to exploit profit opportunities in foreign markets (Yip, 1995)

Observed differences in the behavioral process behind international expansion decisions of firms have stirred a lot of debate in the literature and led to the development of several theoretical models. Much of the debate centered on the stages within the process, where stages either describe an incremental process in which firms

[1] as identified by Porter (1980): threat of entry, rivalry among existing firms, pressure from substitute products or services, bargaining power of suppliers and bargaining power of buyers.

gradually grow and acquire more market knowledge and commit resources to foreign markets (Uppsala model) or the development of a learning sequence parallel to the adoption of an innovation in response to the perception of profit opportunities in foreign markets (Innovation related models). A challenge to the behavioral 'stage' models comes from the growing incidence of international new venture or born global firms that are defined as a business organization, that deploys resources and sells in multiple countries from scratch. Several scholars consider the development of specific knowledge competencies and systemic advantages related to network exchanges as the central explanation behind the growth of the latter type of firms (Mc Dougall, Shane and Oviatt, 1994, Bell, 1995)

Central to all theoretical models is the acquisition and exploitation of knowledge to operate in foreign countries. Focusing on this knowledge issue, an interesting approach that synthesizes many of the different approaches is offered by Casson (1994), who examines internationalization as a corporate learning process. In his model the cost of acquisition of information about a market generates a set-up cost of entry. The necessary information and knowledge development can happen through experience, experimental or systematic market investigation. Key to the choice between sequentially entering or simultaneously entering various foreign markets is a trade-off between exploitation of economies of scope in knowledge maximized by a sequential strategy and the gains from exploiting profitable market opportunities without delay in a simultaneous entry globalization strategy. The latter strategy assumes that substantial extra costs of investigation have to be incurred in acquiring without delay the necessary knowledge about the different market environments. Participating and exchange of information in global networks of international market actors would substantially facilitate exchanges and reduce the cost to committing resources to foreign markets (Bell, 1995).

The Casson model establishes a clear link between the internal knowledge capacities of the firm and the external development of markets and competitive environment. The impact of market development and the competitive environment has been the focus of a lot of previous work focusing on the product life cycle hypothesis. In focusing on the introduction of new products in global markets, Kalish, Mahajan and Muller (1995) distinguish between a roll-over or waterfall strategy, based on the

international product life cycle theory, i.e. a strategy by which innovations trickle down from the most to the least technologically advanced countries and a sprinkler strategy involving the simultaneous introduction of the product in various markets at the same time. Using innovation diffusion models in a competitive game framework, these authors analytically derive the conditions under which a waterfall strategy is optimal in a competitive game. Among these conditions small foreign markets with high entry barriers, little growth prospects and weak competitors would favor the waterfall strategy, and hence deter foreign firms from quickly entering such markets.

The introduction of uncertainty in these models still adds another dimension to the problem. If the costs of information gathering is prohibitively high, firms may opt for experimental learning (Casson, 1997) or optimally exploit the option value of waiting to invest in a foreign country (Pennings and Sleuwaegen, 2000). The option value will be small when uncertainty is low and imitation and /or replication of the resources is easy in foreign countries.

Finally, cross country differences in the prevalence of different types of tariff and non-tariff trade barriers have prompted firms to set up foreign plants in particular countries in spite of attractive conditions to export from the home country or other export platform countries. However, such a tariff jumping strategy appears only to be warranted if the market is large enough to compensate for the high set up costs of investing in a foreign closed market (Blonigen, 1998, Barrel and Pain, 1999 and Belderbos, 1997)

Consequently, from the market characteristics in relation to possible strategic advantages for foreign-based firms as well as from the knowledge requirements to enter small culturally distinguished markets, the theoretical models predict that the latter type of market would be sheltered from rapid and massive penetration by globally operating firms. Not only the size of the country matters in this respect, but also its openness to international trade. For small open markets with high export intensities, the market for firms is significantly larger than the home market alone. Table 1 presents data on the openness of a few small countries and the share of foreign affiliates in manufacturing employment. Clearly, the high presence of multinational firms in the open small economy of Belgium contrasts very well with

the weak presence of foreign firms in some of the more closed Scandinavian countries.

Table 1 – Foreign investment in small countries

	Openness of economy	Foreign presence
Belgium	0,4882	36%
The Netherlands	0,4338	37%
Sweden	0,3698	19%
Finland	0,3548	7%
Norway	0,2372	11%

Openness of economy = exports/(production + imports), 1994
Foreign presence = share of foreign affiliates in manufacturing employment, 1994

Source: OECD statistical data, 1994

2.4 ICT and the emergence of the "New Economy"

The recent developments in information and communication technologies (ICT) are a strong driver towards globalization. However, this evolution also gave rise to a complete new range of information and communication goods. The growing use of information and communication technologies economy-wide, is said to be transforming the structure, functioning and rules of the economy, resulting in a "New economy" or "Information economy".

The Information Economy is a knowledge and idea-based economy where the keys to job creation and higher standards of living are innovative ideas and technology embedded in services and manufactured products. Risk, uncertainty, and constant change are the rule, rather than the exception.

A remarkable element in this evolution is the breakthrough of Internet and 'e-commerce'. In this evolution consumers take a central position by a.o. the development of integrated CRM systems (Customer Relationship Management). These technological changes lower communication costs and integrate markets across existing country borders and institutional barriers. Moreover, this trend enables the

emergence of whole new industries and products, as witnessed by the explosion of new jobs created by the Internet.

In the Information Economy knowledge-based intangibles become more and more important. A lot of new ICT-products have network characteristics. This implies that demand for such products increases, the more the product is diffused (e.g. telephone, Internet).

Contrary to this demand, the supply of such products can be adapted easily with minimum marginal costs. However, the initial investment costs of information goods are very high, as opposed to low marginal costs. But once the product has been developed, there are hardly physical limits to the production of information goods. The development of a software product such as for example Windows 2000 implies a big initial investment, but once the final version is finished, millions of copies can be released with very little additional costs. The first disk of Windows to be sold cost Microsoft about $50 million; the second and subsequent disks cost $3. Clearly, on both supply and demand-side there are strong forces in the Information Economy that favor scale.

The emergence of information goods leads to sharp decreases in search and transaction costs, making markets more transparent. Uncertainty decreases and the physical distance becomes less and less important (‘death of distance’). The value of some information goods also increases with the number of users (‘network externalities’). These users however are technology dependent, which has strategic implications for the companies concerned (‘lock-in’). If for example much downloadable software on the Internet will soon appear as programs written in Sun Microsystems’ Java language, users will need Java on their computers to run them. Java has competitors, but the more it gains prevalence, the more likely it will emerge as standard.

The ICT evolution also influences the internationalization strategy of firms. Whereas firms traditionally used to internationalize following a ‘waterfall model’, i.e. the firm starts its internationalization in more related - mostly neighboring - markets, firms

more and more are 'global born firms', i.e. through Greenfield investments or alliances they are immediately active in all important markets over the world.

The firstly developed ICT applications were directed from business to consumer (B2C). Business to business (B2B) exchanges were slower to develop because of the vastly more complex market structures involved but has attracted attention because of the comparatively larger value of potential commerce. B2B exchanges are thought to work best in highly fragmented markets of relatively small orders, where sellers would obtain better prices through aggregation of demand while buyers would obtain better prices through aggregation of demand. B2B exchanges are, absent some naked price-fixing or market allocation scheme[2], inherently efficiency enhancing. Technological developments, as implemented through B2B exchanges, offer immediate transaction cost savings for many standard business practices. Moreover, by grouping with other companies, a smaller company can use the Internet to reach and secure business outcomes without having to expand geographically.

B2B exchanges that lower entry barriers and increase the competitiveness of smaller players also may result in decreased market share for established players. The result should be a more competitive market with lower prices and better quality products and services for consumers. Of course, a B2B exchange only can produce these benefits if it is truly open. "Open" in this context should not mean that the Exchange Board is required to allow any party seeking access to have it, but rather, that the Exchange will employ reasonable, objective criteria in determining who may participate. On the other hand, if the Exchange Board uses arbitrary eligibility criteria to prevent smaller manufacturers, wholesalers or retailers from obtaining access to the Exchange, the Exchange could have anti-competitive effects. Open access therefore may be a critical factor in ensuring that an exchange plays a pro-competitive rather than an anti-competitive role in the particular markets in which it operates. The importance of open access is increased when entry by additional exchanges is difficult.

[2] If the purchasing collective has monopsony power, meaning the ability to obtain goods below competitive costs for extended periods of time, or if, collectively, the companies refuse to deal with suppliers outside their own online marketplace, that action could be challenged.

- **Unbalanced market dynamics**

The Information Economy is characterized by “creative destruction”, competition is typically Schumpeterian in character, with a fierce struggle to be the next temporary monopolist (Shapiro, 2000). The changes in this new economy are so rapid and complex, that the environment is characterized as being ‘raplex’.

In the Information Economy the underlying mechanisms that determine economic behavior also have shifted from diminishing returns to increasing returns. Increasing returns can be defined as “a greater than proportional unit increase in output generated by a proportional increase in the unit of input” (Stigler, 1958). They imply that those firms that are ahead, get even further ahead and that those firms that lag behind will stay behind. Increasing returns do not lead to a market equilibrium, but to instability. If a product or technology – one of many competing in the market - takes a lead by chance or clever strategy, increasing returns can magnify this advantage and the product or technology can go on to lock in the market (Arthur, 1996).

In the new market environment, characterized by a high degree of uncertainty, the barriers to entry differ from traditional sectors. To possess good knowledge and information and use this in an efficient way are crucial elements for the knowledge-based firm. Success depends not only upon the technology used but also upon chance, related to positive feedback from the market. Possible high profits and possibilities of growth attract entrants. However, also the risk is high. The value of a firm therefore is not only determined by the net present value of normal expected returns, but also by the net present value of uncertain future growth options related to technological possibilities of the firm (Engelen and Cassimon, 1999). Due to the possibilities of ICT, firms will more easily rely on alliances and outsourcing of components and services and make less use of a vertical integration structure.

In figure 3 a comparison is made between the traditional sector and the information economy.

Figure 3 - Traditional versus information economy

TRADITIONAL SECTOR	*INFORMATION ECONOMY*
MARKET DYNAMICS	
Mechanical	Raplex
- Stable markets	- Unstable markets
- Unique market equilibrium	- More than one equilibrium
- Predictable	- Unpredictable
- Market sharing	- Market lock-in
- Normal profits/normal risks	- High profits/high risk
- Value = NPV	- Value = NPV + real options
- Econ. success through investments	- Econ. Success through technology and chance related to positive feedback
- Barrier to entry = capital	- Barrier to entry = information/knowledge
- Vertical integration	- Networks, alliances

- **Entry-deterring strategies in information goods markets**

Finally, some entry-deterring strategies used in information goods markets will be summarized.

Entry Forestalling Price

As a consequence of high switching costs for consumers, a monopolist can, by temporarily reducing its price, prevent the adoption of a new technology until it receives an installed base. This gives the monopolist an insurmountable lead position compared to possible competitors. Recoupment follows afterwards, when the market has been locked in.

Preemptive R&D

By intensifying R&D, the incumbent achieves a cost advantage that may ultimately lead it to relax its innovation efforts without attracting entry.

Predatory Product Innovation

Ordover and Willig (1985) describe a strategy whereby an incumbent excludes a competitor by introducing a new system, which is incompatible with the competitor's components. Moreover the strategy includes withdrawing from production, or raising the price of components that are compatible with the competitor's components.

Product Preannouncements

Product preannouncements can be used to exclude rivals. Preannouncement may induce some buyers to forgo purchasing the present generation of products in order to wait for the new generation of products. The strategy can be viewed as a short-run sacrifice of profits in order to reap (monopoly) profits at a later stage. This strategy is also used for psychological positioning. Under increasing returns, rivals will back off in a market not only if it is locked in but also if they believe it will be locked in by someone else soon. Hence one can observe psychological jockeying in the form of preannouncements.

Asymmetric Joint Ventures

Ordover and Willig (1985) describe a strategy whereby an incumbent with market power reduces the pace of innovation by entering a research joint venture with a potentially innovative rival that lacks market power. The joint venture might be a mechanism for achieving co-ordination between firms with disparate incentives, resulting in a reduction of R&D effort.

3 GLOBALIZATION AND THE DEFINITION OF THE RELEVANT (GEOGRAPHIC) MARKET IN ANTITRUST

This section aims at providing a general understanding of the way EU and US merger regulations treat globalization in the definition of the relevant market. The first paragraph concentrates on the methods actually used is antitrust analysis. In the following paragraphs the concept of a relevant geographic market is analyzed from a comparative perspective in contrasting EU practice with US practice. The last paragraph pays special attention to the definition of the relevant market for information goods.

3.1 The relevant market concept in antitrust

The definition of the relevant market is no doubt one of the most difficult parts of the merger analysis regardless of the concrete merger system to which it refers. The problem in the merger context is that one is not faced with the problem of proving that something has happened, but with predicting the future effect of a merger on the structure and performance of the market. The result of this different approach is that markets are mostly defined in a broader way in merger cases than they are under article 82 of the EC Treaty or Section 2 of the Sherman Act cases (Hellemans, 1993).

A relevant market is the smallest grouping of sales for which the elasticity of demand and supply are sufficiently low that a firm with 100% of that grouping could profitably reduce output and increase price substantially above marginal cost. For purposes of both EC[3] and US[4] law in the context of concentrations, the delineation of the relevant antitrust market is based on the abstract concept of the exercise of monopoly power by a hypothetical monopolist. A candidate market is called the relevant antitrust market if the hypothetical monopolist can set a price in that market which is significantly higher than the prevailing price (in the range of 5% to 10%), without major decrease of its profitability.

[3] See EC Communication 97/C 372/03, point 17
[4] See Section 1.21 MG

The extent to which firms are able to increase prices above the price level appropriate for the particular inquiry depends on the availability of substitute products (i.e. demand-side substitution) and the ability of other firms to supply those products (i.e. supply-side substitution). The fewer good substitute products available and/or the more difficult it is for other firms to enter this market, the less elastic the demand curve is likely to be. The elasticity of demand for a given product will be lower if the supplier of that product is also able to control the supply of its closest substitute. The relevant market contains all those substitute products and regions that provide a significant competitive constraint on the products and regions of interest.

3.2 Empirical economic analysis in geographic market delineation

The concept of the hypothetical monopolist to delineate the relevant market appears rather abstract and does not lend itself to easy use in practice. Less abstract methods are used in the economic literature to delineate relevant antitrust markets. Unfortunately, all suffer from major shortcomings. Many of these economic tests are actually based on the principle of an economic market rather than on the principle of a relevant antitrust market.

- **Economic markets versus antitrust markets**

The definition of an economic market relies on the concept of arbitrage. Cournot (1838) defined a market as “the entire territory of which parts are so united by the relations of unrestricted commerce that prices there take the same level throughout, with ease and rapidity”. Marshall (1920) added to this that “the more nearly perfect a market is, the stronger is the tendency for the same price to be paid for the same thing at the same time in all parts of the market: But of course if the market is large, allowance must be made for the expense of delivering the goods to different purchasers”. This means that “a market for a commodity is the area within which the price tends to uniformity, allowance being made for transportation costs” (Stigler, 1942). A classically defined market is thus that area and set of products within which prices are linked to another by supply- or

demand-side arbitrage and in which those prices can be treated independently of prices of goods not in the market, that is, an area within which partial equilibrium analysis is valid (Scheffman and Spiller, 1987)[5].

An antitrust market however, is defined in a different way. The key question to be answered for antitrust purposes is whether a proposed merger or the presence of a dominant firm will lead to the exercise of monopoly power. The universe considered in antitrust situations should thus not be the economic market but rather the relevant product and geographical space in which sellers would jointly be able to exercise significant monopoly power (see e.g. Fisher, 1987, Davidson and Deneckere, 1984). Therefore, an antitrust market is defined as "any product or group of products and any geographic area in which collective action by all firms (as through collusion or merger) would result in a profit maximizing price that significantly exceeds the competitive price" (Werden, 1981). In any particular case, the smallest group of products and geographic area that constitutes an antitrust market is called the relevant antitrust market.

Summarizing, the delineation of an economic market is completely different from the delineation of an antitrust market. While antitrust markets consists of the smallest group of products possessing potential market power, economic markets are based on arbitrage. However, arbitrage is also a relevant factor in the assessment of market power. Scheffman and Spiller (1987) indicate that arbitrage tempers but does not necessarily eliminate market power.

In antitrust situations, it is essential to delineate an antitrust market instead of an economic market. Unfortunately however, much of the economic research on the delineation of markets for antitrust analysis has generally adopted a view of markets consistent with the classical approach of an economic market, especially since the term antitrust market is not easily translatable into terms that can be applied in practice. After all, it is a difficult task to delineate a market which is based on an abstract concept such as a hypothetical monopoly (which can thus not be observed in practice). Several market

[5] Geroski (1997) comments to this: "This seems to be a particularly pertinent observation, since the common practice of writing down a particular demand curve presupposes the existence of a well defined trading market, and implicitly reflects it's boundaries".

delineation tests, such as price tests, were therefore developed that were based only on the ideas about economic markets. Although none of the alternative methods may provide the optimal solution, in combination, the different methods may lead to a reasonable determination of the size and scope of the relevant antitrust market[6].

It has been standard practice, both in the US and the EC, to refer to the following methods in practical applications.

- **Residual demand estimation**

Baker and Bresnahan (1985, 1988) and Scheffman and Spiller (1987) present a method which is directly meant to estimate the residual demand elasticity. Their analysis is intended to determine how market power possessed by the parties to a merger would be affected by an eventual merger. Additionally, Scheffman and Spiller (1987) consider the estimation of these residual demand curves for use in market delineation in a geographic context. By using marginal costs as an instrument, an estimated residual demand elasticity is simply a measure of the extent to which cost shocks are passed through to prices. If cost shocks are largely passed through to price with relatively little effect on the quantity, then the residual demand is fairly inelastic. If cost shocks are not passed on or are passed on but quantity falls by a proportionately large amount, then the residual demand is fairly elastic.

The test follows from the profit-maximization condition for the hypothetical monopoly or cartel of firms composing the candidate market. For each product c in the candidate market, the monopolistic cartel should set a price p_c, which deviates from marginal cost MC:

$$(p_c\text{-}MC)/p_c = 1/\text{-}e_{pc}$$

where e_{pc} stands for price elasticity of demand ($e_{pc}<0$).

[6] Sleuwaegen, L. and De Voldere, I. (1999), "Competitive distortions and state aid to firms. How to define the relevant market?", EC Report.

This equation can be manipulated to yield a clear test whether the cartel in the candidate market would raise price above the competitive price by at least the a priori fixed significance threshold. Formally, the candidate market is an antitrust market if for the products

$$p_c/p = p_c/MC = e_{pc}/(e_{pc}+1) > 1+t$$

where p_c = the price set by the monopoly (cartel) for good c
p = the competitive price, equal to marginal cost under perfectly competitive conditions
t = the significance threshold (e.g. 5%)

This method is probably one of the best methods for market delineation. If data were sufficiently available, then e_{pc} could be accurately estimated and relevant market delineation could be done with great precision. Nevertheless, although the method is most close to the definition of an antitrust market, it is very difficult to use in practice because of the high data requirements.

- **Demand elasticities**

As an alternative to the previous method, Sleuwaegen (1994) decomposes the residual demand elasticity into two components: the partial demand elasticity, which constitutes the most direct influence on the residual demand elasticity and the competitive reaction elasticity. Whereas the partial demand elasticity is calculated from the market demand for a product, assuming that only the price of that product changes, the competitive reaction elasticity incorporates the effects from adjustments of marketing instruments for all other goods outside the monopolistic cartel in response to a change in price in the candidate market. Examining these different elasticities in detail also provides information about the size of the residual demand elasticity.

However, as data on the latter elasticities are also not readily available, the same reasoning can be used. Instead of directly estimating the different elasticities, different factors related to the elasticities could be examined, which could provide a rough estimate of whether the residual demand elasticity in a specific situation is low or high.

- **Diversion ratio**

Shapiro (1995) defines the diversion ratio as the fraction of sales lost by firm A to competitor B due to a price increase by firm A. Whenever econometric estimation of elasticities is not possible due to lack of sufficient good data, there still may be relevant consumer survey data that can be used to directly estimate the diversion ratio (Shapiro, 1995).

The diversion ratio is closely related to the cross-elasticity of demand. Willig (1991) notes that the ratio of the cross-price elasticity to the own price elasticity measures the share of the marginal sales of one brand that will divert to another in response to a price increase.

- **Price tests**

Whereas the first methods follow closely the definition of a relevant antitrust market, they are very difficult to use in practice due to a lack of adequate information. Therefore, many methods have been developed based on the definition of an economic market. The idea behind the price tests is that prices of two goods that belong to the same market should move together. These tests are thus actually based on the definition of an economic market instead of the definition of a relevant market. However, in spite of criticism on these methods, many still advocate the use of price tests in order to delineate or at least, to get a first indication of the relevant market. Different price tests exist:

Price correlation

According to Kottke (1960), Stigler and Sherwin (1985) a.o. the similarity of price movements captures the essential role of competition in dominating the price movements within each part of the market. Whenever closely parallel price movements are found between 'various' markets, the products should be placed in the same antitrust market. Similarly, whenever significant nonparallel price movements are found, the products are not in the same market.

Bishop and Walker (1999) address the issue of price correlation in the presence of different exchange rates between the markets, to make the approach applicable to the European situation. One has to convert price series from different countries into one currency. When more than two countries are considered, one must impose a common trend on price series, which has the effect of an increasing correlation. If there is a trend already apparent in the price series, then the results are even more biased. They conclude that except where exchange rates are very stable, price correlation analysis is inadequate to define relevant geographic markets across exchange rate areas[7].

Price equality tests

A second price test is the price equality test (see e.g. Shrieves (1978) and Horowitz (1981)). This test is based on the proposition that if two geographic areas are to be considered a single market, then the price at which the product sells in the two areas cannot be different. A closely related test to this would be to use normalised prices to correct for differences in the products (see e.g. Spiller and Huang (1986)). However, Werden and Froeb (1993) remark that the fact that the prices of two products or areas differ significantly is neither a necessary nor a sufficient condition for either product or area to be in or not to be in the relevant market delineated for the other.

Speed of adjustment tests

A third price test is the speed of adjustment test (see e.g. Mathis, Harris and Boehlje (1978), who discuss relative speeds of adjustment, and Horowitz (1981), who discusses absolute speed of adjustment). This type of tests considers the adjustment process through which the difference between any pair of prices would converge to its equilibrium level. If the speed of adjustment parameter is close to zero, then there is fast convergence to the equilibrium.

Granger causality, exogeneity and measures of feedback

Starting in 1985, tests for antitrust market delineation were developed that made use of modern time series methods, such as Granger causality[8], exogeneity[9] and measures of

[7] See Bishop and Walker (1999), sections 10.31 to 10.43, pp. 240-248 for an detailed discussion.

[8] Granger causality measures precedence and information content but does not by itself indicate causality in the more common use of the term. Klein, Rifkin, and Uri (1985, p. 111) describes Granger causality as follows: "A time series X_t 'causes' another time series Y_t , in the sense defined by Granger if the present Y can be predicted better by using past values of X than by not doing so".

feedback (see e.g. Klein, Rifkin and Uri (1985), Uri and Rifkin (1985), Uri, Howell and Rifkin (1985), Cartwright, Kamerschen and Huang (1989), Slade (1986)). These methods are actually refinements of the test proposed by Horowitz (1981).

Cointegration

Cointegrated series[10] can be described by models, known as error correcting, that allow long-run components of variables to obey equilibrium constraints while short-run components have a flexible dynamic structure (see Engle and Granger (1987)). Whalen (1990) argues that if two geographic locations comprise a single geographic market, their price series should be found to be cointegrated.

- **Shipment data**

Similar to the price tests, the shipment data method also tries to provide a good alternative indication of the partial demand elasticity. Elzinga and Hogarty (1973, 1978) present a method that is only applicable in delineating geographic markets. They argue that the presence of shipments between two geographic areas is an indication of the fact that the areas should actually be regarded as one single market.

In table 2 a comparison of the different empirical tests can be found.

[9] Slade (1986, p. 294) explains that this test "seeks to determine whether price movements in one regions have repercussions in another; that is, it seeks to establish if price determination in one market is exogenous to price formation in another and vice versa".

[10] A group of non-stationary time series is cointegrated if there is a linear combination of them that is stationary; that is, the combination does not have a stochastic trend. As an example, consumption and income are likely to be cointegrated.

Table 2 - comparison of empirical tests

	Literature	Type of market	Geographic or product dimension	Demand, supply and potential substitution	Data requirements
Residual demand estimation	Baker & Bresnahan (1985, 1988), Scheffman & Spiller (1987)	Antitrust	Both	All	Firm level
Price tests	Stigler & Sherwin (1985), Horowitz (1981); Bishop & Walker (1996)	Economic	Both	Only demand substitution	Industry level
Shipment tests	Elzinga & Hogarty (1973, 1978), Shrieves (1978)	Economic	Geographic		Industry level
Diversion ratio	Shapiro (1995)	Economic	Both	Only demand substitution	Industry level

3.3 Definition of the relevant geographic market in the EC and US merger regulations

This section discusses the definition of the geographic market as it is specified in the EC and US merger regulations.

- **EC merger policy**

The definition of the relevant geographic market found in the European antitrust regulations originates from the United Brands case (case 27/76, ECR 1978) in which the Court of Justice defined the relevant geographic market as follows:

"The relevant geographic market comprises the area in which the undertakings concerned are involved in the supply of products or services, in which the conditions of competitions are sufficiently homogeneous and which can be distinguished from neighboring areas because, in particular, conditions of competition are appreciably different in those areas. Factors relevant to the assessment of the relevant geographic market include the nature and characteristics of the products or the services concerned, the existence of entry barriers or consumer preferences, appreciable of the undertakings' market share between the area concerned and neighboring areas or substantial price differences."

It should be noticed that the relevant geographic market is not determined in an abstract sense, but rather in relation to the relevant product market.

In 1997, the most recent guidelines for defining the relevant market in EC competition law were published: the Notice on the Definition of Relevant Market for the Purposes of Community Competition Law (EC Communication 97/C 372/03). Advisors, experts and firms have welcomed this publication, as it formalized the Commission's methodology in delineating the relevant market. In the Notice the Commission recognizes that firms are subject to three sources of competitive constrains: demand substitutability, supply substitutability and potential competition. However, the Notice further indicates that demand substitutability is seen as the most important

disciplinary force and therefore stresses its importance in the delineation of the relevant market. Analogously with practices in the US and OECD, the Notice introduced the concept of the hypothetical monopolist in defining the relevant market. The Notice defines it as follows[11]:

"The question to be answered is whether the parties' customers would switch to readily available substitutes or to suppliers located elsewhere in response to a hypothetical small (in the range 5% to 10%) but permanent relative price increase in the products and areas being considered. If substitution were enough to make the price increase unprofitable because of the resulting loss of sales, additional substitutes and areas are included in the relevant market. This would be done until the set of products and geographic areas is such that small, permanent increases in relative prices would be profitable."

The EC Communication remarks that, although in general the price to take into account will be the prevailing market price, exceptions could occur when the prevailing price has been determined in the absence of sufficient competition[12].

Within the application of the so-called 5 per cent or SSNIP-test (i.e. "small but significant non-transitory increase in price" - test), demand-side substitutability has become the determining factor in market definition in the EC Merger Regulation. Supply-side substitutability may only be taken into account when defining markets in those situations in which its effects are equivalent to those of demand substitution in terms of effectiveness and immediacy[13]. In other words, the Commission's approach in deciding whether different products or regions should be included in the same relevant market depends almost exclusively on their substitutability from the perspective of the consumer.

[11] See EC Communication 97/C 372/03, par. 17
[12] See EC Communication 97/C 372/03, par. 19
[13] See EC Communication 97/C 372/03, par. 20

- **US Merger Guidelines**

Section 7 of the Clayton Act, in its original form, prevents the elimination or lessening of competition between the merging parties, and the creation of a monopoly in any line of trade in any section or community. These words form the basis for the requirement that a merger be evaluated within the relevant geographic market. In the Brown Shoe case (Brown Shoe vs. US (370 U.S. 294)) the Supreme Court set out the basis for definition of the geographic market: "The criteria to be used in determining the appropriate geographic market are essentially similar to those used to determine the relevant product market."

The 1997 US Merger Guidelines further describe how this definition will be applied in the context of geographic market analysis of a merger[14]:

"In defining the geographic market or markets affected by a merger, the Agency will begin with the location of each merging firm (or each plant of a multiplant firm) and ask what would happen if a hypothetical monopolist of the relevant product at that point imposed at least a 'small but significant and non-transitory' increase in price, but the terms of sale at all other locations remained constant. If, in response to the price increase, the reduction in sales of the product at that location would be large enough that a hypothetical monopolist producing or selling the relevant product at the merging firm's location would not find it profitable to impose such an increase in price, then the Agency will add the location from which production is the next-best substitute for production at the merging firm's location."

A price increase could be made unprofitable by consumers either switching to other products or switching to the same product produced by firms at other locations. The nature and magnitude of these two types of demand responses respectively determine the scope of the geographic market. As in the EC merger regulation, the definition of the relevant market in the US Merger Guidelines is based first and foremost on demand substitution factors, i.e. possible consumer responses. The Merger Guidelines specify that market definition focus solely on demand substitution factors. Supply

[14] See Section 1.21 MG

substitution factors are considered elsewhere in the Guidelines in the identification of firms that participate in the relevant market and the analysis of entry[15].

This price-oriented basic approach is supplemented by a number of other criteria. The 1992 Horizontal Merger Regulation states that the following criteria will be taken into account - but not limited to - in considering the likely reaction of buyers to a price increase:

- evidence that buyers have shifted or have considered shifting purchases between different geographic locations in response to relative changes in price or other competitive variables;
- evidence that sellers base business decisions on the prospect of buyer substitution between geographic locations in response to relative changes in price or other competitive variables;
- the influence of downstream competition faced by the buyers in their output markets; and
- the timing and costs of switching suppliers. (Section 1.21 MG)

In stating that all relevant evidence will be taken into account, the Merger Guidelines leave room for considering many other factors. For instance, transportation costs will be accepted as a significant economic barrier where there is proof that they constitute a critical factor in the choice of suppliers or customers. For example, in the Allied Waste-Browning Ferries- case (US vs. Allied Waste and Browning Ferries (1:99 CV 01962)) the Court found transportation costs to be a decisive factor to consider separated metropolitan areas as different relevant geographic markets. Also costs of local distribution as barrier to entry are accepted as limiting factor. In the Fiat/New Holland/Case-case (US vs. Fiat/New Holland/Case (1:99 CV 0297)) the relevant geographic market was defined as the United States plus Canada, since a foreign producer would face significant difficulties in establishing a distribution system in the US and Canada. Differences in customer requirements, in terms of delivery times, advertising and marketing programs tailored to a region, different public bidding patterns and higher labor, raw material and construction costs for example, served to

[15] See Section 1.0, 1.3 and 3 MG

persuade the Court of a separate market in the western part of the United States in the Kimberley-Clark case (US vs. Kimberley-Clark Corp. (264 F. Supp. 439, 458)).

- **The "Cellophane" Fallacy in the Merger Guidelines**

In the delineation of the geographic market, the Agency will use prevailing prices of the products of the merging firms and possible substitutes for such products, unless premerger circumstances are strongly suggestive of coordinated interaction, in which case the Agency will use a price more reflective of the competitive price. However, the Agency may use likely future prices, absent the merger, when changes in the prevailing prices can be predicted with reasonable reliability. Changes in price may be predicted on the basis of, for example, changes in regulation which affect price either directly or indirectly by affecting costs or demand.
In general, the price for which an increase will be postulated will be whatever is considered to be the price of the product at the stage of the industry being examined. In attempting to determine objectively the effect of a "small but significant and nontransitory" increase in price, the Agency, in most contexts, will use a price increase of five percent lasting for the foreseeable future. However, what constitutes a "small but significant and nontransitory" increase in price will depend on the nature of the industry, and the Agency at times may use a price increase that is larger or smaller than five percent.[16]

Thus, like the EC Merger Regulation, the 1997 US Horizontal Merger Guidelines normally start from the current price level, unless investigation points to competitive distortions. This is in contrast with the earlier view of the Justice Department that merger policy is preventive, designed to keep matters from getting worse and that in any case the current price was the starting point of investigation. However, starting from current price levels may result in a too broad market definition if the firms under analysis are already charging a monopoly price (Hovenkamp, 1994).

An example may illustrate this[17]. Suppose that the provisional market for cellophane includes four firms A, B, C and D, who are currently charging $3.00 per unit for

[16] See Section 1.11 MG
[17] This example is taken from Hovenkamp (1994)

cellophane. The evidence reveals that in response to a 5% price increase, to $3.15, numerous customers would substitute to wax paper, which is manufactured by 30 firms. As a result, the 30 wax paper firms are included in the relevant market, overall market concentration and the market shares of A, B, C and D drop precipitously and a merger between A and B is approved.
But a closer look reveals that A, B, C and D are currently charging $3.00 because they are fixing prices or they have already attained a high degree of oligopoly coordination. In fact, the competitive price of cellophane is $2.00 and at that price its cross-elasticity of demand with wax paper is very low. The consequence of reliance on current prices as base point from which to measure the effects of an additional price increase is to permit mergers precisely in those markets where mergers seem most harmful: in markets already subject to coordination of prices.

In the literature this phenomenon is called the "Cellophane" fallacy, named after the U.S. vs. E.I. du Pont de Nemours (1956) case, where the Antitrust Division misused the concept of cross-elasticity of demand in the cellophane market and defined the relevant market too broadly.

An interesting issue raised by Hovenkamp (1994) is what to do when such anticompetitive prices are observed. Should the merger simply be challenged when collusive practices already exist? Suppose the Antitrust Division observes that coordinated interaction between four cellophane makers, A, B, C and D is occurring. The question is whether to permit a merger among two of these firms. Need the Division guess the competitive price and then estimate the cross-price elasticity of demand with its closest substitute wax paper at that price? If the merger standard condemns mergers that may substantially lessen competition, then the existence of the coordinated interaction reveals that the market is already performing poorly. A horizontal merger would only make things worse.

3.4 The Commission's approach in practice

Practically, the Commission examines to what extent firms are submitted to competitive forces: demand-side substitutability, supply-side substitutability and

potential competition. The approach followed by the Commission is one in which a number of structural factors are examined to determine whether significant barriers exist to hinder or prevent competition. At first instance the characteristics of demand will be examined (existence of national/local preferences, consumer habits, …),while in a later phase factors related to the supply side are examined (existence of regulatory barriers to market penetration, lack of international distribution network, …). In its evaluation, the Commission also takes into consideration the evolution of the market integration process. An integration process that will lead to an enlarged market area in the short run, will be taken into consideration when defining the relevant geographic market (OJ 1997 C 372/9, par. 32).

In its Notice on Market Definition, the Commission explicitly sums up several elements used in delineating the relevant geographic market. However, although several factors systematically return, the Commission points out that in some cases certain types of evidence may be decisive, while this type of evidence may be of no importance in other cases (OJ 1997 C 372/8, par. 25). The methodology described in the Notice on Market Definition (1997) does not significantly differ from the methods used before in delineating the relevant geographic market. However, in publishing the procedures and the criteria, the Commission has substantially improved the transparency of its policy. This significantly reduces the legal uncertainty of firms, a critique often mentioned in the past (Opi, 1997).

The Commission commonly takes several factors into account in its analysis of the definition of the relevant geographic market. These factors can be grouped into sources of globalization and so called ‘revealed measures’ of globalization, i.e. indicators that may point in the direction of globalization/segmentation. Table 3 gives an overview of both groups of factors. Nevertheless, the Commission exercises considerable discretion in deciding the factors which are influential in any particular case, and rarely highlights any single characteristic as determining the relevant geographic market. It is therefore no guaranty whatsoever to assume that because, for example, a particular level of trade was taken to indicate a Community-wide market in one case, a similar level of trade could lead to the same conclusion in another case (Cook and Kerse, 2000).

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The next paragraphs discuss the most important factors in more detail.

Table 3 - Factors taken into account by the Commission in defining the relevant geographic market

Sources of globalization	'Revealed measures' of globalization
Consumer preferences/brand loyalty	Price differences
Language, culture, lifestyle	Cross-border import, distribution and marketing infrastructure
Local specification requirements	Large market share differences
Regulatory barriers to market interpenetration	
Transport costs	
Potential competition	

Consumer preferences/brand loyalty

Consumer preference refers here to the fact that purchasers within a given geographical area may show a special preference for established brands, making the entrance of new competitors unlikely. For example, in the Renault/Volvo case (OJ 1990 C 281/2) the Commission took this argument, together with other factors, into account when taking its decision. The Commission stated that the market for busses was deemed to be national because the market was still characterized by strong national buying preferences that constitute a high entry barrier for competitors from other Member States. Also in the Nestlé/Perrier case (OJ 1992 L 35671) the Commission held the relevant geographic market to be national, i.e. France, although there were no legislative barriers to enter the French market. A relevant factor was that the great majority of sales made were to large supermarkets or hypermarkets, aware of the loyalty of their customers to the well-known brands owned by the leading French companies. It was unlikely that the French customers would switch to foreign brands because of their deep-seated and long-standing preference for the local product from French springs. More recently, in the Wienerberger/Cremer&Breuer case (1997) the Commission stated that there appeared to be specific preferences for certain materials for sewage pipes in various Member States, which could lead to different conditions of competition. In Germany in particular, a significant preference for clay pipes exists. In the light of these indications, the Commission started an in-

depth investigation. However, in the beginning of 1998 the different parties annulled their joint venture.

Language, Culture, Lifestyle

In some cases the Commission found language differences to be an important reason for breaking up the relevant geographic market (e.g. Otto/Graham (OJ 1991 C 93/6) and Redoute/Empire Stores (OJ 1991 C 156/10)).

In the Bass case (OJ 1999 C 1472) the Commission concluded that the UK market is a distinct relevant market, because it differs from beer markets in other Member States in view of the high consumption of drought beer and the variety in types of ale offered, among others. The same arguments can also be found in the Scottish and Newcastle case (OJ 1999 C 1474).

Differing local specification requirements

Although the local specification requirements are supposed to have disappeared since the establishment of the Internal Market in 1992, in some industries they can still play a role in breaking up the relevant geographic market. Domestic industry and consumers may continue to require such specifications. In this context Jones and González Díaz (1992) speak about "technical consumer preferences". For example, in the Renault/Volvo case (OJ 1990 C 281/2) the Commission found the bus market to be national due to product specifications of public transport authorities. More recently, in the Cégétel+4 case (OJ 1999 C 1194) the Commission considered the relevant market for fixed telecommunications services to be national in scope due to the licensing and regulatory framework for the provision of basic fixed telecommunications services.

The existence of regulatory barriers to market interpenetration

Legislation can constitute an absolute or partial barrier preventing trade between different countries or geographic areas. In the pharmaceutical industry for example (Sanofi/Sterling Drug case, OJ 1991 C 156/10), the Commission found that markets were national due to the "very tight legal framework" under which the industry operates. The Commission held that in the absence of EEC harmonization, the over-the-counter (OTC) pharmaceutical markets of the Community were national in

character because OTC products could be sold in supermarkets in some Member States, whereas in others they could be sold only in pharmacies.

The imposition by one or more Member States of non-tariff barriers, such as taxes, quotas, safety certifications and standards may also have the effect of distorting the cross-border trade in the relevant product and thus have an impact on determining the relevant geographic market. For example, in the United Brands case (case 27/76, ECR 1978), the Court held that the relevant geographic market for bananas did not include France, Italy or the United Kingdom due to the particular systems of state subsidies, pricing and quotas which distinguished these three national markets from those of the other Member States.

Regulatory barriers can also take the form of procurement policies exercised by national monopolies or government departments that purchase exclusively from domestic suppliers.

Although trade barriers within the EEA are no longer of much relevance, they are still influential in the Commission's determination of whether the geographic market is confined of the Community or EEA or extends further to include Eastern Europe, the USA or Asia and the Pacific. With investments taking place in the economies of the former Communist countries, the ability of producers in Eastern Europe to gain access for their products to neighboring parts of Europe has also played a significant role in a number of decisions. For example, in the Shell/Montecatini case the EEA was shielded by import duties of 12.5 per cent from outside producers and the fact that those duties would reduce to 6.5 per cent over a five year period did not justify treating the geographic market as wider than Western Europe. Similarily, in Dupont/ICI the Commission noted that producers of nylon carpet fibres from outside the EC faced a 9 per cent import duty. On the other hand, in the Mannesmann/Vallourec/Ilva case the Commission seemed to suggest that the fact that a 10 per cent import duty for producers outside the EEA would be eliminated only over a 10 year period was not a significant factor in defining the relevant market. In most of these cases, however, the tariff barriers have been reinforced by price differences, different competitors and negligible trade flows, all of which indicate that

the relevant geographic market is no wider than the EEA or Western Europe (Cook and Kerse, 2000).

Transport costs

Transport costs can also play an important role in defining the relevant geographic market, especially with regard to those products whose production cost is low (e.g. cement, water, sugar) and which normally carry significant transport costs. This means that producers situated close to the consumers will have a cost advantage compared to remote manufacturers. Hence, transport costs can make it unprofitable for a producer to meet the demand generated in another market due to the market behavior of the merged firms. The Commission has held that a high transport cost/price ratio was evidence that the relevant geographic market was national in scope for the following products: iron and steel products not governed by the Treaty of Paris (Usinor/ASD (OJ 1991 C 193/34)), oil and petrochemical products (BP/Petromed (OJ 1991 C 208/24)), cans and glass bottles for beverages (VIAG/Continental Can (OJ 1991 C 156/10)), mail order catalogues (Otto/Grattan (OJ 1991 C 93/6)) and bottled source water (Nestlé/Perrier (OJ 1992 L 35671)).

Price differences

Price differences between two regions/Member States are seen as a strong indication that they constitute different markets. For example, in Mannesmann/Vallourec/Ilva (OJ 1994 L102/15) the Commission regarded price differences of 35% between Japan and the EC as conclusive that the two regions were separate markets. Price differences may be explained by short-lived currency fluctuations and similar transitory factors. The Commission therefore is interested in looking at trends in prices and identifying uniformity in the evolution of prices between one country or region and another. If the data are available, the Commission prefers to base its analysis on a comparison of net realized prices. In many consumer markets market survey companies operating throughout the Community can provide volume and point of sale price data which is highly relevant for the purposes of market definition (Cook and Kerse, 2000). However, the Commission remarks that the comparison of prices at the international level is a complex matter and needs to be done with caution. Price differences between different countries may be attributable to such a range of complex factors (such as exchange rates) or more simple factors (such as transport costs) that the

Commission is understandably cautious about placing too much emphasis on even such a key indicator as price and appears to make less use of price information to determine the geographic market than it does to determine the product market. Price correlation data have been provided by notifying parties in a number of cases but appear not to have been a decisive influence on the Commission's ultimate conclusions on the geographic market (see e.g. Nestlé/Perrier (OJ 1992 L356/1), Procter&Gamble/Schickedanz (OJ 1994 L354/32)).

The existence of cross-border import, distribution and marketing infrastructure

In several cases the Commission has used the argument of a lack of cross-border distribution and marketing infrastructure as an argument for considering the relevant geographic market to be national instead of European wide (e.g. CEAC/Magneti-Marelli (OJ 1991 L 222/38), Fiat Genotech/Ford New Holland (OJ 1991 C 118/14)). Also in the Guiness/Grand Metropolitan case (OJ 1997 L 288/24) the Commission decided that the geographic market be national for several reasons, among which a lack of cross-border distribution. In the Saint-Gobain/Wacker-Chemie/NOM case (OJ 1997 L 247/1) the Commission identified five separate markets on the basis of shipment tests. On the other hand, in the Sicasov case (OJ 1998 C 3452) the Commission decided that the market for the production and marketing of seeds corresponds to the EEA, based on the existence of import and export flows, some of which are on a large scale.

Large market share differences

Although the existence of different market shares between neighboring areas cannot in itself be considered a reason for breaking up the relevant market, the Commission took into account this factor, among others, in the Varta/Bosch case (OJ 1991 L 320). Market shares do not change as much as prices over time. To measure market share inequality across several countries the coefficient of variation (i.e. standard deviation as a percentage of the mean) can be calculated and interpreted in relation to significant variation using an a priori determined significance level.

The methodology used by the Commission builds on bringing together cumulative evidence pointing in the same direction.

In the practice of defining the relevant geographic market, the Commission has treated cases where one single Member State was taken as the relevant geographic market, as well as cases where the world market was taken as the relevant geographic market. Much depends on the nature of the goods and services under consideration and the conditions under which they are supplied. Market dynamics are also important: the benefits of the single market program, the EC public procurement regime and Monetary Union are already beginning to change the character of traditionally national markets, in some sectors significantly and rapidly. Manufacturing processes and new technology are increasing the minimum efficient scale of operation of plants which may no longer be confined to supplying the local vicinity or the territory of just one Member State. Emerging capitalist economies in Eastern Europe are naturally directing their products to adjacent readily accessible markets in wealthier Western Europe. Such considerations are all reflected in the Commission's approach to geographic market analysis (Cook and Kerse, 2000).

Although each case is unique and the delineation of the geographic market depends on many factors, some trends in the EC practice can be identified (Goyder, 1998):

- For costly and highly technical products, developed over the last ten to twenty years and which were never manufactured or marketed on national lines, supply is usually concentrated in a few companies and exported worldwide. Customers are likely to be large, willing to purchase wherever the product is cheapest. For those products the market is often considered to be worldwide (e.g. Aérospatiale/Alenia/De Havilland (OJ 1991 L 334/42)).
- With consumer products the geographic market is often still national in scope because the basis for distribution is often national, and the imperfections of the Single Market have meant that it is often necessary for a single manufacturer to treat individual Member States as separate markets. Differing local specification requirements, corresponding to local consumer wishes and the existence of different legislation prescribing requirements for the goods, may also be relevant. See for example CEAC/Magnetti-Marelli (OJ 1991 L 222/38), Varta/Bosch (OJ 1991 L 320). However, the trend is that in the future those markets are also becoming wider.

- Where there are national regulatory barriers (banking/insurance, pharmaceutical industry) markets are likely to be considered national.
- Service markets will most of the time be considered local in scope, especially where the purchaser of the service is the population at large. In the Promodes/Dirsa case for example it was concluded that markets for food retailing are local in scope. Similar conclusions can be expected for other consumer services such as hotels and restaurants.

Montag (1993) remarks that in counting the cases where the Commission defined European wide markets and national markets as relevant geographic market, there are still more national markets than EC markets. In a number of decisions however, the Commission pointed out that the national markets are in state of transition towards EC markets. See for example Mercedes Benz/Kässbohrer (OJ 1995 L161/27), ABB/Daimler-Benz (OJ 1997 L11/29), PTT Post/TNT/GD Express (notified November 1996). Also the harmonization of national legislation and introduction of Community legislation under which the barriers of cross-border entry are gradually broken down are elements in favor of expanding the geographic market definition. See for example the Alacatel/Telettra case (OJ 1991 L 122/48), where the acquisition of Telettra by Alacatel resulted in an aggregate market share of 80% for both microwave and line transmissions in the Spanish market. Moreover, the Spanish telecommunication operator Telefonica, held an effective monopoly in the Spanish market for telephone services; it also had a minority shareholding in both companies and a known policy at that time of purchasing only from local suppliers. Notwithstanding these factors the merger was cleared, largely because of assurances received from Telefonica that it would not only cease to hold any share interest in any of the companies, but also abandon its previous preference for local purchasing and would treat foreign suppliers equally. This decision was taken in the knowledge that the Commission was itself in the process of seeking to liberalize the telecommunications equipment markets throughout the EC. Had this general policy trend not been in evidence, the merger might well have been prohibited.

3.5 Information goods and antitrust practice

It has been argued that current European antitrust laws may be increasingly irrelevant to deal with new economy and its new generation of information goods and services (see paragraph 2.4.) Though critics claim that determining the relevant market for information goods is either useless as far as current generation products are concerned, or impossible when one considers new generation of products, the expected number of mergers in the information goods markets calls for investigation of antitrust violations. The critics' main argument stems from the observation that high-technology markets evolve so rapidly that it is hard to define a product which continuously changes both in its internal characteristics and in its interaction with other similarly developing products (Hruska, 1992). They argue that determining the relevant market for future generation products for which demand is unknown is impossible and that analyses based on existing products and markets are largely irrelevant (Clapes, 1993).

As already pointed out in paragraph 2.4., the nature of competition in information markets is driven by a cost structure that much differs from the one in traditional product markets. Most importantly, information entails high sunk cost (especially costs of R&D) to produce, but is cheap to reproduce and to transport to the final consumer. Hence production of an information good involves high fixed cost but low marginal cost. Moreover, the negligible transportation cost makes the precise location of the firm producing an information good largely irrelevant. As a consequence the relevant geographic market of an information good is typically the global market.

The next paragraphs discuss when regional entry barriers may exist for information goods and thus when the relevant market may not be global. In the remaining sections it is argued that when delineating antitrust markets of information goods, the relevant product market deserves major attention. Not only the typical cost structure of information goods is important, but also the economics of networks, lock-in and switching costs.

- **The relevant geographic market for information goods**

A stylized fact of information goods is that its producers are not restricted by location requirements such as access to natural resources or adequate infrastructure for transportation. With modern communication technologies information can be spread around the world at negligible cost and firms can produce their goods in a global network so as to maximize profits. Since information - let it be entertainment, news, or software - is essentially an identical product marketed throughout the world, the relevant geographic market can be considered as global.

Still there may be national entry barriers for an information good. Most importantly, language and culture, which have been discussed as relevant in the analysis of the definition of the relevant geographic market in the previous paragraph, act as a national barrier to entry[18]. Software products, such as Microsoft Office, have been translated to practically all languages without changing the rest of the product, thereby establishing a truly global market. News channels, on the contrary, are often targeted at a local market, either through their content or through their language. Up to now the only news channel that covers a large part of the world with different programs for different areas is CNN.

Considering mergers between firms whose core business is development of information goods, the strong consensus is that R&D are likely to occur in a world market (Gilbert and Sunshine, 1995; Brodley, 1990; Jorde and Teece, 1990). Grossman and Shapiro (1986) state that geographic markets are domestic when transmitting research findings across borders is difficult. Also for pharmaceutical R&D products subject to FDA (Food and Drug Administration) approval, the US have narrowed geographic markets because of regulatory or other entry barriers. For information goods, the latter arguments seem to be less relevant.

[18] The criteria of language and cultural differences seem to be important for the Commission when delineating the geographic market for media and Internet products; see "décision de la Commission du 3 mars 1999 relative à une procédure de l'article 85 du traité CE IV/36.237 *TPS*-JO L90/6 du 2.4.1999" – cited in the merger decisions JV. 40 Canal+/ LAGARDERE/ CANALSATELLITE and JV 47. CANAL+/ LAGARDERE/ liberty media/ multithematique – of 22.06.2000.

- **The relevant product market for information goods**

Markets may be served either through web-based sales or through 'traditional' distribution systems. As a consequence price differences between both systems may exist. This price difference can be attributed to some extent to the difference in consumer perception of the product. Though products can be basically the same (e.g. music that can be downloaded from the Internet or be bought at a record store) service, delivery aspects and specific product features may differ. Another source of price difference is the value added tax (VAT) that is levied. Currently there is a debate over where an Internet retailer is located and which VAT should be paid. Even when the issue is solved, Internet retailers can locate its headquarters in any part of the world where VAT is zero or negligible. Consequentially, products delivered through different channels should be separately treated in cases of antitrust. Whereas web-based sales of the product are predominantly global, the relevant market of the product through traditional distribution systems may be more local when a major group of consumers have a strong preference for the product through traditional distribution channels.

Though Internet has changed the business environment, it is at present difficult to assess for some goods which distribution system will prevail. The advantages of web-based sales over traditional distribution channels are clear for information goods, but less obvious for tangible products such as clothing. With respect to these goods incumbents may create strong barriers to entry since size, physical distribution and reputation are important. Incumbents may use their current reputation to persuade consumers to buy these products through the web. Moreover, the established supply chain and inventories help incumbents to speed up their web-based activities thereby creating and sustaining a competitive advantage over potential entrants.

Product markets for information goods not only differ from traditional goods markets with regard to their cost structure, as previously argued, but also in other respects. In the recent case between the US Department of Justice (DOJ) and Microsoft the mere fact that Microsoft has a dominant market position in PC operating systems was not the reason for the verdict. The DOJ asserts that Microsoft attempted, albeit

unsuccessfully to date, to monopolize the web browser market, likewise in violation of §2 of the Sherman Act. Moreover, the DOJ contends that certain steps taken by Microsoft as part of its campaign to protect its monopoly power, namely tying its web browser to its operating system and entering into exclusive dealing arrangements, violated § 1 of the Sherman Act. The fact that the dominant position Microsoft has in PC operating systems is not a violation of any antitrust rule can be understood by the economics of networks, lock-in, and switching cost, which are vital for understanding the economics of information goods.

For many information technologies, consumers benefit from using a popular format or system. When the value of a product to one user depends on how many other users there are, this product exhibits network effects. Technologies subject to strong network effects tend to exhibit long lead times, followed by explosive growth. The pattern results from so-called positive feedback: as the installed base of users grows, more and more users find adoption worthwhile. Eventually, the product achieves critical mass and takes over the market. In the presence of network effects the consumer benefits from a dominant standard, as the relevant alternative is no standard at all.

Another characteristic of many information technologies is that the technological products do not stand alone. They depend on the existence of other products and other technologies. Close attention is paid to the provision of complement goods and services. The Internet's World Wide Web operates within a grouping of businesses that include browsers, on-line news, e-mail, network retailing and financial services. Pharmaceuticals exist within a network of physicians, testing labs and hospitals. Laser printers are part of a grouping of products that include computers, publishing software, scanners and photo-input devices. Unlike products in the traditional economy, technological products exist within local groupings of products that support and enhance them. They thus exist in "mini-ecologies" (Arthur, 1996). This implies that for firms these technological ecologies are now the basic units for strategy in the knowledge-based world, players compete not by locking in a product on their own but by building webs – loose alliances of companies organized around a mini-ecology – that amplify positive feedback to the base technology. When in the mid-1980s Novell introduced its network-operating system, Netware, as a way of connecting PC's in

local networks, Novell made sure that Netware was technically superior to its rivals. It also heavily discounted Netware to build an installed base. But more important, Novell recognized that Netware's success depended on attracting software applications to run on Netware – which was a part of the ecology outside the company's control. So it set up incentives for software developers to write for Netware rather than for its rivals. The software writers responded to it positively and by building Netware's success, they ensured their own. Novell managed these cross-product positive feedbacks actively to lock in its market. It went on to profit hugely from upgrades, spin-offs and applications of its own.

Once a certain format of keeping information has been chosen, switching to another format can be very expensive. From the previous section on network economics, it is easily understood that users benefit from a single and uniform standard. When switching to another new and possibly superior technology entails high cost, consumers are known to be locked in to the product, and do not easily switch to a superior product.

All these characteristics have strong implications for antitrust policy. First of all, since firms operate in mini-ecologies, firms can no longer easily set up a monopoly position on their own. Dominance may consist not so much in cornering a single product as in successively taking over more and more threads of the web of technology, thereby preventing other players from getting access to new, breaking markets. With respect to compatibility standards, those should not be discouraged in antitrust. Existence of compatibility standards allows a competitor to enter by producing a single component rather than an entire system. Compatibility may allow viable entry at a smaller scale thereby reducing sunk investment. With information goods, incompatibility would deny the entrant the benefits of an installed base (i.e. the current group using the standard).

In this respect, two observations are important for antitrust regulation. First, Katz and Shapiro (1986) demonstrate that through penetration pricing an entrant may always be able to displace an established incumbent firm with a second generation technology despite the presence of network effects. Second, Liebowitz and Margolis (1994) claim that there are no compelling examples of markets failing in the sense that the 'wrong'

choice of network, among feasible alternatives, was made. For example Microsoft Windows became the industry standard because PC makers thought it was a superior product and consumers shared that view. There were no barriers to entry that prevented a competitor from ousting Windows as the market leader (Levy, 1998). Shapiro (2000) remarks that in antitrust policy thinking should be shifted from substitutes (competitors) towards thinking about complements (partners). And such cooperation among complementors is generally pro-competitive.

3.6 Conclusion

Since the new Notice Market Definition, the EU Merger Regulation has become much more transparent and consistent. It also brought the EU Regulations much more in line with the US Merger Guidelines, leaving only minor differences. Both regulations focus strongly on demand-side substitution. Whereas the EU Merger Regulation takes supply-side substitutability into account but only in a second stage, the US Merger Guidelines explicitly mention that market definition focuses solely on demand substitution factors.

However, the phenomenon of globalization and its effect on business and company organization focuses mainly on supply substitution. Therefore this element should be better integrated in the antitrust analysis and analysis of relevant market. In the next paragraph a methodology will be developed that takes both demand and supply substitution into account in assessing the scope of the market, both for traditional products and information goods.

4 DEFINING THE RELEVANT GEOGRAPHIC MARKET: A METHODOLOGY

Using the theoretical principles and criteria set out in the previous section, the purpose of this section is to develop an integrating methodology to delineate the geographic scope of the relevant market. First, price data and shipments data are used in connection with border effects to define the economic market. Next, the analysis of competition information is used to extend the analysis to define the relevant competitive arena. In combination both sources of information provide a reliable indication of the 'global' scope of the relevant antitrust market.

In a first paragraph the shipment data method as currently used in antitrust analysis is discussed in some detail. However, this method has received a lot of criticism. Therefore, in combination with price data in the next paragraph border effects are examined as a complementary indication for market fragmentation/globalization. Such border effects give an indication to what extent the actual trade between two regional markets deviates from the trade that is normally expected if the markets would be integrated. The third paragraph focuses on the scope of competition and uses industrial and economic data on the presence of competitors in the different countries. Micro-economic data are used next to get an indication of how firms actually perceive the relevant market by analyzing their strategic market behavior.

4.1 Shipments data, price data and geographic market delineation

Elzinga and Hogarty (1973, 1978) suggest a method, based on interregional shipments, that is applicable to delineate geographic markets. They argue that the presence of shipments between two geographic areas is an indication of the fact that the areas should actually be regarded as one single market. The method is constructed by the application of two tests: the LOFI ("Little Out From Inside") and the LIFO ("Little In From Outside") test. The LOFI test concerns the supply side and poses the question: 'What is the smallest geographic region required to account for nearly all shipments from a given producing area?'. The LIFO test deals with the demand side and poses the question: 'Of total purchases within the region identified by the LOFI test, do nearly all emanate from within that region itself?'. If both 75% (or alternatively 90%) of the consumption of a

product is produced within a specific area, and 75% (or 90%) of the production within this area is consumed within this area, then a distinct geographic market has been identified.

Shrieves (1978) extends the shipments test developed by Elzinga and Hogarty by calculating two criteria: the similarity measure and the significance measure. The *similarity measure* considers whether the patterns of shipments into the two areas under consideration are similar, while the *significance measure* measures the importance of the two areas for total consumption of the product concerned. Because of the difficulty in application this Shrieves-test is not widely used.

- **Criticism**

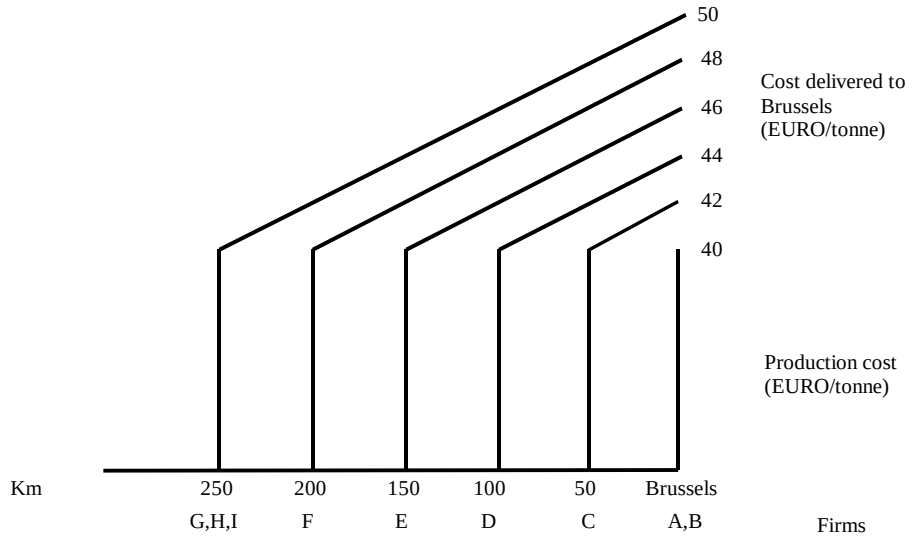
The approach of Elzinga and Hogarty (and also Shrieves (1978)) has received a lot of criticism in the economic literature.

Werden (1981) identifies two important situations in which the proposed test will produce erroneous results.
Firstly, if there are no cross shipments between the regions at a particular point in time, both Elzinga and Hogarty and Shrieves conclude that the two are distinct geographic markets. However, if the cross-price-elasticities of demand are very high, a cartel in one of these regions would not be able to profitably raise price and the two regions are not in fact, distinct markets. In other words, potential shipments and competition from firms outside the region is not taken into account. However, potential competition from producers outside the region may threaten producers in this region to such an extent that they will keep prices down. The fundamental dependence of the patterns of shipments and the size of the relevant geographic market on price settings behavior can easily be illustrated in the next figure (Scherer and Ross, 1990).

Suppose a merger is proposed between two paper suppliers A and B, both located in the vicinity of Brussels. All the other paper suppliers C, D, and so forth, are located in cities eastward from Brussels following the distances shown in figure 3. Assume that each supplier has production and local delivery costs of 40 EURO per tonne. Shipping a tonne of paper to another city costs 2 EURO for every 50 miles of distance. Assuming that

there are no physical limits on local supply, the competitive battle between firm A and B should result in a price for the Brussels consumer of approximately 40 EURO. The ability of the merging firms A and B to raise the prices locally is, however, constrained by the possible shipments by more distant suppliers. Firm C could supply paper if the Brussels price is raised above 42 EURO, firm D with a price elevation above 44 EURO, and so forth.

Figure 4 - Distance and the geographical size of markets



Source: Scherer and Ross (1990), p. 179

In this kind of situation, the central question is which firms can meaningfully constrain the actions of A and B, so that they can be considered as being in the same market. Therefore, it is necessary to decide, first of all, on how much the price in Brussels would have to be raised above the competitive level in order to consider this a significant price increase. If for example the limit is set at 5%, i.e. a price of 42 EURO, then the relevant set of suppliers for the Brussels paper market will include firms A, B and C. Thus the relevant market is in this case defined as the Brussels firms, along with all firms within 50 miles of Brussels. More distant firms are shut out of this market. Actual shipments data will not reflect this. For instance, the lack of actual shipments by C to Brussels may merely reflect that the actual price is set at a competitive level or less than 5% above this level in Brussels, and not refer to a significant segmentation of the market.

The second major error that the proposed shipments tests make, involves failing to delineate important markets within markets. They fail because they do not really consider what the firms could do after the possible merger. The test is not suited to determine whether producers in any region could raise prices significantly through collective action, because it is entirely based on actual shipments data and it does not indicate what will happen in case of a price increase. Therefore, in some situations markets will be defined too broadly, and potential anti-competitive mergers will not be detected. Again, some notion of cross-price elasticity of demand is the key element that should not be ignored.

Werden (1981) concludes however that, despite the shortcomings of the tests, shipments data can be very useful. First, they can be used to establish a first cut from which to work in delineating relevant geographic markets. Second, they establish an understanding of product flow patterns, which is the quintessence of the geographic market delineation process. In using trade data, the focus should be on trade between independent parties. Intra-firm trade does not necessarily respond to demand conditions, but basically reflects the international integration of supply activities of firms.

Stigler and Sherwin (1985) also state that the physical movement of goods (or buyers) is a potential source of information on the geographic size of the market. However, they argue that no volume of physical movement may insure that two areas are in the same market. For instance, competition from mobile buyers can bring about price equality without a movement of the good in question in its primary form. Moreover, the fact that a substantial amount of a product is shipped from one area to another is not sufficient to guarantee that both areas should be in the same market. They are separate economic markets if price discrimination is causing the price in one region to be lower than in the other region.

The different points of criticism cannot be overlooked. Consequently, the shipments method, and also price differences data, can never provide a definitive answer to the geographic market delineation problem. However, they can provide a first indication of whether certain geographic areas should or should not be included in an economic market.

Price differences between two regions are a good indication of fragmented economic markets. Mostly a price difference of about 10% or more is considered to be significant to separate markets. The same logic can be found in the different price tests that exist. The idea is that prices of two goods that belong to the same market move together, such that price differences between two regions should be observed consistently over time. Price differences between regions however do not imply that firms do not consider competitors' reactions from the other region in setting prices. One should remark here that prices across countries/regions should be taken for one and the same products. If necessary, corrections have to be made for country specific options and differences in model. Secondly, the observed price differences should be consistent over at least a specific period in time. A period of at least 2 years is suggested.

These price differences data can be complemented with a trade exposure measure. The idea of using trade level data to get an indication of intercountry links can also be found in the literature about the definition of global industries, as discussed in section 2. In line with the arguments of Elzinga and Hogarty (1973,1978), it is essential to take both the LIFO test and the LOFI test into consideration. After all, there can be disciplinary forces from both the demand side and the supply side, and by only applying one of the tests, one can only have a very fragmented picture. This study therefore suggests to use the trade exposure measure, as discussed in the model of Sleuwaegen (1994).

In order to improve the method of defining the economic market and to meet the basic criticisms on the use of price difference and shipments data, the next step is to learn more about the economics that produce the observed shipments patterns, i.e. transportation costs, regulations, … which as a result may lead to the identification of border effects separating markets.

4.2 Border effects

Extensive research has been done in the past to measure and explain sources of market fragmentation still present in the European Union. For example, Neven and Roller (1991) estimated the impact of non-tariff barriers on the share of EU imports in apparent

consumption of the four major European countries for the years 1975-1985, making use of Buigues et al. (1990) to measure NTBs. Smith and Venables (1988) employed a numerical calibration of an imperfect competition model to project the welfare gains achievable through greater market integration. Fontagné et al. (1998) studied the impact of the Single Market Program (SMP) on intra-European trade. They estimate in particular whether the removal of remaining barriers to trade changed the proportion of inter-industry, horizontally differentiated and vertically differentiated trade. In a more recent work, Head and Mayer (1998) empirically examine how NTBs affect consumption of foreign goods relative to consumption of domestic goods, making use of the empirical construct of border effect.

Border effects measure the extent to which domestic subunits trade more with each other than with foreign units of identical size and distance. Borders matter when firms have greater access to domestic consumers than to consumers in other nations. Border effects are measured as the average deviation between actual trade and the 'normal trade' that would be expected in an integrated economy without border-related barriers.

The literature on border effects was established by McCallum (1995) who analyzed trade between Canadian provinces and between US states and Canadian provinces. In his analysis he made use of gravity-type equations to examine the determinants of international trade patterns, including the impact of preferential trade blocs. Trade between any two regions is a function of each country's gross domestic product, the distance between them and possibly other variables. The effect of a trade bloc on trade patterns is then estimated by appending to the equation a dummy variable set equal to 1 for cases of intrabloc trade and zero for all other cases. McCallum (1995) and Helliwell (1996) showed that the border effect on US-Canadian trade for the period 1988-1990 was extremely large. Trade between Canadian provinces was estimated to be more than 20 times larger than trade between Canadian provinces and US states.

For the European Union, Head and Mayer (1998) were the first to estimate industry-level border effects. The methodology they use is the monopolistic competition model of trade introduced by Krugman (1980). That model establishes a relation between the relative amounts consumers spend on foreign and domestic goods and their relative prices net of transport costs. The border effect measures divergence from the predicted

consumption ratios. They start by calculating the border effect for 98 industries within Europe before the implementation of the SMP. They pool the years 1984, 1985 and 1986. The results can be found in table 4. The table includes the coefficients of the border variable measuring the importance of missing trade in the gravity-equation per industry, as explained hereafter.

Starting from the border coefficients in table 4, there are several ways to express the magnitude of border effects. First, the ratio of imports from self to imports from others, holding other things equal, can be used (McCallum, 1995). For example, when the border coefficient for pharmaceuticals is 3.66, the magnitude of the border effect is exp(3.66) = 38.86. This means that trade in the pharmaceutical industry within an EU country is 38.86 times larger than trade between countries of the EU. A second way to quantify border effects is to convert them to distance equivalents. This approach can be found in Helliwell (1996) a.o. Given that the 'normal' distance coefficient in the gravity-equation is equal to - 0.95, crossing a border in the pharmaceutical industry is equivalent to multiplying distance by exp(-3.66/-0.95) = 46.99. Since the average internal distance in the EU is 135 miles, this implies a border "width" in the pharmaceutical industry of 6344 miles. On average for all industries Head and Mayer (1998) found that in the period 1984-1986 crossing a border was equal to bridging a distance of 3206 miles.

In table 4 the industries are ordered in terms of increasing magnitude of border effects. It seems noteworthy that ingestible products, i.e. food, beverages, tobacco and drugs, figure heavily among those with large border effects.

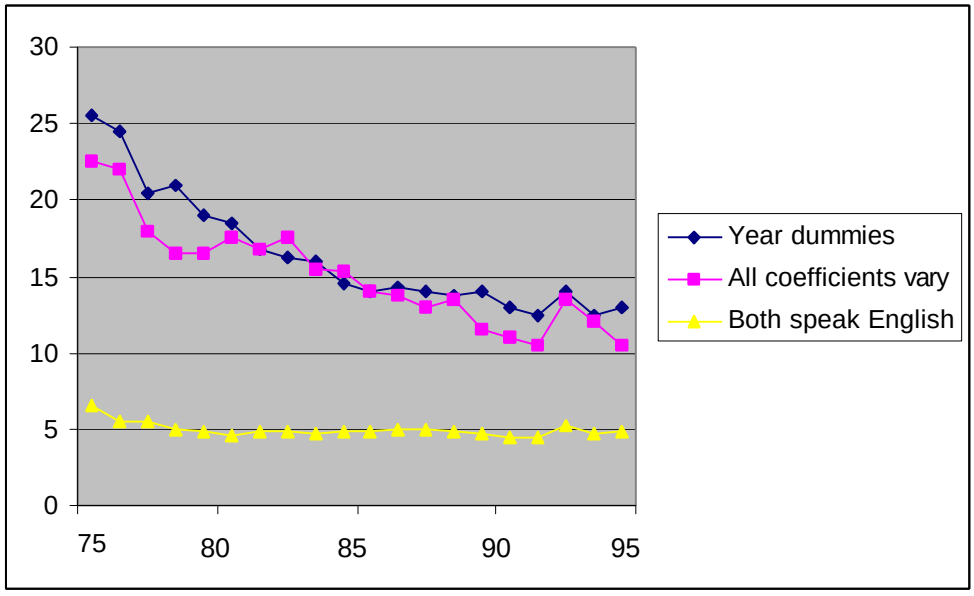
Table 4 - Border effects per industry within the EU

Industry	Coefficient	Industry	Coefficient
Motor vehicles - ass and eng	-0,06	Meat	2,27
Asbestos	0,14	Machine-tools	2,33
Motor vehicles - parts	0,55	Knitting	2,40
Electrical apps. - indl.	0,62	Industrial chem. n.e.s.	2,47
Textile n.e.s.	0,62	Soap	2,47
Steel tubes	0,89	Electrical plant	2,51
Machinery - misc	0,98	Footwear - mass	2,57
Machinery - agricultural	1,01	Clocks	2,59
Office machinery	1,06	Wires	2,71
Household chem. n.e.s.	1,17	Oils and fats	2,72
Man-made fibres	1,18	Fish	2,74
Non-ferrous metals - prod.	1,24	Wooden furniture	2,81
Transmission eq.	1,27	Wood - processed	2,82
Receivers - TV and radio	1,28	Confectionery	2,89
Industrial chem.	1,35	Cork and brushes	2,97
Electrical apps. - domestic	1,36	Clothing	3,00
Machinery n.e.s.	1,37	Railway	3,03
Abrasives	1,44	Aerospace	3,04
Steel-preprocess	1,45	Printing	3,31
Optical ins.	1,47	Metals transformation	3,34
Furs	1,53	Paint and ink	3,47
Glass	1,60	Shipbuilding	3,52
Lighting eq.	1,61	Motor vehicles - bodies	3,52
Musical instr.	1,64	Graphic labs	3,59
Toys and sports	1,67	Foudries	3,61
Ceramics	1,72	Structural metal	3,63
Leather-tanning	1,74	Pharmaceuticals	3,66
Floor coverings	1,78	Dairy	3,97
Cycles	1,79	Distilling	4,04
Jewelery	1,79	Grain milling	4,08
Machinery - engineering	1,82	Used tyres	4,08
Transport eq. n.e.s.	1,82	Metal containers	4,09
Pulp and paper	1,83	Bread	4,10
Starch	1,86	Food n.e.s.	4,22
Wood n.e.s.	1,87	Pasta	4,25
Stone	1,91	Tobacco	4,32
Machinery - textile	1,94	Clay	4,34
Precision instr.	2,01	Beer	4,51
Tools etc.	2,04	Wine	4,57
Telecoms	2,06	Poultry	4,66
Vegetables	2,07	Soft drinks	4,73
Machinery - food and chem.	2,09	Concrete	4,73
Textiles-households	2,14	Cement	4,74
Iron and steel	2,15	Forging	4,86
Plastics	2,19	Wooden containers	5,38
Rubber	2,23	Wood - sawing	5,47
Leather - products	2,24	Oil refining	5,69
Medical eq.	2,26	Carpentry	5,97
Paper processing	2,27	Sugar	6,40

Source: Head and Mayer, 1998

When examining the evolution of border effects over time (period 1976 to 1995), Head and Mayer found that border effects within Europe[19] have declined substantially until 1986, but that border effects remained stable since then (see figure 5).

Figure 5 - Evolution of border effects in the period 1976 - 1995



Source: Head and Mayer, 1998

In another article, Head and Mayer (2000) compare industry-level border effects between Europe, the US and Japan on average for the period 1981-1994. The results show some interesting elements about the level of integration within Europe, as compared to Japan or the US. As a first element Head and Mayer found that in general trade between the EU and Japan or the US in the 80's suffered much more from domestic preferences than intra-EU trade. A maximum border effect could be observed in the mid 80's for the US and at the end of the 80's for Japan.

As a second element they examine in which specific industries border effects towards Japan and the US are most important. The results are shown in table 5 for Japan and table 6 for the US.

[19] Given the period of investigation, the authors consider Europe equal to EU9 (Belgium and Luxembourg are aggregated), to avoid problems of countries that joint the EU entering the sample during the period of investigation.

Table 5 - Industry-level border effects for EU9 and Japan

Industry	EU9 effect	Japan effect	Industry	EU9 effect	Japan effect
Jewellery	4,07	0,06	Rubber	11,16	62,76
Leather tanning	3,31	0,30	Railway	30,18	63,25
Ceramics	5,75	0,67	Pulp and paper	8,87	68,24
Textile n.e.s.	2,77	0,75	Clocks	8,72	73,36
Industrial chem.	3,71	0,77	Electrical plant	17,33	76,69
Shipbuilding	22,91	0,79	Machinery - engineering	12,99	82,47
Optical ins.	2,9	0,88	Steel - preprocess	8,3	87,96
Machinery - misc.	2,44	0,98	Wooden furniture	30,8	91,44
Cycles	6,23	0,99	Non-ferrous metals-prod.	7,61	94,75
Telecoms	13,37	1,04	Starch	13,84	95,35
Steel tubes	3,21	1,08	Receivers - TV and radio	12,73	108,94
Toys and sports	4,38	1,13	Clothing	25,11	109,64
Abrasives	4,32	2,32	Knitting	8,3	124,12
Asbestos	4,82	2,40	Furs	5,03	127,55
Man-made fibres	1,79	2,44	Aerospace	15,75	129,50
Musical instr.	7,1	2,61	Motor vehicles - ass and eng	11,43	140,71
Floor coverings	4,79	2,92	Pharmaceuticals	25,28	141,07
Machinery - textile	4,33	3,33	Oil refining	109,34	167,74
Stone	11,41	3,51	Wires	62,47	193,40
Machinery n.e.s.	4,45	3,57	Plastics	20,35	209,38
Glass	8,77	4,91	Meat	9,9	220,67
Electrical apps. - domestic	5,3	4,93	Textiles - households	27,85	226,76
Electrical apps. - indl.	11,67	5,27	Metal containers	65,78	246,82
Leather - products	6,77	5,32	Poultry	66,53	298,96
Machinery - agricultural	4,41	6,75	Printing	67,42	322,11
Precision instr.	6,89	8,96	Bread	84,36	542,28
Transmission eq.	4,84	10,62	Vegetables	14,83	609,74
Metals transformation	35,61	10,91	Forging	72,51	680,32
Iron and steel	4,81	11,06	Grain milling	55,94	690,27
Medical eq.	12,22	11,66	Pasta	51,34	715,12
Office machinery	5,52	11,97	Sugar	101,91	863,75
Transport eq. n.e.s.	9,64	12,05	Tobacco	86,73	881,07
Household chem. n.e.s.	5,77	13,61	Structural metal	44,61	881,27
Oils and fats	23,91	14,71	Beer	127,64	1173,34
Tools etc.	15,26	14,83	Clay	153,3	1269,59
Paint and ink	31,37	17,18	Food n.e.s.	43,11	1838,30
Cork and brushes	19,3	17,90	Soft drinks	167,15	2097,10
Wood n.e.s.	15,13	21,40	Wooden containers	303,62	2107,59
Lighting eq.	9,49	23,32	Motor vehicles - bodies	21,43	2160,35
Foundries	31,21	25,73	Wood - processed	29,38	2447,84
Soap	16,47	33,99	Confectionery	22,06	3232,41
Machinery - food and chem.	10,57	35,79	Wood - sawing	153,64	3881,25
Paper processing	16,51	36,23	Concrete	134,21	4124,43
Used tyres	25,68	37,89	Cement	385,06	7548,77
Footwear - mass	7,46	41,18	Dairy	40,13	8937,64
Fish	16,28	42,52	Motor vehicles - parts	13,14	9106,84
Graphic labs	50,54	50,54	Carpentry	233,72	11500,94
Machine-tools	12,95	53,15	Wine	259,29	66770,45
Industrial chem. n.e.s.	10,68	62,21	Distilling	155,32	288681,60

Source: Head and Mayer, 2000

Table 6 - Industry-level border effects for EU9 and US

Industry	EU9 effect	US effect	Industry	EU9 effect	US effect
Jewellery	4,07	0,09	Wood-sawing	153,64	33,21
Leather tanning	3,31	0,57	Pharmaceuticals	25,28	37,64
Starch	13,84	0,58	Poultry	66,53	39,50
Shipbuilding	22,91	1,72	Furs	5,03	44,01
Telecoms	13,37	1,73	Foundries	31,21	44,81
Industrial chem.	3,71	1,87	Aerospace	15,75	44,83
Asbestos	4,82	2,06	Tools etc.	15,26	45,77
Oils and fats	23,91	2,21	Tobacco	86,73	47,99
Textile n.e.s.	2,77	2,61	Graphic labs	50,54	50,54
Machinery - textile	4,33	2,64	Lighting eq.	9,49	57,89
Machinery - misc.	2,44	2,85	Machinery - engineering	12,99	61,43
Abrasives	4,32	3,15	Vegetables	14,83	65,10
Oil refining	109,34	4,21	Wood n.e.s.	15,13	65,61
Optical instr.	2,9	4,24	Machine-tools	12,95	66,10
Toys and sports	4,38	4,73	Iron and steel	4,81	66,20
Ceramics	5,75	4,76	Printing	67,42	67,42
Floor coverings	4,79	4,95	Metal containers	65,78	72,91
Machinery n.e.s.	4,45	4,99	Plastics	20,35	74,74
Steel tubes	3,21	5,27	Steel - preprocess	8,3	78,25
Machinery - agricultural	4,41	6,07	Textiles - households	27,85	78,27
Pulp and paper	8,87	6,27	Electrical plant	17,33	80,86
Meat	9,9	6,81	Structural metal	44,61	83,41
Man-made fibres	1,79	6,88	Paper processing	16,51	88,37
Stone	11,41	6,94	Wires	62,47	91,46
Transport eq. n.e.s.	9,64	7,44	Rubber	11,16	102,11
Cycles	6,23	7,72	Forging	72,51	116,32
Precision instr.	6,89	8,05	Wooden furniture	30,8	121,76
Fish	16,28	8,66	Clothing	25,11	196,50
Metals transformation	35,61	9,25	Knitting	8,3	200,47
Office machinery	5,52	9,51	Receivers - TV and radio	12,73	217,65
Glass	8,77	10,22	Sugar	101,91	270,12
Paint and ink	31,37	11,43	Motor vehicles - bodies	21,43	287,08
Medical eq.	12,22	12,02	Concrete	134,21	300,81
Musical instr.	7,1	12,45	Clocks	8,72	318,74
Electrical apps. - indl.	11,67	12,49	Wooden containers	303,62	344,69
Electrical apps. - domestic	5,3	14,63	Food n.e.s.	43,11	697,06
Transmission eq.	4,84	16,86	Confectionery	22,06	712,41
Footwear - mass	7,46	17,16	Beer	127,64	1013,31
Grain milling	55,94	17,28	Carpentry	233,72	1244,24
Leather - products	6,77	18,62	Bread	84,36	1672,74
Cork and brushes	19,3	21,04	Soft drinks	167,15	1737,22
Railway	30,18	22,40	Distilling	155,32	1905,27
Industrial chem. n.e.s.	10,68	22,63	Clay	153,3	2007,20
Wood - processed	29,38	23,19	Pasta	51,34	2651,51
Non-ferrous metals - prod.	7,61	25,10	Motor vehicles - parts	13,14	2895,63
Used tyres	25,68	25,68	Dairy	40,13	2965,67
Soap	16,47	27,78	Cement	385,06	3188,06
Machinery - food and chem.	10,57	30,46	Motor vehicles - ass and eng	11,43	3675,35
Household chem. n.e.s.	5,77	32,87	Wine	259,29	3986,76

Source: Head and Mayer, 2000

From table 5 it can be seen that in a non-negligible number of industries European consumers prefer 'on average' Japanese products over domestic products. This seems to be the case for optical instruments, several textiles, jewelry, telecom, cycles, to give some examples. In these industries, the border effect coefficient is lower or close to 1, which indicates a preference for Japanese products and which seems to reflect a favorable competitive position for Japanese producers.

On the contrary, for other industries there seems to exist a very large border effect towards Japan, much larger than the border effect towards other European countries. This is the case for the agro-food industry such as wine, distilling, bread, pasta, …

In the same group some industries show a large intra-EU border effect, but which is much smaller than the border effect towards Japan (cement, wood-processing and sawing, carpentry, oil refining, …). For these industries trade between Japan and the EU is very limited in absolute value. The lack of transport possibilities or very high transportation costs are a major explanation.

Lastly, there are some very important industries in the Japanese economy including motor vehicle parts and motor vehicle bodies, plastics, pharmaceuticals, electrical and electronic appliances (TV, Hi-Fi, …) where Japanese producers face a major border effect compared to European producers, suggesting serious artificial barriers to trade in relation to transport costs.

Table 6 shows a comparison of the intra-EU border effects versus the border effects vis-à-vis the United States. Some similarities with the Japanese border effects can be observed: the agro-food industry and goods that are difficult to transport show a much higher border effect than the intra-EU border effect for those industries, both for the US and Japan.

On the other hand, for the automotive industry border effects are higher vis à vis the US than vis à vis Japan. This is translated into a weak penetration of American producers in the European automobile industry.

Considering the industries where consumers prefer American products rather than domestic products, only three industries emerge: jewellery, leather tanning and starch (which is significantly less than for Japanese products, namely 3 for the US versus 9 for Japan). On the other hand, in some industries the "average" EU consumer prefers

American products to products from other EU countries, but not to domestic products. This is the case for industries like shipbuilding, telecom or industrial chemicals.

Those interregional border effects can give a good indication of the level of trans-regional globalization (i.e. a level of globalization that goes beyond the borders of the EU) of a specific industry.

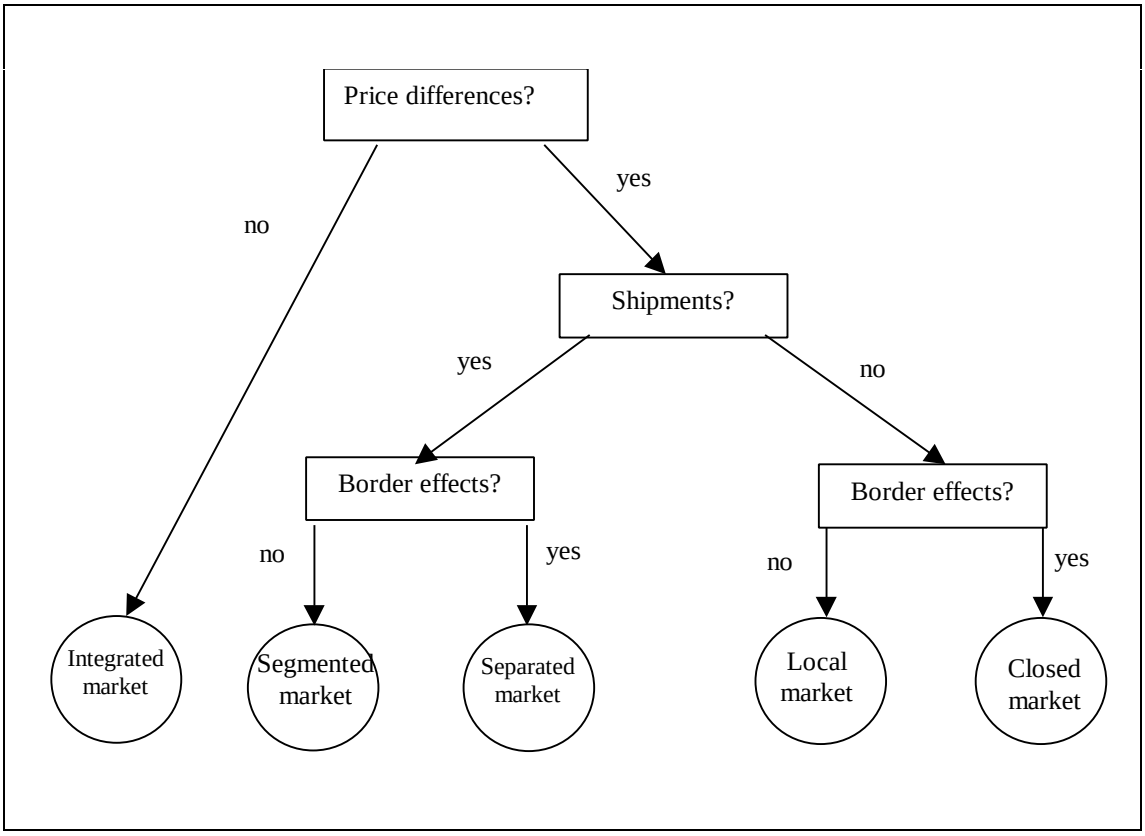
4.3 Combining border effects with shipments and price difference data

The border effects technique provides an interesting instrument to refine the delineation of economic markets based on shipments and price data. Combining price data, shipments data and border effects, the following elements can be concluded:

- If price differences between regions are non-existent, one can speak of an integrated economic market.
- If in a specific industry shipments between regions worldwide are taking place on a regular basis, no border effects are present but normalized prices differ between regions, this is an indication that the market for this industry is a segmented economic market.
- If shipments are taking place between regions, but border effects do exist, then the market may be considered to be separated. Likely, prices will differ between regions in this case.
- If there are no shipments between regions though no border effects are present for that specific industry, then the market can be considered as local.
- If no shipments are taking place, but if border effects exist for that industry, then the market is closed and firms are organized following a multidomestic structure.

Schematically:

Figure 6 - Economic market: scope



In all the cases discussed above, it is not possible to simply conclude that the relevant antitrust market is equal to the economic market. Firms from other regions can have a disciplinary effect on firms in the region, implying that the relevant market is larger than the economic market. Additional information about the pattern of competition should be used to come to conclusions about the relevant "antitrust" market.

4.4 Global supply response and global versus multimarket competition

Starting from the economic market, defined through a combination of price differences, shipment data and border effects, the next step is to identify the competitors and their possible supply reactions.

If there is one central characteristic of globalization of firms and industries, it is the effective response in supplying goods and services to customers scattered around the world. This not merely happens by means of trade but increasingly by setting up production and distribution units in various parts of the world. This global flexibility in supply response should be explicitly considered in delineating relevant antitrust markets. Hence, in assessing the scope of the market and arena of relevant competitors measures should be developed that are able to take this supply flexibility into account. Logically, intra-firm trade could give a good indication of the global flexibility within a company. However, figures on intra-firm trade are rare.

Davies and Lyons (1996) present a useful alternative measure. They define a globally integrated industry as an industry in which corporate strategies are integrated. They suggest that whilst a market may only be integrated given the absence of price differences or significant trade flows, the industry or relevant competitive arena may be integrated by multinational production or sales as well, the latter two being taken as evidence of integrated corporate strategies. The degree of multinationality of supply at the level of the industry is defined as:

$$M_j = \Sigma (M_{ij} * v_{ij})$$

where M_{ij} = the individual firm i's multinationality in industry j
$= 1 - \Sigma (x^2_{ijk}/x^2_{ij})$, with x_{ijk} = share of output or sales of firm i in industry j in country k
$v_{ij} = x^2_{ij}/\Sigma x^2_{ij}$ (1 = 1, ..., N)

In its number-equivalent form this becomes:

$$NM_j = (1 - M_j)^{-1}$$

For an industry to show a high degree of multinationality and thus to be characterized by integrated corporate strategies, they require that NM>1.4.

The idea behind this measure is that the more multinational firms are within an industry, the more likely that competitive reactions will occur across markets. In this multinationality measure not only the impact of trade on competitive conditions is captured through the multinationality of sales, but also foreign direct investments are captured through the multinationality of production. Such foreign direct investments are as much a source of potential supply response in a global economy as is trade. This has already been recognized in the 1997 UN World Investment Report. However, up till now this has not been explicitly taken into account in either EC or US competition laws.

A high degree of multinationality requires a deeper insight in the multimarket presence of the different competitors. If the same sellers are present in more than one economic market, this should be explicitly considered in the application of the market-delineation principle. Given multimarket presence of the same firms, when firms take actions, they never do this in isolation. A firm's action most probably implies reactions from other actors in that market or even other economic markets. The interdependence of firms across product markets has first been hypothesized by Edwards (1964):

"When one large conglomerate enterprise competes with another, the two are likely to encounter each other in a considerable number of markets. The multiplicity of their contacts may blunt the edge of competition. A prospect of advantage from vigorous competition in one market may be weighed against the danger of retaliatory forays by the competitor in other markets. Each conglomerate competitor may adopt a live-and-let-live policy designed to stabilize the whole structure of the competitive relationship. Like nation states, the great conglomerates may come to have recognized spheres of influence and may hesitate to fight local wars vigorously because the prospect of local gain are not worth the risk of general warfare."

Multimarket competition involves rivalry among the same group of firms in a set of related (product or geographic) markets. Since firms often compete in different economic markets with costs that are interrelated across these markets (e.g. through the use of joint input), the actions taken in one market may provoke important direct and

indirect (strategic) adjustment effects in the other markets. This interrelatedness has important implications for market delineation. Firms in one market can influence firms in other markets such that both firms can no longer increase prices in their home market without retaliation from the other firm. Consequently, the combination of both economic markets should be considered in identifying the relevant antitrust market.

In order to illustrate multimarket behavior, reference is made to an example in Sleuwaegen (1994).

Assume that there are two economic markets, C and O and two firms, one multimarket firm that is present in markets C and O and one national firm denoted by superscript N, i.e. only present in market O. Market C is considered as a possible antitrust market. In addition, the costs of the multimarket firm are assumed to be interrelated across markets. Thus, total costs do not only depend on the quantity produced for market C, but also on the quantity produced and sold on market O, q_o: $C = C(q_c,q_o)$.

With oligopolistic competition in market O, the actions by the multimarket firm for market O, which we reduce here to quantity settings, will not be independent from the quantity of the good offered by the rival firm N in market O, q^N_o, and vice versa.

With these assumptions, it follows that total profits of the multimarket firm operating as a monopoly in market C and under oligopolistic conditions in market O, will depend on its sales in markets C and O, and also on the quantity offered by the rival firm in market O: $\pi = \pi(q_c,q_o,q^N_o)$. Profits of the rival firm N in market O depend on its level of sales as well as on the quantity offered in market O by the multimarket firm: $\pi = \pi^N(q^N_o,q_o)$.

The actual adjustment of quantities offered by the rival firm N in market O will depend on the kind of strategic interactions among the firms in market O (i.e. strategic complements or substitutes). Let us further assume that for the multimarket firm, there are joint economies across the two markets, which may result from economies of scale and/or scope: $\delta^2\pi/(\delta q_o \delta q_c) > 0$.

With joint economies across these two markets, it is clear that an increase in sales in the market O will decrease the marginal costs of the firm. Therefore, with lowered marginal costs, the multimarket firm will also increase sales in the other market C. If the product is a strategic substitute to the competing firm in that market, the increase in sales will lead to a decrease in sales by the competing firm N, which effect would induce the multimarket firm to further increase sales in market O. In such a case the strategic

indirect effect reinforces the direct effect from economies of scale. Clearly, within such a scenario, it becomes less likely that the multimarket firm in market C would do the opposite and would prefer, following profit maximization, to substantially reduce quantity and raise price significantly above the competitive level in market C. If for these reasons the multimarket firm prefers to keep the price in market C very low, not different from the competitive level, market C cannot be considered as an antitrust market.

The reasoning developed in the example above also holds when strategic complements occur together with joint diseconomies across markets or if demand is interrelated across markets. Possible interaction effects could also be extended to other instruments than price and quantity setting (e.g. advertising).

One central result of the multimarket theory implies that firms that are more equal competitors across products or geographic markets, will refrain from taking unbalanced aggressive competitive actions (Van Wegberg (1993)). When the same firms meet in different markets, this facilitates multimarket collusion (Bernheim and Whinston, 1990). The result of multimarket competition may after some time be a reduction in competition (Caves, 1982). Edwards (1955) proposed the hypothesis that firms meeting in several markets recognize their interdependence and therefore may decide to lower competition. Firms with multimarket contact are inclined to facilitate collusion (Feinberg, 1985), since the payoff of the cooperative outcome exceeds the competitive profit (Kantarelis and Veendorp, 1988). Also in this case the relevant market is larger than the different economic markets and includes all markets subject to coordinated actions by multimarket competitors (Sleuwaegen, 1994).

In empirical studies about multimarket competition (Scott, 1982, 1991, Hughes and Oughton, 1993) two more refined measures for multimarket competition have been used.

Scott (1982, 1991) states that “the focus of scientific inquiry must be contact above that expected by chance meetings”, that is the probability that given the observation that two firms are already rivals in one market, that they will also meet up in other spheres of activity. Given that firms do follow some sort of strategy when diversifying in order to exploit e.g. economies of scope from production or marketing, it seems likely that firms will meet in several of their markets, but whether they do this ‘purposively’ to increase

multimarket contact is another matter. Scott's hypothesis regarding the level of multimarket competition is that the lower the number of industries in which the two companies meet relative to their total number of operations, the smaller the likelihood that they will recognize their mutual interdependence. More formally, he measures the probability distribution over the number of ways a 'representative' pair of firms can meet in their other markets, given that they were initially observed to be operating in the same market.

Hughes and Oughton (1993) measure the degree of multimarket contact through the calculation of the pair wise contact of the leading 5 firms in each country.

If the multimarket measure spans the world and reaches high values, multimarket competition becomes global competition.

Both measures of multimarket competition have limitations. For a discussion of these limitations we refer to Lund (1993). Another problem is that both measures require a lot of specific data.

A more crude measure of multimarket contact can be found in Sleuwaegen and De Voldere (1999). Based on the market shares and rankings of the different competitors in the EU Member States, the relative positions of the competitors are determined. When these relative positions do not differ strongly across the different Member States, it can be concluded that the relevant competition arena is the European Community (or larger). If on the other hand these relative positions do differ significantly, this can be interpreted as different markets from a competition point of view.

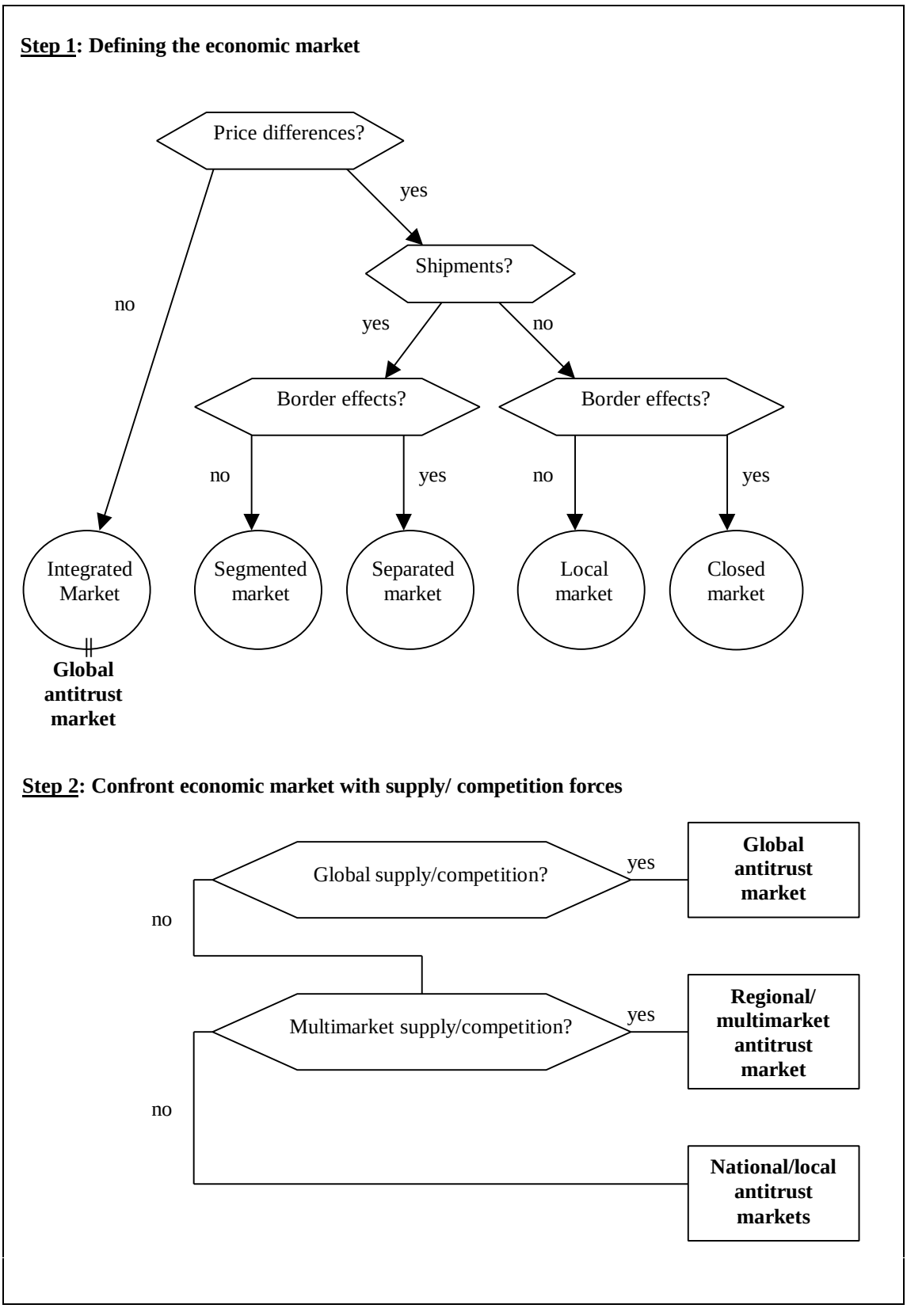
4.5 A comprehensive framework for delineating the relevant geographic market

Bringing together the different building blocks set out in the previous paragraphs, the following stepwise method appears useful to measure the geographical scope of the antitrust market.

In a first step the economic market can be defined combining price data, shipment data and border effects. If no price differences are found, the markets are integrated and should be treated also as global antitrust markets. For fragmented economic markets, the information should be complemented with information about the scope of possible competitive reactions to correct the definition of the relevant market for competition. Therefore, in the next step data about the foreign penetration should be examined to determine the "competition arena".

Figure 7 shows how the elements are linked together to arrive at the delineation of the relevant geographic antitrust market.

Figure 7 - Identifying the geographical scope of the relevant antitrust market



As the framework set out above contains all essential ingredients to delineate antitrust markets, the collection and processing of the necessary data at the level of products of individual firms may appear cumbersome. However, we believe that the value of the framework lies in the systematic approach it provides to process the information provided by the companies. In unraveling the underlying causalities, the framework does not merely assemble information, but also builds up cumulative evidence to arrive at a more solid market delineation outcome.

4.6 Defining the relevant geographic market in the information economy

In defining the relevant market for information goods, Gilbert and Sunshine (1995) have sought to assess market power in future goods markets by using observable variables such as competition in the R&D market and asset holdings as proxies. Gilbert and Sunshine explain that a merger between two competitors in information development can impede innovation, with adverse effects on (i) goods markets where neither firm has yet entered and (ii) goods markets where the merging firms may be neither actual nor potential competitors, such as the case where the firms produce similar products for different geographic markets. These effects may be misperceived by analysis confined to goods markets, but they are brought into focus by innovation markets. The proposed methodology for defining the relevant market for information goods is analogous to the one used in analyzing goods markets, as discussed in the previous paragraphs. Gilbert and Sunshine would identify 'the set of research and development activities for which a hypothetical monopolist would profit by a small but significant and non-transitory reduction in R&D' as the relevant market for information goods.

In our model this idea can be incorporated in our multimarket measure. Instead of measuring the foreign penetration at the level of investments, in new industries foreign penetration could be measured at the level of R&D efforts. The logic behind this is that patent data of firms with respect to information technology[20] can very well

[20] On August 11, 1998 the U.S. Patent & Trademark Office (PTO) issued Priceline.Com a patent for the world's first buyer-driven e-commerce system. With the patented system, consumers can go the

picture a firm's involvement in different product ecologies. Even if firms are not really active in a given industry by means of a production plant, holding patents can form a potential treat to entry and thus work in a constructive way to counterbalance competitors in other markets. Though patents can be checked at the several patent offices around the world, the precise impact of currently unused 'sleeping' patents on the competitive environment is difficult to assess.

Internet to name their price for goods and services, and sellers electronically decide whether to accept the customer's price. The patent allows the firm to recoup the investments made in the development of the system.

5 DATA REQUIREMENTS

In this section informational requirements following the proposed methodology will be linked to information available from published statistics and/or specific data sources. In the different paragraphs shipment data and price data, border effect data and foreign penetration information will be discussed.

5.1 Shipment and price data

Data on exports and imports within the EU can be found at 4 digit-level NACE rev. 1 in COMEXT. This database is available from Eurostat that integrates this database within its Competitiveness Database. However, the information in the database has a serious time lag of 2 years, a period that is not at all negligible for so-called new industries. Another problem with trade data is that they consist not only of inter-firm trade, but also of intra-firm trade. This last trade volume should not be considered when using trade data to measure shipments in the light of the delineation of markets. The problem will clearly be demonstrated when discussing the Volvo-Scania case in the next section. The truck industry is a typical example of an industry that shows a large amount of trade when looking at trade statistics. However, most trade within the industry is actually intra-firm trade. As a consequence, trade statistics overestimate the effect of interregional shipments.

Price data can be found in NEWCRONOS where harmonized indices of consumer prices are collected annually and even monthly for many industries within the EU and the European Economic Area. For various consumption goods and services even price indices are collected from Canada, the US, Japan and Switzerland, as well as from the accession countries (Bulgaria, Czech Republic, Hungary, Poland, Romania, Slovak Republic, Slovenia, Estonia, Latvia, Cyprus).

More directly the notifying parties can be asked to deliver price data for the products concerned. The prices to be provided are actual transaction prices, not listed prices. The price data should be for the same product in the different countries. If products differ among the different countries, then corrections in prices have to be made to

make prices comparable. Moreover, prices should differ consistently over time and thus price data are required for more than one period, preferably two or three years. In general, in a stable competitive market price differences below 5% are often considered to be normal. For markets in new products it is necessary to examine whether there is a trend of price convergence over time.

5.2 Border effects

Head and Mayer (2000) have calculated border effects at a 3 digit industry level. They have calculated these border effects not only between European countries, but also between the EU, Japan and the US. These border effects have been specified in this study in the tables 2 to 4 of section 4. To make border effects a useful instrument in the definition of geographic markets those border effects should be updated on a more or less regular basis and if data were available on a more disaggregated level, then the 3 digit level border effects could be calculated accordingly.

To get around the difficulty of getting the appropriate data, the following procedure can be applied. The notifying parties should be asked the following questions:

1. Indicate the different distribution centers[21] from where the product is delivered to the final customer within the EEA.
2. What is the maximum distance to economically transport the product involved (=action radius) within the EEA?
3. Indicate per distribution center what other countries are served and the percentage of shipments going to these countries.

Given the information from questions 1 and 2 the amount of trade that could be expected in a world without borders. Based on question 3, a comparison can be made between the expected amount of trade without borders and the observed amount of trade to the different countries where the company is active at this moment. When the

[21] Distribution center: place from where the manufactured product will be shipped to its final destination (i.e. customer, sales representative). This can be a traditional distribution center or the

test indicates that border effects do exist, the sources causing these border effects should be investigated.

It is clear that this test should only be done as long as the action radius of the distribution center crosses country borders.

The methodology is very suitable as long as the markets to investigate are not physically separated. However, when markets are physically separated by for example an ocean, the methodology is no longer useable. A solution to this problem is then to look immediately for different sources of border effects.

5.3 Competitors information

To get an indication about the extent of global or multimarket competition in an industry, competitors' information must be collected. Extensive information is available through the Internet and the formation of specialized research companies and information providers specialized in collecting company data. Basic business information is provided by market research organizations such as Dun & Bradstreet or Kompass. Dun & Bradstreet publishes annual information about firms in all sectors. The available information concerns basic data on the company, its parent company, which businesses it is active in, … A list of the top 5000 firms is available ranked per sector. Next to this basic information Dun & Bradstreet also annually publishes 'Who owns whom', which provides information on the corporate structure of a company, its relation to its subsidiaries and associated companies. Apart from the annual publications, Dun & Bradstreet also owns the **D&B Worldbase**. This database contains information on more than 52 million businesses in over 200 countries. Given the name of the parent company or subsidiary, Worldbase is able to identify a company's corporate structure worldwide. It shows which companies are related, where a corporation has subsidiaries, and where the highest decision-making authority lies.

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production plant, if the company ships the products directly from the production plant to the customer/sales representative.

Starting from the information found in Dun & Bradstreet, Onesource Information Services (www.onesource.com) – an English company – offers the "European Business Browser" which includes ready-to-use information on around 300,000 public and private companies from 19 European countries. In the database core company data from Dun & Bradstreet is integrated with news, trade press and market research from premier data sources.

Another useful data source is Kompass. Apart from the basic information on companies in all sectors that is published by Kompass annually, it also has a database called Kompass Database. This database contains basic information on companies, their personnel, financial situation and other statistical information. The database is directly accessible on the Internet (www.kompass.com) after free registration for some basic information or through subscription for more specialised information.

Other research organizations that provide company information are ACNielsen, Fortune and Amadeus. ACNielsen is mostly specialized in the following sectors: food, personal and household products, durables and retailing. The Amadeus database provides mainly financial data on companies.

However, all these databases only offer publicly accessible information about companies. More specific business and competitors' information mostly is not readily available. Another drawback is the industry classification of companies. Often companies are classified in one specific industry, whereas they might be active in more than only this one industry. These limitations are solved in the SPES matrix. This matrix includes information on all companies belonging to the top 5 producers in about 100 NACE 3-digit industries in the EU. For all these companies the geographical and sectoral diversification of their production within the EU is available[22]. The matrix has been constructed by a European academic project team including members from Belgium, Italy, England and recently Austria. So far the matrix was available for the years 1987 and 1993 and contained information for the 12 EU Member States at that time. At this moment they are working on an update of

[22] For more detailed information about the construction of this market share matrix, see Davies et al. (1996).

this matrix for the year 1997 that also includes information about the new EU Member States since 1993.

For specific detailed information, the notifying parties as well as the main competitors should be contacted, to deliver the following information:

1. In which countries in the EEA is your company active?
2. Who are your most important competitors within the EEA? If competitors vary among the different Member States, indicate per country who are the most important competitors.
3. How are your sales divided over the different Member States?
4. What is your market share in each of the different Member States in which you are active?

Based on this information the multinationality of the different players in the market can be estimated and the similarity in market share ranking across countries or regions established. This gives a good indication of the degree of multimarket contact within the industry.

5.4 Patent information

European, American and international patent bureaus offer very useful accessible, accurate and reliable information. Moreover, the number of patents included in the databases is complete since they contain all patents applied for (European Patent Office, EPO) or approved (U.S. Patent and Trademark Office, USPTO). Also, these databases are more and more accessible in an electronic format (e.g. CD-roms of USPTO and Espace Bulletin of EPO). It should be remarked however that here again a time lag of about 3 years should be taken into account. Moreover, the last data (i.e. from the last 18 months) publicly available in the EPO-database might not be reliable since it takes about 18 months between the application by the firm and the publication in the database in the EPO-system.

Recently, there are also a number of databases available on the Internet with patent information. They differ from each other in coverage and content. Interesting databases

to mention are esp@cenet (http://www.european-patent-office.org/patinfopro/databases/index.htm) from the European Patent Organization and the USPTO database (http://www.uspto.gov/patft/index.html) from the US Patent Office. The first offers the largest worldwide data coverage and access to the largest quantity of full patent documents. The second offers an interesting full text search of patents that can yield more results for a keyword search. Coverage, however, is limited to US patents. For the consultation of the esp@cenet database a link is also provided via the European Commission (http://ec.espacenet.com/espacenet/). Searches can be executed through simple text, patent number and company name, the latter being most interesting for this study. Through the Intellectual Property Rights (IPR) Helpdesk (http://www.ipr-helpdesk.org/) a detailed esp@cenet tutorial can be consulted.

6 CASE-STUDY: VOLVO–SCANIA

In this section, the Volvo–Scania case, which has been investigated by the European Commission in 1999-2000, will serve to illustrate the applicability of the new methodology to delineate the relevant geographic market. The first paragraph will shortly introduce the case and discuss the final decision by the European Commission. Special attention will be paid to the definition of the relevant geographic market. In the second paragraph the case will be discussed in the light of the methodology developed in the study.

6.1 Volvo-Scania: Commission decision

- **Introduction**

In Autumn 1999 the Commission received notification of a concentration by which Volvo proposed to acquire control of Scania. Volvo and Scania are both Swedish companies that are mainly active in the manufacture and sales of trucks, buses, marine and industrial engines. Through the proposed operation the new group was about to acquire a substantial share of the market for heavy trucks and buses in the EEA. The Commission therefore thoroughly investigated their competitive position on both product markets and came to the conclusion that for both products (heavy trucks and buses) the proposed operation is incompatible with the common market. For heavy trucks the operation would create dominant positions in the markets for heavy trucks in Sweden, Norway, Finland and Ireland. For touring coaches a dominant position would be created in Finland and the United Kingdom, for inter-city buses in Sweden, Finland, Norway and Denmark, and for city buses in Sweden, Finland, Norway, Denmark and Ireland, each of which would result in competition being significantly impeded in the common market within the meaning of Article 2(3) of the Merger Regulation and Article 57 of the EEA Agreement.

- **Definition of the relevant geographic market in the Volvo-Scania case**

In the notification procedure the notifying party (i.e. Volvo) concluded that the relevant market for both heavy trucks and buses is the EEA. To come to this conclusion, they relied on the Commission's findings in the Renault/Iveco case (n° IV/M.1202), where it was concluded that the relevant geographic market for touring buses was the EEA, basically because of the high levels of imports and exports. According to Volvo, this reasoning could also be applied to heavy trucks. Moreover, Volvo used the following elements in their arguments for a EEA-wide relevant market:

- Price differences between Member States are not substantial.
- Manufacturers are active EEA-wide and imports within the EEA are increasing.
- Large, private, trans-border purchasers emerge due to deregulation in the truck industry.
- Large customers purchase from different manufacturers (dual sourcing).
- Harmonisation of regulations has led to a standardization of product.
- No entry barriers exist for non-domestic producers.

However, despite these arguments, the Commission decided differently. Based on the evidence available to the Commission they decided that for both heavy trucks and buses the relevant geographic market was not EEA-wide. In the next paragraph their arguments will be set out for the different product markets investigated.

Heavy trucks

Contrary to what the notifying party argued, the Commission found that significant price differences do exist across Member States, even after correcting for differences in specifications. Moreover, Volvo applies significantly different margins on the sales of the same good in different countries, again indicating that price discrimination between countries is possible.

The Commission also found non-price evidence that the markets are smaller than EEA-wide. In its decision the Commission argued that customer preferences across Member States differ considerably, related to topographic and climatic differences. Also technical requirements still vary between Member States, despite efforts towards harmonization. Especially for Sweden, the Commission considered the "cab crash test" to be a serious technical barrier to entry. As a consequence purchases still take place on a national basis, even for large, international customers.

When looking at market shares by truck makers across the different Member States, also here the Commission found evidence that the market for heavy trucks is not EEA-wide, but nationally fragmented.

Based on all these elements the Commission concluded that Sweden, Norway, Finland and Ireland constitute separate relevant geographic markets for heavy trucks. The Commission also found strong indications that Denmark constitutes a separate geographic market for heavy trucks. For the remaining Member States the geographic scope of the market was left open, since the operation was not deemed to lead to the creation or strengthening of a dominant position on these markets.

Buses

Concerning the bus market, the Commission first of all remarked that a single relevant product market for all buses cannot be accepted. They considered it appropriate to assess the competitive impact of the operation on the basis of separate markets for city buses, inter-city buses and touring coaches. For all three categories the relevant geographic market has been delineated, based on the following arguments.

Touring coaches

The Commission found that for touring coaches market shares vary significantly between Member States, giving a first indication that the market for touring coaches is not EEA-wide. Moreover, the purchasing behaviour of customers seems to differ significantly between Member States. This last implies that customers very rarely buy outside their country, which is supported by the data found by the Commission. In

addition, technical requirements and preferences still vary across Member States, despite recent harmonization.

Apart from these non-price indications of national markets, the Commission also found that significant price variations exist, even between neighboring countries.

Based on these elements the Commission concluded that Finland and the U.K. constitute a separate national market. For the other Member States again the geographic scope of the market can be left open, since in any case the operation would not lead to the creation or strengthening of a dominant position.

City buses and Intercity-buses

The investigations by the Commission found that in Sweden, Finland, Norway, Denmark, the U.K. and Ireland most of the elements described in relation to touring coaches also applied here.

Thus, the Commission concluded that the markets for city- and intercity buses are national in scope in each of the Nordic countries and Ireland/U.K.

6.2 Assessment of the Volvo-Scania case using the new methodology

As can be concluded from the previous paragraph, the Commission based its decision in the Volvo-Scania case on several indications pointing in the direction of a fragmented market. The methodology suggested in the study is based on the same idea of cumulating evidence to come to a conclusion on the delineation of the geographic market. However, the new methodology brings more structure in the different elements taken into account by the Commission. A critique that is often heard about the Commission's approach, is the arbitrary importance given to the several criteria in the decision making process of different cases. At this moment no real hierarchy exists among the criteria. Also, in cases where conflicting evidence is present and different criteria point in different directions, the Commission's approach remains vague. The methodology suggested in this study, tries to formulate a solution to these problems. Based on the methodology a ranking can be suggested of the

criteria taken into account by the EU Commission for delineating the geographic market. It suggests to first look at the following 'revealed measures' of globalization (see table 3, section 3.4): price differences and trade flows. In a second step regulatory barriers to market interpenetration (analogously with border effects) should be examined, to come to a meaningful definition of the economic market. In the last step, competitors' information and market share differences should be analyzed to define the relevant geographic market. In the next paragraphs this stepwise procedure will be used in discussing the Volvo-Scania case.

Following the methodology, first price data and shipments data are examined.
In the Volvo-Scania case, for both heavy trucks and buses significant price differences have been observed among the different Member States, even after correction of prices for specifications. It should be remarked here that when looking for price differences among countries, prices have to be taken for one and the same product (i.e. corrected for different country specifications and options) and that price differences have to be observed for at least a specific period of time, say 2 years. As already pointed out in section 5, prices to compare should be transaction prices. In the transportation industry those could differ significantly from listed prices.

Secondly, shipments between the Member States are limited. In this context a distinction should be made between intra-firm trade and inter-firm trade. While total trade (i.e. intra- and inter-firm trade) is significant, most trade in the transportation industry is intra-firm trade. When looking only at cross-country inter-firm shipments, these amounts are minor, thus pointing in the direction of more national than European markets.

As prices for the same product differ among the different Member States and shipments between countries are not high, this is a first indication of a fragmented economic market. In observing the limited volume of shipments, the question arises whether external factors, i.e. border effects, cause the market to be fragmented or whether markets are just local in nature. When regulatory barriers are high, border effects will be high, thus indicating a closed market. However, when shipments are non-existent and price differences exist, but border effects are low, then it can be concluded that the market is local.

In both heavy trucks industry and buses industry border effects are high, due to regulatory barriers. Despite some harmonization at the European level, regulatory barriers still exist in a number of countries. For example, in the UK and Ireland all vehicles must be adapted for right-hand drive. This heavily weights on the possibility to import vehicles from other countries. Also across Member States different regulations still apply as concerns permitted total transported tonnage and maximum length of trucks and buses. In Sweden, especially for the truck industry law requires a specific homologation –called "cab crash test". This last regulation is a severe regulatory barrier to entry in this industry, as was also pointed out by the European Commission. Due to all these regulatory barriers, it can be concluded that high border effects characterize the markets for trucks and buses and thus can be considered as closed markets.

The third step of the methodology explicitly pays attention to supply substitution and the way the production structure is globally organized by defining the firms' competitors and looking at multimarket competition. When competitors often meet in different markets, they will influence each other's behavior, thus exercising a tempering effect on anticompetitive behavior. For both heavy trucks and buses the arena of competition is still dominated by national players that do meet in several countries, but not as equal competitors, as can be seen from tables 7 to 10. The most remarkable examples are Volvo and Scania in Sweden, Daimler in Germany and Iveco in Italy. For all players most sales are concentrated in only a few countries (of which most in the home country), thus giving a low index of multinationality. However, competition in the industry has changed over the last ten years, suggesting a growing Europeanization of the industry[23]

[23] See also Sleuwaegen and De Voldere (1999), "Competitive distortions and state aid to firms. How to define the relevant market?"

Table 7 - Market share variations in the heavy truck industry (1998)

	Volvo	Scania	Daimler	MAN	RVI	Iveco	DAF
EEA average	15.2	15.6	20.5	12.6	11.9	10.6	10.5
Sweden	45	46	6	0	1	0	2
Finland	34	31	10	3	18	4	0
Denmark	29	30	18	10	3	7	4
U.K.	18	19	9	7	6	9	18
Ireland	22	27	9	6	3	8	13
Germany	8	9	42	26	2	6	5
Austria	12	16	18	34	4	6	9
France	14	9	16	5	38	8	8
Belgium	23	17	18	11	8	6	17
Luxembourg	11	15	28	14	10	8	15
Netherlands	16	23	12	9	3	3	33
Italy	12	12	16	6	9	41	4
Spain	13	16	19	8	19	20	9
Portugal	25	19	12	6	17	7	14
Greece	24	17	36	12	3	2	3
Norway	38	32	9	12	1	2	4

Source: Notification (based on official registration figures)

Table 8 - Market share variations in touring coaches industry (1998)

	Volvo	Scania	Largest competitor
Denmark	18%	19%	>25%
Finland	68%	21%	<10%
Greece	25%	63%	*
Ireland	27%	33%	*
Italy	14%	7%	>40%
Netherlands	16%	11%	<30%
Norway	29%	11%	>30%
Portugal	17%	15%	>25%
Spain	1%	34%	>25%
Sweden	6%	20%	>30%
U.K.	42%	10%	>10%
Total EEA	17%	11%	>30%

Source: Volvo company

Table 9 - Market share variations in city buses industry (1998)

	Volvo	Scania	Largest competitor
Denmark	55%	33%	<20%
Finland	71%	23%	<10%
Greece	18%	36%	<30%
Ireland	60%	32%	<10%
Netherlands	10%	7%	<30%
Norway	48%	13%	<20%
Portugal	11%	8%	<30%
Sweden	38%	42%	<10%
U.K.	56%	13%	<20%
Total EEA	22%	8%	

Source: Volvo Company

Table 10 - Market share variations in intercity buses (1998)

	Volvo	Scania	Largest competitor
Denmark	51%	25%	<20%
Finland	68%	21%	<10%
Greece	0%	48%	<30%
Ireland	NA	NA	
Netherlands	0%	0%	<30%
Norway	68%	14%	<20%
Portugal	13%	10%	<20%
Sweden	58%	24%	<10%
U.K.	NA	NA	
Total EEA	12%	5%	

Source: Volvo Company

Based on the methodology, here also it can be concluded that the geographic antitrust market is at this moment certainly not the EEA. Despite harmonization over the years, the markets for heavy trucks and buses appear still fragmented at the national level. This fragmentation in the transportation industry is largely related to regulatory barriers. However, most large truck and bus makers are active in all EU Member states, although with substantial variations in market shares (see tables 8 to 10), thus implying an increasingly European wide supply chain organization. This suggests a multimarket competition outcome with strategic interaction over the different national markets, rather than one integrated European market. The reasons for this supply

system organization at the EU level can be found in the substantial efficiency gains still unexplored in the truck industry and linked to the proposed Volvo-Scania merger. However, these efficiency gains appear not to be taken into account in the EC merger control.

Because of the fragmentation mainly caused by government regulation on the one hand and the still largely unexplored efficiency gains on the other hand, our analysis would suggest a less strict attitude towards the Volvo-Scania merger as the one adopted by the Commission in its final decision. Moreover, a further harmonization of regulations at the EU level seems to be a necessary condition to come to one integrated European market.

Annex I. CLASSIFICATION OF BELGIAN INDUSTRIES

Global investors / national shipments

429 Manufacture of tobacco products

European investors / national shipments

427 Brewing and malting

National

243 Manufacture of concrete, cement or plaster products for construction purposes

422 Manufacture of animal and poultry foods (including fishmeal and flour)

Global investors / European shipments

223 Drawing, cold rolling and cold folding of steel

242 Manufacture of cement, lime and plaster

247 Manufacture of glass and glassware

251 Manufacture of basic industrial chemicals and manufacture followed by further processing of such products

252 Manufacture of chemicals obtained from petroleum and from coal

253 Manufacture of other basic industrial chemicals

255 Manufacture of paint, painters' fillings, varnish and printing ink

256 Manufacture of other chemical products, mainly for industrial or agricultural purposes

258 Manufacture of soap, synthetic detergents, perfume and toilet preparations

312 Forging, drop forging; closed die-forging, pressing and stamping

316 Manufacture of tools and finished metal goods, except electrical equipment

321 Manufacture of agricultural machinery and tractors

342 Manufacture of electrical machinery

343 Manufacture of electrical apparatus and appliances for industrial use; manufacture of batteries and accumulators

345 Manufacture of radio and television receiving sets, sound equipment; manufacture of gramophone records and pre-recorded magnetic tapes

346 Manufacture of domestic-type electric appliances

347 Manufacture of electric lamps and other electric lighting equipment

351 Manufacture and assembly of motor vehicles and manufacture of motor vehicle engines

353 Manufacture of parts and accessories for motor vehicles

413 Manufacture of dairy products

414 Processing and preserving of fruit and vegetables

418 Manufacture of starch and starch products

419 Bread and flour confectionery

423 Manufacture of other food products

453 Manufacture of ready-made clothing and accessories

466 Manufacture of articles of cork and of straw and other plaiting materials; manufacture of brushes and brooms

472 Processing of paper and board

481 Manufacture of rubber products

482 Retreading and repairing of rubber tyres

483 Processing of plastics

European

26 Man-made fibres industry

311 Foundries

315 Boilermaking, manufacture of reservoirs, tanks and other sheet-metal containers

352 Manufacture of bodies for motor vehicles and of motor-drawn trailers and caravans

421 Manufacture of cocoa, chocolate and sugar confectionery

424 Distilling of ethyl alcohol from fermented materials; spirit distilling and compounding

439 Miscellaneous textile industries

465 Other wood manufacture (except furniture)

494/495 Manufacture of toys and sports goods; miscellaneous manufacturing industries

National investors / European shipments

231 Extraction of building materials and refractory clays

241 Manufacture of clay products for constructional purposes

244 Manufacture of articles of asbestos

245 Working of stone and of non-metallic mineral products

246 Production of grindstones and other abrasive products
248 Manufacture of ceramic goods
313 Secondary transformation, treatment and coating of metals
314 Manufacture of structural metal products
327 Manufacture of other machinery and equipment for use in specific branches of industry
341 Manufacture of insulated wires and cables
412 Slaughtering, preparing and preserving of meat
415 Processing and preserving of fish and other seafoods fit for human consumption
417 Manufacture of spaghetti, macaroni, etc.
428 Manufacture of soft drinks, including the bottling of natural spa waters
43 Textile industry
438 Manufacture of floor coverings
441 Tanning and dressing of leather
442 Manufacture of products from leather or leather substitutes
451 Manufacture of mass-produced footwear
455 Manufacture of household textiles and other made-up textile goods
456 Manufacture of furs and fur goods
462 Manufacture of semi-finished wood-products
463 Manufacture of carpentry and joinery components and of parquet flooring
464 Manufacture of wooden containers
467 Manufacture of wooden furniture
473 Printing and allied industry

Global
257 Manufacture of pharmaceutical products
322 Manufacture of machine-tools for working metal, and other tools and equipment for use with machines
324 Manufacture of machinery for the food, chemical and related industries
325 Manufacture of plants for mines, the iron and steel industry and foundries, civil engineering and the building trade
326 Manufacture of transmission equipment for motive power
328 Manufacture of other machinery and equipment
330 Manufacture of office machinery and data-processing machinery
344 Manufacture of telecommunications equipment, electrical and electronic measuring and recording equipment, and electro-medical equipment
361 Shipbuilding
363 Manufacture of cycles, motor-cycles and parts and accessories thereof
371 Manufacture of measuring, checking and precision instruments and apparatus
372 Manufacture of medical and surgical equipment and orthopaedic appliances
373/374 Manufacture of optical instruments and photographic equipment; manufacture of clocks and watches and parts thereof

European investors / global shipments
211/212/221 Extraction and preparation of metalliferous ores; iron and steel industry
224 Production and preliminary processing of non-ferrous metals
259 Manufacture of other chemical products, chiefly for household and office use
471 Manufacture of pulp, paper and board

National investors / global shipments
222 Manufacture of steel tubes
232/239 Extraction of minerals
323 Manufacture of textile machinery and accessories; manufacture of sewing machines
362 Manufacture of standard and narrow-gauge railway and tramway rollingstock
364/365 Manufacture and repair of aerospace equipment and transport equipment
411 Manufacture of vegetable and animal oils and fats
416 Grain milling
420 Sugar manufacturing and refining
425/425 Manufacture of wine and of cider
461 Sawing and processing of wood
491 Manufacture of articles of jewellery and goldsmiths' and silversmiths' ware; cutting or working of precious and semi-precious stones
492/493 Manufacture of musical instruments; photographic and cinematographic laboratories

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