More intra-region direct investment through economic integration? Modelling the experience of the EU's Single Market

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Abstract

Regional integrating agreements in most cases brought about increases in intra-regional trade and direct investment (DI). The surge in intra-EU DI during the Single Market Programme is a particularly stunning example. A model is built where a multinational enterprise (MNE) located within an integrating region decides how best to supply a group of countries in this region ('core'). Exporting is associated with trade and distance costs. Distance cost within the core is lower than from the MNE's home country ('periphery'). Investing involves a fixed cost of setting up. Reducing obstacles to investment unambiguously favours setting up plants in one or more core countries. Lowering (non-tariff) trade barriers instead is more likely to make exporting from the periphery or consolidation of investment in one core country more profitable, but can also induce investment.

Keywords: multinational firm, foreign direct investment, economic integration
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1 Introduction

Multilateral trade liberalisation after World War II had a remarkable impact on growth rates of exports and imports worldwide. The subsequent increases in international production and investment from the 1980s onwards were even greater. By taking additional measures towards trade and investment liberalisation, regional trading and integrating agreements like the European Union (EU) have benefited from these developments more than proportionally.

The literature on trade creation and trade diversion explains why and when this should be the case. The early integrating steps of the EU have, in fact, been studied extensively in this tradition. Concerning foreign direct investment (DI) and multinational activity in the EU, the focus has been mainly on firms located outside the union, in particular on US and Japanese multinationals. The quite pronounced increases in the flows of foreign direct investments and to a lesser extent trade among the EU member countries along with the implementation of the Single Market Programme (SMP) up until 1992 have, however, received less attention so far.

From a theoretical perspective foreign direct investment has been explained on the basis of two arguments: one is to better serve a local market, and the other is to profit from lower-cost inputs. Proximity to a local market usually gives rise to horizontal DI, that is duplication of parts of the production process in different locations, while the reasoning based on factor costs generates vertical disintegration of the production process in different locations. Cost considerations are crucial in this literature in that the trade-off between exporting to a foreign market and setting up a production facility there arises due to a comparison between the variable cost of exporting (trade barriers, transport) and the fixed cost of establishing a foreign subsidiary.

The model presented here seeks to address the decision on the supply regime of a potential multinational enterprise (MNE) located inside an integrating region to the other union countries. The question is how measures towards economic integration, which affect either the variable cost or the fixed cost in the trade-off just mentioned, change the MNE's supply decision. The potential multinational enterprise is located in a country in the union from where it has to overcome a greater distance to the markets it wants to serve, than the firms based in these markets have to bridge to serve each other. The idea is that even in a region where economic integration has been underway for a while there will be groups of countries that are closer to each other than to the rest of the union countries. This may simply be in terms of geographic distance, but also in terms of cultural proximity, like, for example, a common language or a similar way of doing business. Taking the evidence on border effects and home bias at face value would imply that regions that are close to each other do not extend beyond national borders. Nitsch (2002) finds that even after the Single Market Programme EU countries trade on average ten times more within

national borders than with other EU countries; Head and Mayer (2000) confirm this number at the industry level.

The paper is structured as follows: section 2 documents how trade and foreign direct investment have evolved alongside European integration and the Single Market Programme in particular. Section 3 summarises the existing theoretical work. In section 4 the model is presented, first for the case of the MNE acting as a monopolist (4.1), and second when it faces competition from local incumbents (4.2). Section 5 summarises and concludes.

2 Foreign Direct Investment and Trade in the European Union: The Evidence

The Treaty of Rome signed in 1957 inaugurated the European Economic Community and provided the basis for the Common Market among the Benelux countries, Germany, France and Italy, - the founding members of what was later to become the European Union. In a series of steps this agreement brought about the elimination of internal tariffs and the harmonisation of external tariffs. This process was completed in 1967. It took much longer to liberalise capital movements, however, from 1962 on direct investments between firms in the common market came under the heading 'fully free' (Pollard (1974), Molle and Morsink (1991)). Balassa (1975) and Yannopoulos (1990) document positive trade as well as direct investment effects for the formative years of the European Community.

To prevent the integration process from stagnating - a trend already manifest in an intensification of non-tariff barriers to trade - the Single Market Programme was implemented in the mid-1980s. By 1992 broad scale harmonisation was to be achieved. Measures still affecting trade and direct investment were customs and tax controls at borders, technical barriers, and restrictive practices in government procurement, but also harmonisation of technical and product standards or simplified bureaucratic procedures for establishing new plants (Monti (1996)).

The Single Market Programme raised high expectations in politics and academia (e.g. Cecchini (1988)). Simulations in general equilibrium models undertaken by Smith and Venables (1988) and by Gasiorek, Smith and Venables (1992) are concerned with reductions in trade barriers on EU welfare. Considering small reductions in (non-tariff) trade barriers in imperfectly competitive industries they predict increased import penetration in each country, thereby increasing competition and raising welfare. Baldwin, Forslid and Haaland (1996) proceed in a similar way and obtain investment creation in sectors with high non-tariff barriers.

Figures 1 and 2 show the evolution of trade and direct investment in the EU. The top panel in figure 1 shows that intra-EU12 trade as a share of total EU12 trade increased by 5 percentage points between 1986 and 1992 to a level of roughly 55%. The same effect is visible also for EU15 albeit to a higher level (approx. 60%). A similar development can be observed only for the Japanese share in EU12 trade; the share of the US in EU trade even declined over the period (see figure 2 top).

Breaking down intra-EU12 trade as done in EC (1998b) reveals that in particular the share of two-way trade in vertically differentiated products went up from a level of roughly 35% to 42% from 1986 to 1994.[1] The Grubel-Lloyd indicator which measures the share of balanced trade (overlap between exports and imports) in all trade confirms the scope of this increase. The share of two-way trade in similar products remained stable at around 20%, whereas the share of one-way trade in intra-EU12 trade decreased considerably from about 47% in 1986 to 38% in 1994.

While intra-EU trade already had a relatively high share in total EU trade before the SMP was implemented, intra-EU direct investment inflows and outflows doubled their share in total EU12 DI flows from about 20% in the mid-1980s to more than 40% in 1993 (see figure 1 bottom). Looking at EU15, intra-EU direct investment flows have remained at a level of 50% in total EU15 DI flows ever since. Comparing this to the US and Japanese shares in EU direct investment flows (figure 2 bottom) reveals that the Japanese share shows an upward trend in the period under consideration while the US share seems to be decreasing (EU12) or constant (EU15). The increase in direct investment flows to the EU during the implementation of the SMP is accompanied by an increase in direct investment stocks, in particular those of EU and Japanese firms (Dunning (1997a), EC (1998a)).

A large share of DI results from mergers and acquisitions (M&A): While in the US the share of acquisitions in FDI ranges from 60% to 90% in the period from 1980 to 1995 (McCorriston (2000)), the share of M&As in EU12 inward FDI is lower - ranging from 46% to 63% in the period from 1986 to 1994 (Sleuwaegen (1998b)). Looking at M&As within the EU only, the number of mergers between firms located in the same member state doubled between 1987 and 1989 and diminished continuously thereafter. Cross-border mergers within the EU quadrupled after 1988 but fell back substantially after 1990, however the number in 1994 (913 deals) remains close to three times the level in 1987 (Sleuwaegen (1998b) and European Economy, Supplement A, no. 2 (1999)). Between 1991 and 1996 the main targets of M&As were Germany, France, the

[1] In this classification trade is labelled intra-industry trade in differentiated (similar) products if there is significant trade overlap and unit values differ by more (less) than 15%. For the precise construction and aggregation procedure see EC (1998b), ch. 4.

UK and Spain, while the main bidders were the UK, France, Germany and the Netherlands. In public statements about the motives behind mergers and acquisitions collected by the European Commission firms named 'rationalisation and synergy' as the prime motive for M&As from 1985 to 1988, after 1988 'strengthening the market position' ranked first (Sleuwaegen (1998a)). From 1986 to 1994 the most targeted sectors were business services and distribution/wholesale, in manufacturing the most actively merging sectors include engineering industries and the food and chemical industries (Sleuwaegen (1998b)).

Dunning (1997b) summarises the existing econometric work on direct investment associated with the Single Market in the EU. Among the few studies concerned with its impact on intra-EU direct investment, van Aarle (1996), including dummies in a pooled regression finds that the EU12 countries trade and invest relatively more with and in each other, and, moreover, that the SMP has had a positive effect on inward and outward DI and trade within the EU. Pain (1997) and Pain and Lansbury (1997) look at the stock of direct investment in the UK and Germany, respectively. They estimate panels allowing for sector and country specific variables and a set of constructed Internal Market variables. They conclude that the SMP had a significant positive impact on the aggregate level of intra-EU direct investment by British as well as by German corporations in both industrial and services sectors.

Concerning the determinants of direct investment and trade in general, gravity-type models including a measure of market size together with distance between home and host countries work quite well. All econometric studies concerned with intra-EU direct investment during all or some part of the SMP period confirm the significance of these variables. In addition dummy variables constructed to capture the impact of the SMP turn out to be significant for intra-EU direct investment flows (studies by Clegg (1998), Dunning (1997b), EC (1998a)).

3 Existing theoretical work

The theoretical literature on the activity of multinational enterprises has followed Dunning's (e.g. Dunning (1993)) conceptual framework of ownership, location and internalisation advantages (OLI). Based on the "new trade theory", theories of MNE activity have been developed in a general equilibrium framework, but also as partial equilibrium models focusing more on the strategic considerations of firms when serving foreign markets.

Helpman (1984) and Helpman and Krugman (1985) initiated the general equilibrium literature with the idea that different factor prices across countries might be a reason for a firm to set up production in a low-cost location. The model is set in a framework with two factors of production and two sectors, one perfectly competitive producing a homogeneous good under constant returns to scale, and the other producing differentiated products under increasing returns to scale. If countries are different enough in their relative factor endowments, trade does not equalise factor prices and firms thus have an incentive to divide activities among countries, placing the more capital-intensive part (e.g. headquarter services) in the capital-abundant country and production in the labour-abundant economy. This result of vertical foreign direct investment is obtained assuming that there are no costs associated with either trade or splitting up the production process.

General equilibrium models on horizontal DI are essentially based on the trade-off between, on the one hand, locating production close to a local market, thereby saving variable trade and distance costs and, on the other hand, concentrating production in one location to profit from plant-level scale economies, which involves additional fixed costs (Markusen (1984), Brainard (1993), Markusen and Venables (1998)). MNEs in these models arise endogenously in equilibrium when transport and tariff costs are high, and when firm level scale economies are important relative to plant level scale economies. Both approaches to FDI have recently been brought together in what has been termed the ”knowledge-capital” model (see e.g. Markusen (2002)).

The strategic literature also focuses on the decision between exporting and producing abroad as a trade-off between the fixed and the variable cost associated with these two possibilities. In addition it addresses the issue of market structure explicitly. Smith (1987) in a model of oligopolistic competition shows that tariffs can either induce or deter foreign direct investment. Rowthorn (1992) deals with the issue of market size in a multinational's decision and finds that DI is a likely alternative to exporting when foreign markets are large, and when natural or artificial trade barriers are relatively high. Motta (1992) explains how strategic interaction between a foreign and a local firm may interfere with the trade-off between a larger host market/high trade costs and low plant-specific or information costs.

The consequences of regional economic integration on multinational activity have received more empirical attention than formal economic modelling. Notable exceptions are Norman and Motta (1993) and Motta and Norman (1996). In their 1993 model of strategic interaction they show that both market growth and improved accessibility due to economic integration will induce external firms to switch from exporting to DI. In the second paper they consider the impact of integration on the supply decision of an external firm and of two firms located inside an integrating region. For the external firm the result from above continues to apply, while for

the intra-region firms they obtain consolidation of intra-region investment to export platform investment, i.e. intra-region firms supply the region with exports from the one country they invested in.

Neary (2002) also looks at the supply strategy of a MNE located outside an integrating region; he obtains tariff-jumping DI to all n union countries when the external tariff is high and fixed costs of a new plant are relatively low. As internal tariff barriers go down the MNE is likely to switch to export platform investment. When allowing for competition from domestic firms one possible outcome is that profits from investing or exporting are diluted to such an extent that the foreign firm decides not to supply the region at all ('fortress Europe outcome'). It may, however, also happen that the foreign firm is able to prevent intra-region firms from supplying the country where it sets up a plant.

While existing work has directed attention mainly at the impact of integration on the changes in supply strategies of extra-region firms, the model presented in the next section will consider how decreasing internal barriers to trade and investment affect the decision of a firm located within the integrating region. The focus of the model is on cost considerations associated with horizontal foreign direct investment.

4 The Model

As outlined above the object of analysis is a group of countries which have set up a customs union or have developed even stronger ties of economic and political integration. The building blocks of the model are the determinants identified in empirical and previous theoretical work on multinational activity, that is distance, trade and investment barriers and market size. The union countries are supposed to have reduced internal trade barriers, but there are still obstacles to trade and also to investment.[2] In other words, in the region under consideration economic integration is under way, but far from complete. Markets are therefore assumed to be segmented.[3]

Within the union some of the countries are assumed to be closer to another, while others are more distant. This is captured by two different levels of distance cost that are levied on

[2]The extent of such barriers can be gauged from the Eurostat Business Survey (EC 1998c), which questioned some 13,500 enterprises during the first half of 1995. Regarding trade barriers, the effect of the SMP on the elimination of customs documentation, on the deregulation of freight transport, and on the elimination of delays at frontiers was reported positive by, respectively, 60%, 43% and 56% of the enterprises. Concerning potential barriers to investment, 31% of the firms questioned felt a positive impact from the harmonisation of technical regulations and/or standards, 32% from the mutual recognition of technical regulations and/or standards, 23% from the conformity of assessment procedures, and 13% from simplified patenting procedures.

[3]Venables (1990) compares the implications of a reduction in trade costs in a model of international trade under oligopoly when markets are segmented and when markets are integrated.

exports. The distance cost can be interpreted as transport cost, consider, for example, the way commodities have to travel from the Nordic countries to the central or Southern members of the EU. Another way to see it, is that some countries are more similar to each other than others, e.g. in terms of culture or the way of doing business - in this case the costs of doing business differ between groups of countries. Countries that face low distance costs when dealing with each other will be denoted 'core' as opposed to 'periphery'. The main concern of the model is to see how changes in a firm's cost of trading and investing affect its mode of supply.

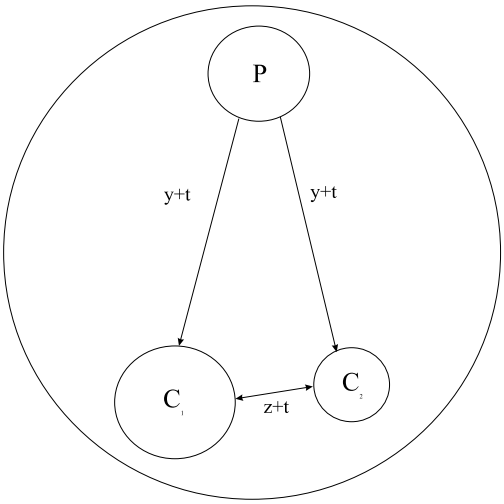
The focus is on firms in a single industry that are producing a homogeneous good, i.e. the model is partial equilibrium. In particular, consider a potential multinational enterprise located in a peripheral country when deciding to supply some or all of n ($n \geq 2$) core countries that differ in market size s_i, but are symmetric with respect to the other parameters. The indirect demand function $p(x, s_i)$ is such that $\frac{\partial p}{\partial s_i} > 0$ and $\frac{\partial^2 p}{\partial s_i^2} \leq 0$. Assume that countries are ordered according to market size: $1 \geq s_1 \geq ... \geq s_n > 0$. The MNE produces at constant marginal cost c, that is for simplicity set equal to zero. If it decides to engage in foreign activity this does not affect output and profits in its home country.

The MNE has several alternative ways of serving the core: first, it can export from its home country facing a per unit distance cost $d = y$ ($0 \leq d \leq 1$), and a per unit cost to overcome the trade barrier t ($0 \leq t \leq 1$). Second, it can set up a plant in one of the core countries and serve the other core countries with exports from there. Establishing a plant in a core country, on the one hand, saves the MNE the per unit trade and distance costs to this country, but, on the other hand, involves a fixed cost f of setting up. As the core countries are closer to each other, exporting within the core is less costly than exporting from the periphery. The trade barrier cost t is still in place, but the within-core distance cost $d = z$ is lower than the periphery-core distance cost, i.e. $0 \leq z < y$. Third, the MNE can decide to establish plants in more than one of the core countries, in which case DI buys it preferential access to all of these markets at the cost of setting up. Not to engage in any core country at all is, of course, always a choice for the MNE as well. The first part of the model discusses the strategic decision of the MNE as a monopolist, while the second part discusses the situation when it faces competition from one incumbent firm in each core country.

The analysis is set out in a general form. To illustrate ideas each section is accompanied by an example with linear demands of the form $p(x, s_i) = \left(1 - \frac{x}{s_i}\right)$ with $0 \leq x \leq s_i \leq 1$ for well-defined prices.[4] The figure below is a simple illustration of the trade and distance cost between

[4]Defining the indirect demand function in a more general way as $p(x) = a - bx$ ($a > 0,\ b > 0,\ \frac{a}{b} \leq x \leq a$) and assuming that the marginal cost of production c is non-zero, gives $\frac{a-c}{b}$ as an alternative measure for market size (see Rowthorn (1992) for a more detailed discussion).

the MNE's home country P and two core countries C_1 and C_2, where $C_1$is larger than C_2.



The specification here is based on the structure of a model by Neary (2002). He considers the impact of the formation of a customs union among symmetric countries on the mode of supply (exports or investment) of an MNE located outside the union. Neary looks at how the multinational's decision changes when after the formation of a customs union it is more costly to export to the union than to export within the union. Here, instead, the MNE is located within the union and, therefore, trade barriers are the same between all countries. Thus, in this model a distance cost that differs between union countries is introduced. In addition, countries are not assumed to be symmetric, but can have different market size.[5]

4.1 The Supply Decision of the MNE as a Monopolist

First, the decision of a potential multinational located in a peripheral country is modelled under the assumption that it is the only supplier in this industry. The multinational can, thus, act as a monopolist under any supply regime. There are no other firms that might enter the market. This setting is likely to be more than just the hypothetical benchmark case it seems. It may well be a good approximation for a firm with some sort of technological or organisational advantage making it more likely to start production abroad. In particular if this firm, therefore, manages to advance into a market where competitors have yet to establish themselves.

The MNEs' profits from exporting to a core country i are given by $\pi_i(s_i, t, y)$.[6] Quite natu-

[5]The model turns into Neary's (2002) model when considering only the distance cost - fixed cost trade-off. The two different levels of distance cost z and y in this model correspond, respectively, to the within-union tariff and the external tariff in his model.

[6]Profits can be shown to be convex in the trade barrier and distance cost irrespective of the functional form

rally, they are increasing in the size of the market s_i and decreasing in both the trade barrier cost t and the distance cost y. If the trade barrier and the distance cost are at a sufficiently high level, it will not be profitable to export to any of the n core countries. In general the prohibitive level of t given s_i and y is defined implicitly by $\pi(\tilde{t},\, \bar{s}_i,\, \bar{y}) = 0$. The prohibitive trade barrier $\tilde{t}$ is smaller, the smaller the market size of country i and the larger the cost of exporting from the periphery y. If the MNE decides to serve all core countries via exports (X) from its home country (at distance cost y), its profits are given by

$$\Pi^{X_y} = \sum_{i=1}^{n} \pi_i \left(s_i, t, y\right). \tag{1}$$

Alternatively, the multinational can set up a plant in one of the core countries and supply the remaining ones with exports. If it sets up a plant in a core country the MNE becomes a monopolist in that country, facing the fixed cost of setting up f, but no other supply cost ($\pi_i(s_i, 0, 0) \equiv \pi_i(s_i)$). Exporting to the other core countries entails the trade barrier cost and the within-core distance cost z. Other things being equal, as profits are increasing in market size, the MNE will invest (I) first in the core country with the largest market (country *1)*, earning

$$\Pi^{I,1+X_z} = \pi_1 \left(s_1\right) - f + \sum_{i=2}^{n} \pi_i \left(s_i, t, z\right). \tag{2}$$

Comparing exports from the MNE's home country to investing in one country and exporting from there, investing in core country *1* is profitable if

$$\begin{aligned} \Pi^{I,1+X_z} - \Pi^{X_y} &= \underbrace{\pi_1 \left(s_1\right) - f - \pi_1 \left(s_1, t, y\right)}_{} + \underbrace{\sum_{i=2}^{n} \left[\pi_i \left(s_i, t, z\right) - \pi_i \left(s_i, t, y\right)\right]}_{} \\ &= \quad \gamma_y \left(s_1,\, t,\, y,\, f\right) \quad + \quad \chi\left((n-1),\, s_i,\, t,\, z,\, y\right) \\ &\qquad + + + - \qquad\qquad + \quad + \quad - + \end{aligned} \tag{3}$$

is positive. The first term, $\gamma_y \left(s_1, t, y, f\right)$, measures the difference in profits between investing in country 1 ($\pi_1 \left(s_1\right) - f$), and exporting to this country from where the MNE is located ($\pi_1 \left(s_1, t, y\right)$), i.e. it is the net gain from avoiding the trade barrier and distance cost by investing. If this expression is positive it is always profitable to establish a plant abroad. As can

of the demand function. Redefining $\tau = t + d$, the result of maximising operating profits ($\max_x \pi(\cdot) = \max_x \left[p(x, s_i) - c - \tau\right] x$) by the choice of sales in country i can be written as $\pi^* = \pi\left(p(x^*, s_i), x^*, \tau\right)$. By the envelope theorem $\frac{\partial \pi^*}{\partial \tau} = \frac{\partial \pi}{\partial \tau} = -x^*$, and, thus $\frac{\partial^2 \pi^*}{\partial \tau^2} = -\frac{dx^*}{d\tau}$. From the first-order condition one can see that x^* is decreasing in τ, and hence π^* is convex in τ.

be seen from the profit function, $\gamma_y(s_1, t, y, f)$ is increasing in the trade barrier t and in the core-periphery distance cost y, and decreasing in fixed cost f. It may be intuitive but not so obvious that $\gamma_y(s_1, t, y, f)$ is increasing in s_i: market size enters the profit function via the indirect demand function and is therefore a factor and not an additive term (like costs) in the optimal demand and, hence, also in the profit function.

The second term $\chi((n-1), s_i, t, z, y)$ sums the differences in profits between exporting from within the core and exporting from the periphery over all countries that the MNE can access at the lower distance cost by investing in country *1*. In other words, country *1* can be viewed as an "export platform" to the other core countries. This export platform gain $\chi((n-1), s_i, t, z, y)$ is always positive, since $y > z$ and profits $\pi_i(s_i, t, z)$ and $\pi_i(s_i, t, y)$ are decreasing in y and z, respectively. That is, this second term can render investing in one core country profitable even if the trade and distance cost avoiding gain (the first term in eq. (3)) is negative. $\chi((n-1), s_i, t, z, y)$ is increasing in the number of countries $(n-1)$ close to country *1*; and it is decreasing in the within-core distance cost z but increasing in the core-periphery distance cost y. In net terms it is not influenced by the trade cost as long as t is a per unit cost, and $\pi_i(s_i, t, z)$ and $\pi_i(s_i, t, y)$ take the same functional form.[7] Like $\gamma_y(s_1, t, y, f)$ it is also increasing in market size s_i. Put differently, this also means that investing in country *1* is less attractive the smaller the market size of the countries that can be served at a low distance.

Setting up plants in m ($m \leq n$) core countries instead earns the MNE profits of

$$\begin{aligned} \Pi^{I,m} &= \sum_{i=1}^{m} [\pi_i(s_i) - f] + \sum_{i=m+1}^{n} \pi_i(s_i, t, z) \qquad (4) \\ &= \Pi^{I,m-1} + \gamma_z(s_m, t, z, f), \\ &\qquad\qquad\qquad\quad + \; + \; + \; - \\ \text{where} \quad & \gamma_z(s_m, t, z, f) = \pi_m(s_m) - f - \pi_m(s_m, t, z). \end{aligned}$$

The profits from investing in m countries can be expressed as a function of the profits from investing in $m-1$ countries plus the term $\gamma_z(s_m, t, z, f)$. It is profitable to invest in an additional core country as long as this trade and distance cost avoiding gain is positive. $\gamma_z(s_m, t, z, f)$ depends on trade, distance and fixed cost as well as on market size in the same way as $\gamma_y(s_m, t, y, f)$. However, here instead of y the lower within-core distance cost z enters, implying that the ad-

[7] When taking the derivative of $\chi((n-1), s_i, t, z, y)$ with respect to t, the linear term in t will enter once with a positive and once with a negative sign and therefore cancels. To see this for quantities as the decision variable: $\chi((n-1), s_i, t, z, y) = \sum_{i=2}^{n} [\pi_i(s_i, t, z) - \pi_i(s_i, t, y)] = \sum_{i=2}^{n} s_i \left[\left(\frac{1-t-z}{2}\right)^2 - \left(\frac{1-t-y}{2}\right)^2 \right]$, therefore $\frac{\partial}{\partial t} \sum_{i=2}^{n} [\pi_i(s_i, t, z) - \pi_i(s_i, t, y)] = \frac{1}{2} \sum_{i=2}^{n} s_i (z - y)$.

ditional gain from investing in a further core country will always be lower than the profit from the investment in country *1*. In addition, $\gamma_z(s_m, t, z, f)$ depends on the market size of country m and not on that of the larger country *1*; this also reduces the gain from investing in more than one country. Thus, the lower within-core distance cost and the smaller market size can make it less profitable to invest in many or all core countries. If setting up in all countries is profitable ($\gamma_z(s_m, t, z, f) > 0$ for all $m = 1, ..., n$), total profits amount to

$$\Pi^{I,n} = \sum_{i=1}^{n} [\pi_i(s_i) - f],$$

implying that fixed cost cannot exceed $f = \pi_i(s_i)$ in each country i, respectively; i.e. the upper bound for investment increases with the size of the market.

Summarising the impact of the different parameters: the incentive to invest in core country *1* stems from the difference in distance cost. In the absence of distance costs the MNE's decision would be driven only by the trade barrier and by market size. The decision between exporting and investing in the core in this case would simply be a trade-off between the trade barrier and fixed cost. Without distance costs equation (3) does not produce the export platform term, but only the term that arises from trade barrier jumping

$$\begin{array}{cccccc} \gamma & (s_1, & t, & f) & = & \pi_1(s_1) - f - \pi_1(s_1, t). \\ & + & + & - & & \end{array} \tag{5}$$

This extends to investing in $m \leq n$ countries in the same way as in equation (4), and therefore, as long as $\gamma(s_m, t, f)$ is positive it pays to invest in more core countries in order to avoid the trade barrier. If, in addition, all core countries had the same market size, without distance cost the MNE would either invest in all core countries or export to all of them or not serve them at all - depending on the levels of the trade barrier and the fixed cost.

In the presence of different within-core and periphery-core distance costs, however, a high trade barrier cost favours investment in more than one country via its positive impact on the trade and distance cost jumping gain. The first plant in the largest core country in any case gives the highest trade and distance cost avoiding gain, because this saves the trade barrier and the periphery-core distance cost. Investing in any further core country will still save the MNE the trade barrier cost; it will, however, no longer save the periphery-core distance cost but only the lower within-core distance cost. In addition the smaller market size of these core countries makes investment there relatively less attractive.

Thus, regarding the SMP's attack on border formalities as *a reduction in variable trade cost*,

a lower t implies that the gain from avoiding the trade barrier will be smaller, and therefore - for low levels of distance costs - exporting from the MNE's home country or consolidation of investment in one core country that is being used as an export platform is more likely. However, a lower trade barrier t also allows for a greater range of values of the periphery-core distance cost y (this follows from the definition of the prohibitive trade barrier). Thus, as y has a positive impact on both terms in (3) for high values of the periphery-core distance cost this effect will outweigh the consolidation of investment induced by a lower t, and make investing in country *1* more attractive.

Going back to the empirical evidence, SMP measures, by reducing transaction costs, have certainly facilitated exports; in particular intra-industry trade has increased in industries with high non-tariff barriers (EC (1998b), p. 115). The implication that lower trade barriers make export platform investment more attractive captures - at least to some extent - the surge in mergers across community borders. Trade and direct investment are rarely found to be substitutes for each other; for the case of the EU also the Single Market Review (EC (1998b), p. 116) provides evidence of a complementary relationship. This mainly reflects the lack of DI data at the firm or product level in the EU, however. Noting that intra-EU one-way trade decreased considerably during the implementation of the SMP (see section 2), while at the same time intra-industry trade in differentiated products which is generally associated with multinational activity (trade in intermediate goods) increased, suggests that there has nonetheless been trade-replacing DI. The lowering of non-tariff trade barriers is likely to account for this to a certain extent.

Concerning the cost of setting up, a high fixed cost makes exporting - even from the periphery - more attractive. If, however, the within-core distance cost is low compared to the periphery-core distance cost and if, in addition, the core consists of many countries, a high cost of setting up a plant can be offset by the export platform gain. Thus even with high fixed costs, it may be more profitable to set up a plant in the largest core country and export from there, but not to invest in more core countries. Due to SMP measures such as harmonisation of technical and product standards or improved business relations across countries one can argue that *the fixed cost of setting up a plant has decreased*. Given trade and distance costs, a lower f raises the gain from avoiding trade costs, therefore it makes investment in general more attractive. In particular, investing in one core country will be the more attractive the more countries are accessible from this export platform. This captures mainly so-called 'greenfield investment', and is representative of the fact that in mergers and acquisitions the most actively targeted sectors were distribution and wholesale. The example below will illustrate both channels further.

Example with linear demands and quantities as the strategic variable:

Taking the indirect demand function to be $p(s_i, x) = \left(1 - \frac{x}{s_i}\right)$, output is given in the upper half of table 1. Plugging these values in equation (3) the border line between exporting from the periphery with investing in country *1* and exporting from there can be obtained as

$$f = s_1 \left(\frac{1}{2}\right)^2 - s_1 \left(\frac{1-t-y}{2}\right)^2 + \sum_{i=2}^{n} s_i \left[\left(\frac{1-t-z}{2}\right)^2 - \left(\frac{1-t-y}{2}\right)^2\right]. \tag{6}$$

Comparing investment in m with investment in $m-1$ core countries, the equivalent to equation (4) is

$$f = s_m \left(\frac{1}{2}\right)^2 - s_m \left(\frac{1-t-z}{2}\right)^2. \tag{7}$$

The upper graph in figure 3 plots (6) and (7) for 2 core countries with market size $s_1 = 1$ and $s_2 = 0.8$ in the $f, y -$ space for given values of t and z. The permissible range of values for the periphery-core distance cost y is between z (by assumption) and $1-t$ which marks the prohibitive level of trade and distance cost. The upper line represents the border between exporting from the periphery and investing in the largest core country (eq. (6)). Given that $\pi_i(s_i, t, d)$ has been shown to be convex irrespective of the demand function, this line will be concave in y as depicted. The lower line is the border between investing in core country *1* and investing in core countries *1* and *2* (eq. (7)). The figure shows a decrease in the trade barrier cost from $t = 0.2$ (solid lines) to $t = 0.1$ (dotted lines). The within-core distance cost is set at the rather low value of $z = 0.1$.[8]

Consider first the solid lines only and imagine a vertical line at some fixed level of y anywhere between z and the prohibitive level where the no supply region $\oslash$ starts. Moving down this line shows what happens as fixed costs decrease: for high values of f the MNE will supply the core with exports from its home country, for lower values of f investing in one core country becomes profitable, and as f decreases even further investing in both core countries becomes profitable. The switch from exporting to investing in one core country will be profitable for higher values of fixed cost the higher the periphery-core distance cost y.

Looking at the change induced by a lower trade barrier, the barrier between exporting and investing in one core country tilts compared to the initial situation (solid to dotted line). This illustrates how for low values of the periphery-core distance cost y the effect from a lower t dominates, while for high values of y, the corresponding 'increase' in the periphery-core distance cost itself dominates. For low values of y exporting becomes more attractive compared to

[8] From the specification of the demand function the prohibitive trade barrier is not affected by market size s_i, y can thus vary from 0.1 to 0.8 in the first case and to 0.9 in the second case.

investing in one core country and also in a small region where there was investment in both core countries previously (the existence of this latter region depends on the size of the change in t). The shift from I1 to X is induced, as avoiding the trade and distance cost by investing is now less attractive due to the lower trade barrier. The shift from exporting to I1 due to the greater emphasis on y in this area may have some validity where the periphery-core distance cost weighs particularly high. Further, by lowering the profitability of investing in an additional core country the I1 region extends downwards, i.e. there is consolidation of investment as the incentive to be a local monopolist in each market decreases. Finally, by mechanically enlarging the possible range of values of y, a small part of the region of no supply is replaced by exports and another one by investment in country *1*.

The lower graph in figure 3 replicates the analysis for 3 core countries where the third core country is assumed to have market size $s_3 = 0.5$. This splits the region where there was investment in two core countries in the upper graph into a region with investment in the two larger core countries as above and a new region with investment in all three core countries. The I1 region here extends to higher values of fixed cost as the core, i.e. the region to be served from country *1* is now larger. The X-I1 region is subject to the same changes mentioned in the two country case as trade barriers go down. The changes at the border of the I1 and I2 regions induced by a lowering of trade barriers are similar to the two country case. The same reasoning now also applies to the frontier between the I2 and the I3 region.

4.2 The Supply Decision when the multinational faces competition

The analysis conducted for the multinational as a monopolist can be regarded as a good approximation in the most innovative industries; however, it is likely that the MNE will face some sort of competition. The amount of competition introduced here is restricted to local incumbent firms in the core countries, which always supply their home market, and if profitable export to the other core countries. To keep things tractable they do not have the possibility to invest abroad. All firms still treat markets as segmented. There is no entry of firms other than those mentioned so far. That is, in each market there are between two (if the trade barrier is such that it is profitable for the MNE to invest, but too high for the other core firms to export) and $n+1$ firms operating.[9] Demands are linear with the intercept normalised to 1 and firms compete in quantities. This results in a Cournot-Nash equilibrium.

Denote by $\bar{x}_i = \sum_{k=1}^{n+1} x_{k,i}$ the total amount of sales of all k firms in market i. With total sales divided by market size s_i, the profits of firm k in any market i are

[9]Considering only cases where it is profitable for the MNE to serve the centre market at all .

$$\pi_{k,i} = (1 - t_k - d_k - \frac{\bar{x}_i}{s_i})x_{k,i}, \tag{8}$$

where $t_k = t$, - the trade barrier cost from above for all firms that export to this market, and $t_k = 0$ for the domestic firm and for the MNE if it decides to invest in country i. The distance cost d_k is equal to y for the multinational if it decides to export to a core country from its home country, it is equal to z for the exports of any firm located in the core and equal to zero for a firm with a plant in this market. The MNE is labelled $k = 0$, the local firm in market i is $k = i$, and for the remaining core country firms this leaves $0 < k \neq i$. When profits of the multinational are referred to the firm subscript k will be suppressed. From (8) the first order condition for output of firm k is given by

$$x_{k,i} = s_i \left(1 - t_k - d_k - \frac{\bar{x}_i}{s_i}\right), \tag{9}$$

i.e. equilibrium profits are given by $\pi_{k,i} = s_i \left(1 - t_k - d_k - \frac{\bar{x}_i}{s_i}\right)^2$. When it is profitable for all firms to be active in market i, total sales in this market can be obtained as

$$\bar{x}_i = s_i \frac{1 + n - \bar{t} - \bar{d}}{n + 2}, \tag{10}$$

where $\bar{t} = \sum t_k$ and $\bar{d} = \sum d_k$. Plugging this back into (9) output of each firm is

$$x_{k,i} = s_i \frac{1 - (n+1)t_k - (n+1)d_k + \bar{t}_{-k} + \bar{d}_{-k}}{n + 2}, \tag{11}$$

where $\bar{t}_{-k}$ and $\bar{d}_{-k}$ denote, respectively, the sums of the trade barrier and of the distance cost of all firms other than firm k operating in this market. The output of the MNE, the domestic firm and a core country firm are calculated explicitly in table 1 for the case of $n+1$ firms (lower part).

From equation (11) one can see that a firm's sales and hence its profits in a market are decreasing in its own access cost (trade barrier and distance cost) and increasing in its competitors' access costs to this market:

$$\begin{array}{rcccccccc} \pi_{k,i} & = & \pi & (s_i, & t_k, & d_k; & \bar{t}_{-k}, & \bar{d}_{-k}) \\ & & & + & - & - & + & + \end{array} \tag{12}$$

Summing the trade barrier and distance cost to $\tau = t + d$, Neary (2002) proves that this result also applies to different specifications of demand functions. In his appendix he shows that the properties in (12) hold for Bertrand as well as for Cournot competition with linear demands and

differentiated products. They also hold under Cournot competition with general demands except when demands are highly convex and the firm in question has a relatively small market share. As in the monopoly case profits are increasing in market size. For the trade and distance cost, things are not so straightforward. If either the trade barrier cost or the distance cost change simultaneously for firm k and its $n-1$ competitors, one obtains

$$\begin{aligned} &d\bar{t}_{-k} = (n-1)dt_k \quad \Rightarrow \quad \tfrac{dx_{k,i}}{dt_k} = \tfrac{\partial x_{k,i}}{\partial t_k} + (n-1)\,\tfrac{\partial x_{k,i}}{\partial \bar{t}_{-k}} < 0 \\ &\text{and} \\ &d\bar{d}_{-k} = (n-1)dd_k \quad \Rightarrow \quad \tfrac{dx_{k,i}}{dd_k} = \tfrac{\partial x_{k,i}}{\partial d_k} + (n-1)\,\tfrac{\partial x_{k,i}}{\partial \bar{d}_{-k}} < 0. \end{aligned} \tag{13}$$

From (11) one can see that in both cases the direct effect dominates; thus, as the trade barrier/distance cost increases, output and therefore profits fall, and vice versa.

The analysis of the different supply strategies proceeds much the same way as above. Consider first the multinational's profits from exporting to all core countries

$$\Pi^{X_y} = \sum_{i=1}^{n} \pi_i \left[s_i,\, t,\, y;\, (n-1)t,\, (n-1)z \right]. \tag{14}$$

The properties of the profit function in one market (eq. (12)) continue to hold; total profits are also increasing in market size s_i, decreasing in own distance cost y and increasing in the competitors' distance cost z. The same holds for the trade barrier cost t, where the direct effect dominates (see (13)), that is total exports are decreasing in t. From the expressions in table 1 note that the prohibitive barrier of trade cost is not as clear-cut as above. For the multinational the prohibitive level for exports from his home country to market i given distance cost is

$$\tilde{t}_{MNE} = \frac{1-(n+1)\bar{y}+(n-1)\bar{z}}{2}. \tag{15}$$

For exports of a core country firm to market i the prohibitive level of trade cost given distance cost is

$$\tilde{t}_{CF} = \frac{1-3\bar{z}+\bar{y}}{2}. \tag{16}$$

As z approaches y the prohibitive level of trade cost for a core firm approaches that of the MNE (for $z=y$ we get $\tilde{t} = \frac{1-2y}{2} = \frac{1-2z}{2}$, or taken together $\widetilde{t+y} = \widetilde{t+z} = \frac{1}{2}$). Otherwise the trade barrier threshold for the core firms is always higher than that of the multinational.[10] This implies that the presence of competitors with lower access cost to market i limits the range of parameter

[10] $\tilde{t}_{CF} - \tilde{t}_{MNE} = \frac{(n+2)(y-z)}{2} > 0$ for $0 \leq z < y$.

values where the MNE finds it profitable to export to any core country. There are parameter values such that the MNE will never export to the core market, but where the firms in the core countries will still trade among each other. Nonnegativity constraints on (15) and (16) as well as the condition $0 \leq z < y$ further restrain the range of possible values of z and y. If both the trade barrier and the within-core distance cost are zero, the maximum value the periphery-core distance cost can take for exports to be profitable is $y \leq \frac{1}{n+1}$.

If instead the MNE decides to invest in one core country, the prohibitive barrier of trade cost given within-core distance cost z for the core firms lowers to $\tilde{t}_{CF} = \frac{1-3z}{3}$ or $\widetilde{(t+z)}_{CF} = \frac{1}{3}$. Thus, for values of trade and distance cost larger than this, investment by the multinational gives rise to a duopoly in the country where the investment takes place, with the other core firms abandoning this market. For values of $\widetilde{(t+z)}_{CF} \leq \frac{1}{3}$ the multinational faces competition from core exporters wherever it decides to establish a plant. By investing in the core the MNE also benefits from lower distance costs for exports to the other core markets; its total profits from investing in, as before, the core country with the largest market size (country *1*) are

$$\Pi^{I,1+X_z} = \pi_1 \left[s_1;\, (n-1)t,\, (n-1)z \right] - f + \sum_{i=2}^{n} \pi_i \left[s_i,\, t,\, z;\, (n-1)t,\, (n-1)z \right]. \tag{17}$$

While in the monopoly case lower trade barriers unambiguously increase this expression, competition is likely to change the picture here. Deriving (17) with respect to the trade barrier t gives

$$\begin{array}{ccccccc} \frac{d\,\Pi^{I,1+X_z}}{d\,t} & = & \sum_{i=2}^{n} \frac{\partial \pi_i^o}{\partial t} & + & (n-1)\left[\frac{\partial \pi_1^c}{\partial t} \right. & + & \left. \sum_{i=2}^{n} \frac{\partial \pi_i^c}{\partial t} \right], \\ & & - & & + & & + \end{array} \tag{18}$$

where the superscripts o and c denote the own and the competition effect, respectively. With lower trade barriers the own effect from investing in one country still increases profits. However, this means that also the MNEs' competitors have easier access to market *1*, and therefore the negative impact on profits due to increased competition may easily outweigh the positive own effect. In the case of the demand function employed in (8), equation (18) becomes

$$\frac{d\,\Pi^{I,1+X_z}}{d\,t} = -\frac{2}{(n+2)^2} \left\{ 2\sum_{i=2}^{n} s_i - s_1 (n-1) - (t+z) \left[s_1 (n-1)^2 + 4\sum_{i=2}^{n} s_i \right] \right\}. \tag{19}$$

Normalising s_1 to 1, this says that for values of $t+z \geq \frac{1-n+2\sum_{i=2}^{n} s_i}{(n-1)^2+4\sum_{i=2}^{n} s_i}$ the impact from competition dominates. If all core country markets were of equal size ($s_1 = s_i = 1$), this would be equal to $t+z \geq \frac{1}{n+3}$.[11] This threshold will already be very low for a small number of countries that are

[11] A similar result is obtained by Neary (2002), p. 305.

to be served from country *1*. If in addition these countries have small market sizes, the threshold for the own effect to dominate is reduced even further. All this implies that with competition and low trade barriers, exporting from its home country becomes a more likely supply strategy for the MNE.

Comparing profits from investing in one core country with the profits from exporting to all core countries from the periphery,

$$\begin{array}{rcccccccccccccc} \Pi^{I,1+X_z} - \Pi^{X_y} & = & \gamma_y^C & (s_1, & t, & z, & y, & f) & + \chi^C & ((n-1), & s_i, & t, & z, & y), \\ & & & + & + & & + & - & & & + & & - & + \end{array} \tag{20}$$

where $\gamma_y^C(s_1,t,z,y,f) = \pi_1[s_1;(n-1)t,(n-1)z] - f - \pi_1[s_1,t,y;(n-1)t,(n-1)z]$
and $\chi^C((n-1),s_i,t,z,y) = \sum_{i=2}^{n}\{\pi_i[s_i,t,z;(n-1)t,(n-1)z] - \pi_i[s_i,t,y;(n-1)t,(n-1)z]\}$.

The trade and distance cost avoiding gain $\gamma_y^C(s_1 t,z,y,f)$ is increasing in s_1, the market size of country *1*, increasing in t and in y, and decreasing in the fixed setup cost f. It is not affected by the within-core distance cost, as long as z is a per unit cost. If profits take the same functional form, this is because the impact of z on the profit from investing and its impact on the profit from exporting from the periphery cancel. The export platform gain $\chi^C((n-1),s_i,t,z,y)$ is increasing in the number of countries close to country *1*, in the market size of these countries, and in the periphery-core distance cost y. It is decreasing in the within-core distance cost, and unaffected by t if the trade cost is per unit. Thus, concerning the impact of the parameters on the MNEs supply decision nothing has changed with respect to the analysis of the monopoly case in section 4.1. This also holds for setting up in more than one core country. The profits from investing in m core countries in the order of their market size can be written

$$\begin{array}{rcccccccc} \Pi^{I,m} & = & \sum_{i=1}^{m}\{\pi_i[s_i;(n-1)t,(n-1)z] - f\} + \sum_{i=m+1}^{n}\pi_i[s_i,t,z;(n-1)t,(n-1)z] & & & & & & & (21) \\ & = & \Pi^{I,m-1} & + & \gamma_z^C & (s_m, & t, & z, & f). \\ & & & & & + & + & + & - \end{array}$$

In this case, too, as long as $\gamma_z^C(s_m,t,z,f)$ is positive it is profitable to establish plants in further core countries.

For values of $\tilde{t}_{CF} > \frac{1-3z}{3}$ or $(\widetilde{t+z})_{CF} > \frac{1}{3}$ up to the prohibitive level of trade and distance cost for the MNE the analysis remains essentially unchanged. If the MNE decides to invest in

the core in this range of parameter values it shares the market of the country where it established a plant only with the local firm. That is, in equation (17) $\pi_1 [s_1;\ (n-1)t,\ (n-1)z]$ has to be replaced by the duopoly profits $\pi_1^D (s_1)$. This carries into the trade and distance cost avoiding gain (20), which is then $\gamma_y^D(s_1, t, y, z, f) = \pi_1^D(s_1) - f - \pi_1 [s_1, t, y; (n-1)\, t, (n-1)\, z]$. This expression now depends negatively on the within-core distance cost z; however, from (13) note that the direct effect of the periphery-core distance cost y in $\pi_1 [s_1, t, y; (n-1)t, (n-1)z]$ dominates.

In the presence of competition the model predicts that exports from the periphery and also consolidation of investment become more likely as trade barriers decrease. For new investment to be induced the level of fixed cost has to be rather low. Thus, the observation that DI within the EU has increased much more strongly than trade during the SMP is not as well represented here as in the monopoly case. The difference to the monopoly case is that all interaction takes place within a much more limited range of parameter values. The presence of incumbent firms in the core countries deprives the multinational of much of its profits in the case of exporting from its home country and also in the case of investing. The best setting that can arise for the MNE is the duopoly outcome. If either the costs of setting up or the trade and distance costs are too high, the MNE may even decide not to engage in the core at all.

Example with linear demands and Cournot competition:

Output for the different firms under alternative supply strategies of the MNE (assuming that all firms are active) are calculated in the lower part of table 1. The border line between investing in core country *1* and exporting from the periphery (eq. (20)) is, thus, given by

$$f = s_1 \left(\frac{1+(n-1)(t+z)}{n+2}\right)^2 + \sum_{i=2}^{n} s_i \left(\frac{1-2(t+z)}{n+2}\right)^2 - \sum_{i=1}^{n} s_i \left(\frac{1-2t-(n+1)y+(n-1)z}{n+2}\right)^2. \quad (22)$$

This holds for values of trade and distance cost ($\widetilde{(t+z)}_{CF} \leq \frac{1}{3}$) where it is profitable for the other core firms to supply country *1* as well. For values of $\frac{1}{3} \leq \widetilde{(t+z)}_{CF} \leq \frac{1}{2}$ the MNE will share the market in country *1* with the local firm. In this case the first term in eq. (22) has to be replaced by the Cournot duopoly profits of $s_1 \left(\frac{1}{3}\right)^2$; the other terms remain unchanged.

For investment in additional countries the border line between investing in m and $m-1$ core countries (eq. (21)) is given by

$$f = s_m \left(\frac{1+(n-1)(t+z)}{n+2}\right)^2 - s_m \left(\frac{1-2(t+z)}{n+2}\right)^2. \quad (23)$$

Also here if $t + z$ is such that core country firms cease to export to country m the first term has to be replaced by the Cournot duopoly profits of $s_m \left(\frac{1}{3}\right)^2$.

Consider values of trade and distance cost such that there is competition from core country firms ($\widetilde{(t+z)}_{CF} \leq \frac{1}{3}$). The upper graph in figure 4 shows the same situation as in figure 3 for the case with competition (2 countries, $s_1 = 1,\ s_2 = 0.8\ , z = 0.1$, change in t from 0.2 (solid line) to 0.1 (dotted line)). Compared to the monopoly case multinational activity is now limited to a much smaller parameter space; this is true for fixed cost and for periphery-core distance cost alike.

Examining a decrease in fixed costs the results from the monopoly case continue to apply, but the regime shifts from exporting to investing in country *1*, and from I1 to I2 require fixed cost to be much lower than in the monopoly case. As trade costs decrease the border line between exporting and I1 still tilts, but not enough to create the region where investment substituted exports. This is due to competition from the other core countries. From (19) note that for the own effect to dominate (or new investment to arise) given the parameter values assumed $t + z$ would have to be smaller or equal $\frac{1}{7}$. These observations extend in a similar way to the analysis of three core countries, as can be seen from the lower graph in figure 4. The analysis of the duopoly case is very similar to the situation just presented; only the range of parameter values differs.

5 Concluding remarks

The model presented considers the decision of a multinational enterprise located within an integrating region on how to supply other countries in this region. The decision between exporting and setting up production facilities in another country is based on a trade-off between variable and fixed costs. The variable costs make exporting more expensive: they are composed of a cost associated with trade barriers and a distance cost that is higher if the MNE exports from its home country (in the periphery) than when it sets up a plant in a core country and exports to the adjacent countries from there. Investing in turn involves a fixed cost to establish production facilities. A group of core countries is characterised by closeness in terms of geographical distance or in terms of cultural linkages. The core countries differ in the size of their markets.

Within this setting the impact of a lowering of trade and investment barriers as suggested by measures associated with the Single Market Programme in the EU is examined. If the MNE is able to act as a monopolist a lowering of trade barriers such as abolishing border formalities induces a shift from investing to exporting as well as consolidation of investment in fewer (one,

at the margin) core countries. This accounts for the increase in intra-EU exports associated with the SMP as well as the surge in cross-border mergers and acquisitions within the EU from 1988 to 1990. If the cost of exporting from the MNE's home country to the core is rather large a shift from exporting to investing arises as a third possibility. In this region the incentive to avoid the distance cost outweighs the effect from a lower trade barrier, and therefore investment is created.

Arguing that the SMP has affected the fixed cost associated with setting up a plant, the model predicts that rather than exporting the multinational will invest first in the largest of the core countries, or invest in several core countries for even lower values of fixed cost. This is likely to be representative for some of the greenfield investment the SMP has brought about. The fact that the MNE will always establish the first plant in the core country with the largest market size is inherent to profit maximisation rather than an outcome of the model. However, it is well-known that firms prefer to locate in countries where they have access to large markets.

If the multinational faces competition from core country incumbents that are able to export to the other core countries, investment will be induced for low levels of fixed cost. As trade barriers decrease in this case, consolidation of investment in one core country plant is still an outcome, but exporting from the periphery becomes much more likely. The reason for this is that the local incumbents benefit from lower trade costs too, and, therefore, competition reduces the profits from investing as well as the profits from exporting to or within the core.

Confronting the model with the empirical observations - even though aggregate data and a model at industry level do not match perfectly - it does account for the increase in trade related to the SMP; and it is suggestive for the share of mergers and acquisitions in DI (even though this is not explicitly modelled[12]). The case when competition is allowed for suggests that exports should increase much more than DI as trade and investment barriers vanish, in reality, however, the opposite has happened. This suggests that the SMP has brought about changes in the environment for direct investments that go beyond the reductions in trade and investment barriers.

Splitting up intra-EU direct investment geographically, flows going from the core (the founding members of the EU plus the UK) to the periphery increased quite considerably between 1980 and 1992 (see Morsink (1998), p. 69). This kind of DI is likely to be motivated by factor cost considerations rather than by trade cost, and, therefore, not captured here. The model also neglects the impressive amounts of intra-EU DI small countries such as Belgium and, in particular, Ireland have been able to attract.

Next to these concerns it would be interesting to see how the results change when the local incumbent firms are not only able to export but also to invest in the other core countries. To

[12]Falvey (1998) and Horn and Persson (2001) examine incentives for mergers brought about by trade policy in two-country models.

see how the cost considerations in the model affect the factor markets in the countries involved as well as in the integrating region as a whole, the discussion should be embedded in general equilibrium analysis.

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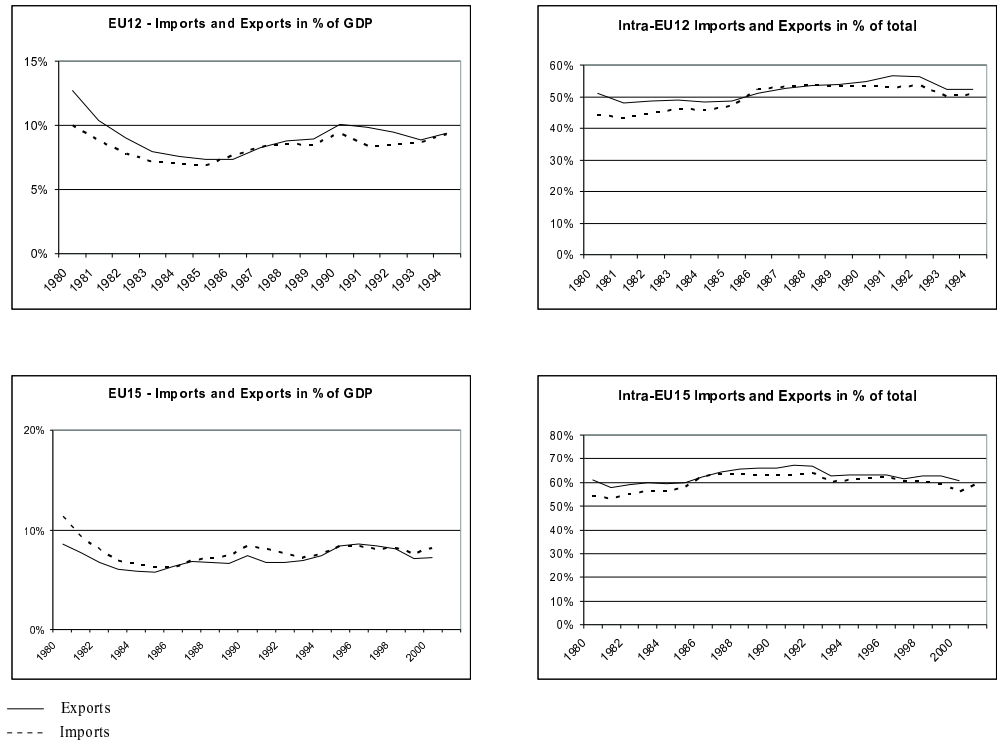
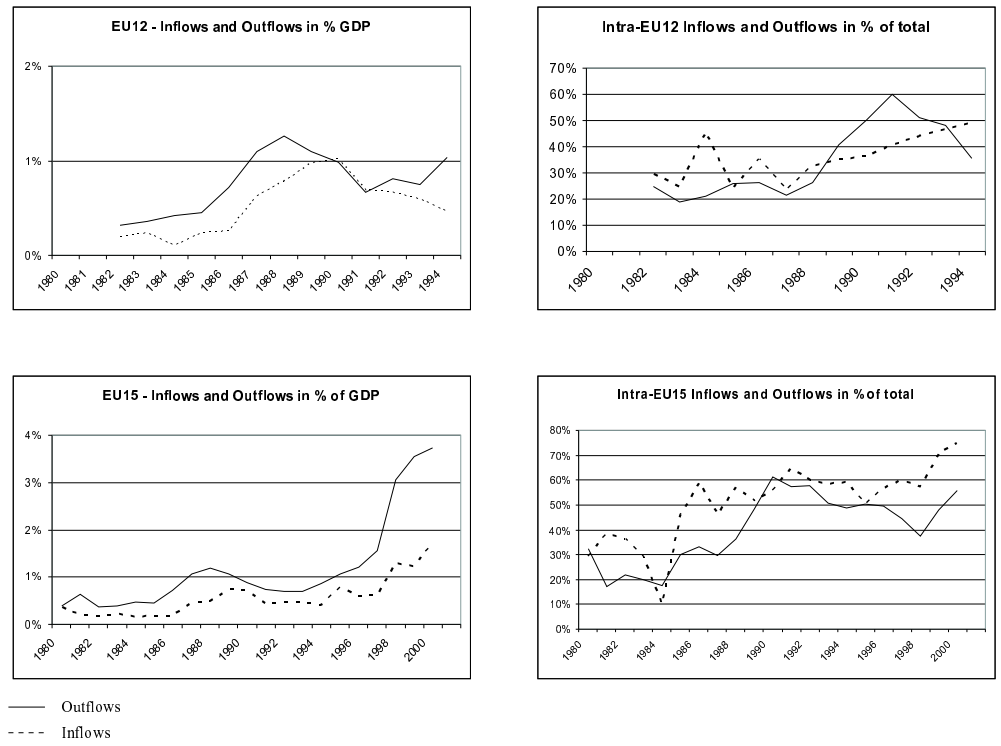
Table 1: Sales of different firms under alternative supply strategies

The MNE as a monopolist			
	sales in country i ($i = 1, ...n$) by the		
supply strategy	MNE 0: x_0^i	Home Firm i: x_i^i	Core Firm j: x_j^i
X_y	$s_i \frac{1-t-y}{2}$	-	-
$Ii + X_z$ ($i = 1, ..., m$)	$s_i \frac{1}{2}$	-	-
In	$s_i \frac{1}{2}$	-	-
	sales in country j ($j \neq i$) by the		
	MNE 0: x_0^i	Home Firm i: x_i^i	Core Firm j: x_j^i
X_y	$s_j \frac{1-t-y}{2}$	-	-
$Ii + X_z$ ($j > i$)	$s_j \frac{1-t-z}{2}$	-	-
In	$s_j \frac{1}{2}$	-	-
The MNE facing competition from n core firms			
	sales in country i ($i = 1, ...n$) by the		
	MNE 0: x_0^i	Home Firm i: x_i^i	Core Firm j: x_j^i
X_y	$s_i \frac{1-2t-(n+1)y+(n-1)z}{n+2}$	$s_i \frac{1+nt+y+(n-1)z}{n+2}$	$s_i \frac{1-2t+y-3z}{n+2}$
$Ii + X_z$ ($i = 1, ..., m$)	$s_i \frac{1-(n-1)t+(n-1)z}{n+2}$	$s_i \frac{1-(n-1)t+(n-1)z}{n+2}$	$s_i \frac{1-3t-3z}{n+2}$
In	$s_i \frac{1-(n-1)t+(n-1)z}{n+2}$	$s_i \frac{1-(n-1)t+(n-1)z}{n+2}$	$s_i \frac{1-3t-3z}{n+2}$
	sales in country j ($j \neq i$) by the		
	MNE 0: x_0^i	Home Firm i: x_i^i	Core Firm j: x_j^i
X_y	$s_j \frac{1-2t-(n+1)y+(n-1)z}{n+2}$	$s_j \frac{1-2t+y-3z}{n+2}$	$s_j \frac{1+nt+y+(n-1)z}{n+2}$
$Ii + X_z$ ($j > i$)	$s_j \frac{1-2t-2z}{n+2}$	$s_j \frac{1-2t-2z}{n+2}$	$s_j \frac{1+nt+nz}{n+2}$
In	$s_j \frac{1-(n-1)t+(n-1)z}{n+2}$	$s_j \frac{1-3t-3z}{n+2}$	$s_j \frac{1-(n-1)t+(n-1)z}{n+2}$

Figure 1: Evolution of trade flows for the EU12 (1980-1994) and EU15 (1980-2000)

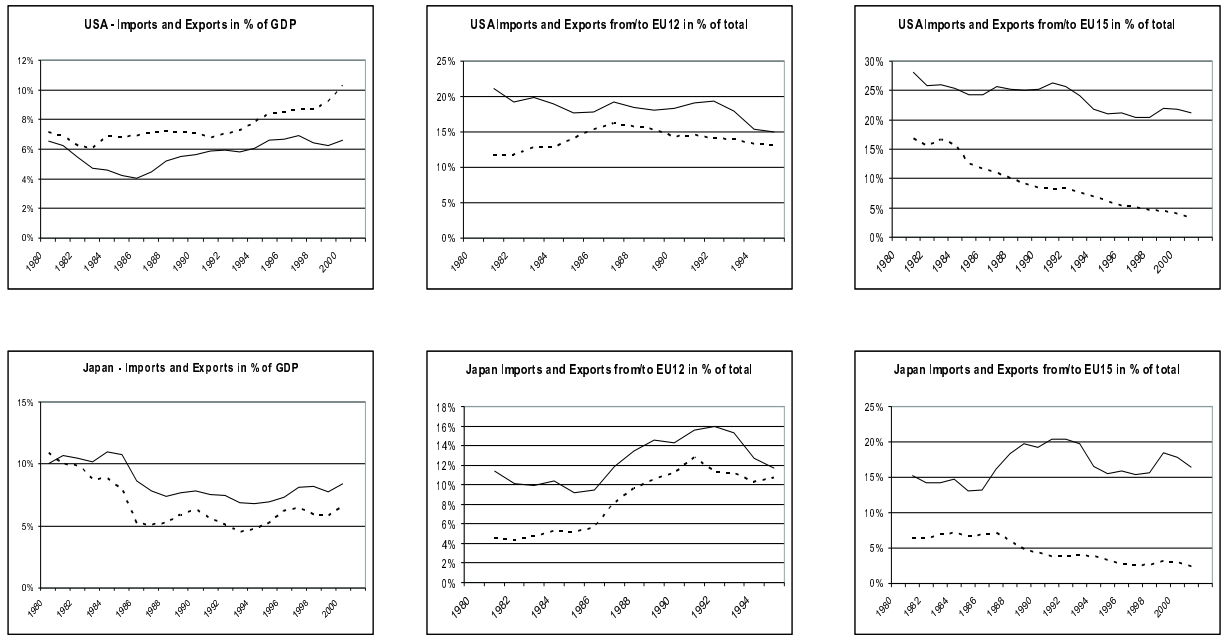


Evolution of direct investment flows for the EU12 (1982-1994) and EU15 (1980-2000)

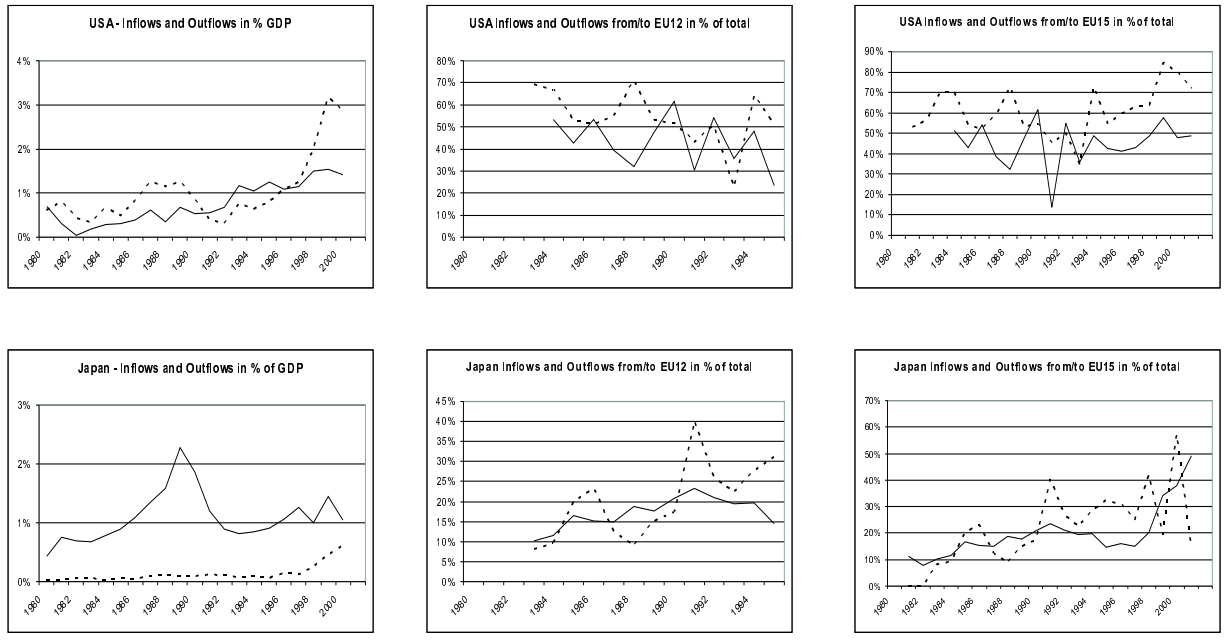


Source: compiled from OECD data.

Figure 2: Evolution of trade flows for the USA and Japan (1980-2000)

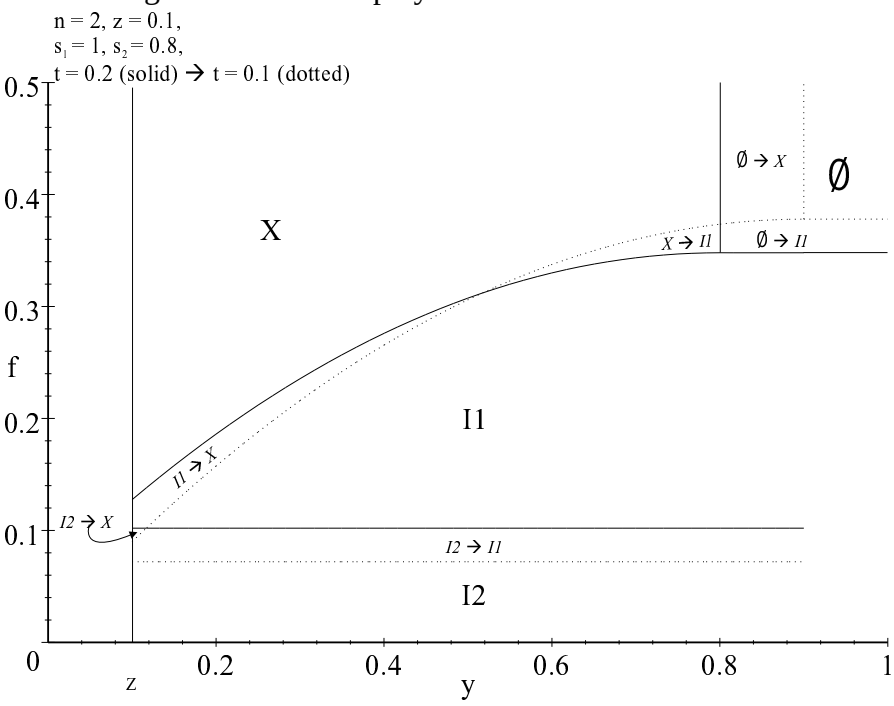


Evolution of direct investment flows for the USA and Japan (1980-2000)

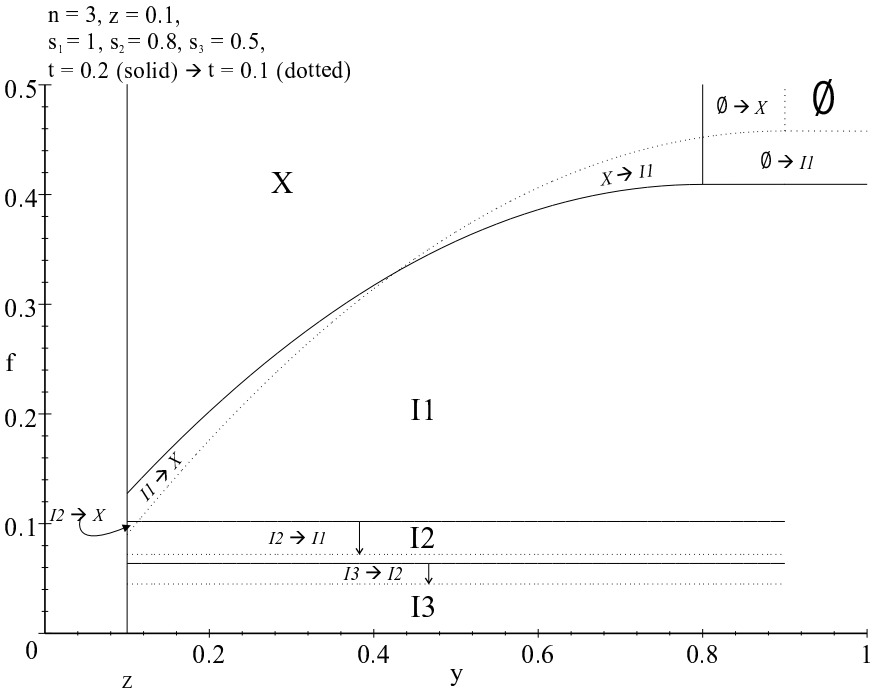


Source: compiled from OECD data.

Figure 3: The monopoly case for two core countries

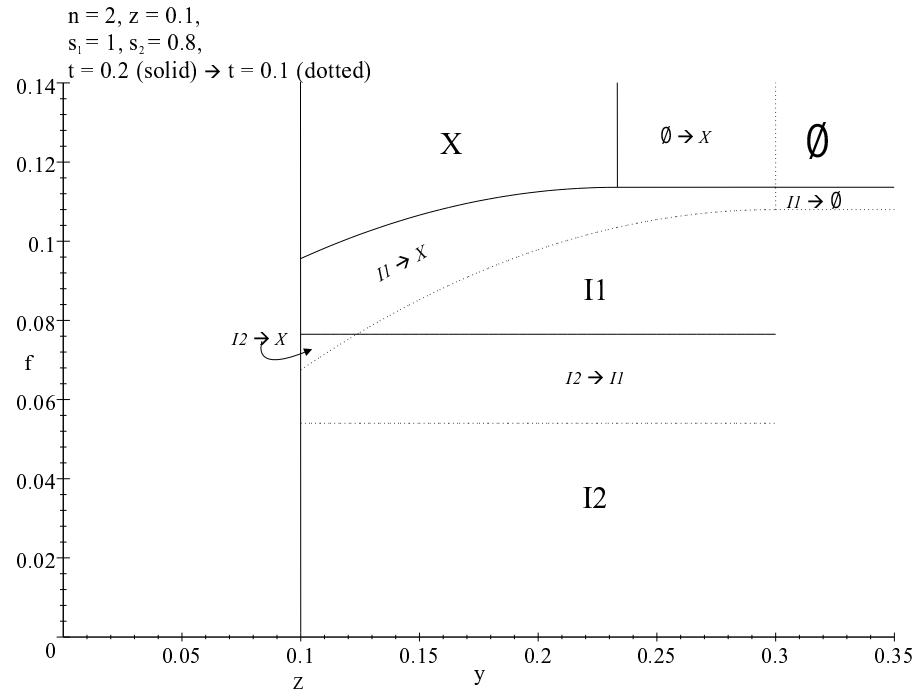


The monopoly case for three core countries

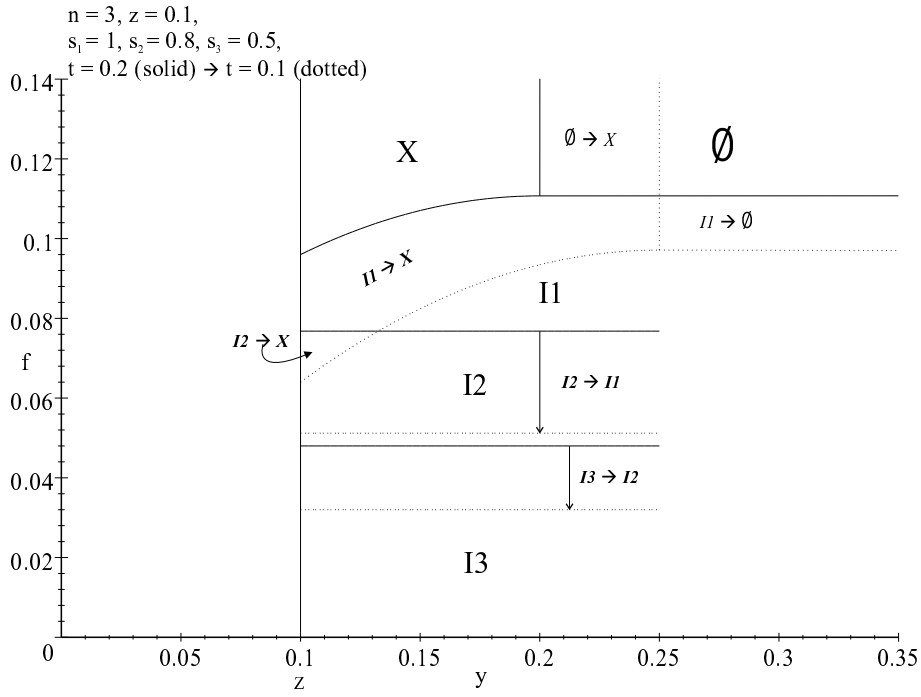


X: Exports
I1: Export platform investment in one core country
I2 (I3): Investment in two (three) core countries
⊘: no supply
Regions of change due to lower t

Figure 4: The competition case for two core countries



The competition case for three core countries



X: Exports
I1: Export platform investment in one core country
I2 (I3): Investment in two (three) core countries
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Regions of change due to lower t