



## **Trade costs, Openness and Productivity: Market Access at Home and Abroad**

Lejour, Arjan and Rojas Romasgosa, Hugo and Rodriguez,  
Victor and Montalvo, Carvos and Van der Zee, Frans

European Commission - DG Enterprise and Industry

January 2009

Online at <https://mpra.ub.uni-muenchen.de/21214/>  
MPRA Paper No. 21214, posted 09 Mar 2010 12:02 UTC

# **Trade costs, Openness and Productivity:**

## **Market access at home and abroad**

*Industrial Policy and Economic Reform Papers No. 10*

Arjan Lejour

Hugo Rojas-Romagosa

Victor Rodriguez

Carlos Montalvo

Frans van der Zee

**Enterprise and Industry Directorate-General  
European Commission**

# **Trade costs, Openness and Productivity:**

## **Market access at home and abroad**

Arjan Lejour<sup>\*</sup>

Hugo Rojas-Romagosa<sup>\*</sup>

Victor Rodriguez<sup>\*\*</sup>

Carlos Montalvo<sup>\*\*</sup>

Frans van der Zee<sup>\*\*</sup>

26 January 2009

<sup>\*</sup>CPB Netherlands Bureau for Economic Policy Analysis. Contacts: [arjan.lejour@cpb.nl](mailto:arjan.lejour@cpb.nl) and [h.a.rojas@cpb.nl](mailto:h.a.rojas@cpb.nl)

<sup>\*\*</sup>TNO Innovation Policy Group. Contacts: [victor.rodriguez@tno.nl](mailto:victor.rodriguez@tno.nl), [carlos.montalvo@tno.nl](mailto:carlos.montalvo@tno.nl), [frans.vanderzee@tno.nl](mailto:frans.vanderzee@tno.nl)

This project is carried out within the Framework Service Contract B2/ENTR/05/091 – FC. The authors thank Josefina Monteagudo for her constructive comments and helpful ideas in particular in suggesting data and research questions in section 4 of this paper. We are grateful to the European Commission for access to the survey data Observatory of European SMEs. Arjan Kneppers provided useful research assistance. We also thank the participants of the meetings in Brussels and the CPB colleagues Henri de Groot, Albert van der Horst and Bas ter Weel for useful comments.

Industrial Policy and Economic Reforms Papers are written by the staff of the Directorate General for Enterprise and Industry or by experts working in association with them. This publication series aims to raise the awareness and stimulate the debate on issues in the areas of industrial policy and economic reforms. Views expressed in these papers represent the positions of the authors and do not necessarily reflect those of the European Commission or the CPB Netherlands Bureau for Economic Policy Analysis.

### **Contact information**

European Commission

Enterprise and Industry Directorate-General

Unit B4 – "Economic Analysis and Evaluation"

Rue de la Loi / Wetstraat 200

B-1049 Brussels

Tel: (32-2) 295 49 39

Fax: (32-2) 297 41 23

E-mail: entr-economic-analysis-and-eval@ec.europa.eu

Web page:

[http://ec.europa.eu/enterprise/enterprise\\_policy/competitiveness/3\\_indpol/industrial\\_policy.htm](http://ec.europa.eu/enterprise/enterprise_policy/competitiveness/3_indpol/industrial_policy.htm)

A great deal of additional information on the European Union is available on the internet.

It can be accessed through the Europa server <http://ec.europa.eu>

ISBN-13: 978-92-79-11485-4

ISSN: 1831-0672

DOI: 10.2769/43314

Luxembourg: Office for Official Publications of the European Communities

© European Communities, 2009

Reproduction is authorised provided the source is acknowledged.

## **Abstract**

This paper discusses the channels between openness and productivity and trade hampering factors. The stylized facts from the heterogeneous firms literature suggests that firms face market entry costs for each new product they export and to each new export market. Transport costs, border costs and retail and wholesale distribution costs might add up to 170% of the export value, but formal import tariffs and duties are relatively unimportant. The results by the Observatory of European SMEs survey, which has firm-level data for the whole European Union confirm this result. Lack of knowledge on export markets and regulations in other countries are important trade barriers for European firms. From these outcomes it could be derived that EU trade policies should be directed to deep integration with other countries, preferably by implementing internal market policies for goods and services trade and foreign direct investment. These policies can deal with reducing regulations heterogeneity, non-tariff barriers and customs procedures. Providing public information on export markets (e.g. customers, contact, and distribution networks) could also be helpful, if well targeted.

*Key words:* *Openness, productivity, heterogeneous firms, innovation, trade costs, trade policy*

*JEL codes:* *F1, F13, F15*

## **Contents**

Executive summary	6
1. Introduction	8
2. Transmission channels between openness and productivity	9
3. Stylized facts from the new heterogeneous firms literature	12
3.1. Firms and exporting behaviour: the export premia	12
3.2. EU firms and exporting behaviour: stylized facts	14
3.3. EU firms and importing behaviour: stylized facts	17
3.4. EU innovating firms and trade: stylized facts	18
3.5. Stylized facts on multinationals and productivity	21
3.6 Stylized facts on knowledge and technology spillovers	22
3.7 Summarizing stylized facts	24
4. Hampering factors to trade	25
4.1 The concept of trade costs	25
4.2. Empirical linkages between trade costs and productivity	26
5. Concluding comments and policy implications	33
5.1. What has the heterogeneous-firm literature delivered?	33
5.2. Proposed trade policies	35
5.3. Concluding remarks	38
References	40

## **Executive summary**

There is massive empirical evidence that open economies are richer and more productive than closed economies: one percentage point increase in the share of trade in GDP raises the level of income in the range of 0.9 to 3 percent. Openness in terms of trade or foreign direct investment benefits the economy, but it is less clear which factors hamper openness, which policies promote openness and how more openness leads in the end to higher productivity and income. This paper identifies which factors hamper trade and which of them are policy related. Second, it discusses the relevance of the main channels of more openness to productivity.

These questions are not new, but this paper examines them from a different perspective: the heterogeneous firm literature that uses firm-level data. This new literature has shown that firms are very heterogeneous, not only in size, capital intensity and R&D intensity but also in export and import performance. Moreover, multinationals are even more productive than exporters. Thus, foreign direct investment also differs much between firms, as well as the importance of capital and knowledge spillovers. The stylised facts on this literature are used to discuss the channels between openness and productivity and trade hampering factors. The most productive firms are responsible for most exports and imports, but exporting itself does not seem to raise firm productivity substantially in developed countries (only aggregate productivity). Firms face market entry costs for each new product they export and to each new export market. This suggests the existence of fixed market entry costs, which can only be overcome by ex-ante higher productivity levels. The consequence would be that firms have to increase productivity years before they start exporting, although this is still under investigation.

Innovating firms export on average more than non-innovating firms, which in turn often constraints to finance innovations. For smaller countries access to foreign knowledge is very important, and this is usually attached to imported inputs and spillovers from FDI. Moreover, exports could be stimulated by the protection of intellectual property rights in countries in which the risk of imitation is fairly high.

Trade hampering factors are discussed in the context of trade costs. These consist of transport costs, border costs and retail and wholesale distribution costs. For EU countries these might add up to 170% but formal import tariffs and duties are relatively unimportant in total trade

costs. This result is confirmed by the Observatory of European SMEs survey, which has firm-level data for the whole European Union. Lack of knowledge on export markets and regulations in other countries are important trade barriers for European firms. In addition, they perceive internal market policies as very helpful for doing business abroad because of simplified customs procedures, a common currency and standardised regulations.

In the past, decreasing trade costs were often the result of lower transport costs and formal import tariffs and duties. Our results and those from the heterogeneous firms' literature suggest that EU trade policies should be directed to deep integration with other countries, preferably by implementing internal market policies for goods and services trade and foreign direct investment. These policies can deal with reducing regulations heterogeneity, non-tariff barriers and customs procedures. The recently established Transatlantic Economic Council and deep regional trade agreements between the EU and some Asian countries pursue this line of thought.

Providing public information on export markets (e.g. customers, contact, and distribution networks) could also be helpful in reducing the lack of information by SMEs. This could increase exports at the extensive margin (i.e. when non-exporters become exporters and exporters enter new export markets). It is the entrance to markets where the difference could be made; this. This is more effective than efforts to increase the export volumes to current markets. Export promotion policies should be well targeted and should not apply to very productive firms which already managed to overcome these entry costs. It is also ineffective to support very low productivity firms, because the support will not transform them into exporters or importers. Policies should be targeted to firms whose productivity is just too low to overcome market entry costs. It has to be taken in mind that these policies should not only be directed towards improved market access abroad but also at Europe's home market. Imports are at least just as important as exports for raising productivity and income.

## **1. Introduction**

The post-World War II era has been characterized by high growth rates in the world economy and a progressive reduction in barriers to international trade and investment. Productivity increases in agriculture and manufacturing, and more recently in services have been a major driver in the generation of income and wealth. There is massive empirical evidence that open economies are richer and more productive than closed economies. In an overview of studies about the income effects of openness Lewer and Van den Berg (2003) found that a percentage point increase in the rate of growth of international trade increase the growth rate of the economy by about 0.22%. It is hard to believe this is a permanent increase, but even if the income *growth* effect dies out after 10 years, income is about 2.5% larger. For high income countries, like the EU, Lewer and Van den Berg (2003) found that the effect is twice as large, although this result is based on only 30 studies. Other recent studies focussing on the income *level* found similar effects: one percentage point increase in the share of trade in GDP raises the level of income in the range of 0.9 to 3 percent.<sup>1</sup>

The link between openness and income is convincing but it is more difficult to establish an empirical link between *trade policy* and income.<sup>2</sup> Moreover, it is hard to identify empirically which factors limit openness and the accompanying productivity gains. The theoretical channels between openness and productivity are clear (such as reallocation of resources, more competition, economies of scale, bigger variety of products, innovation, and knowledge spillovers), but their quantitative importance less so. Two questions come to the fore. First, which factors hamper trade and which of them are policy related. Second, what are quantitatively the main channels from increased openness to productivity? From a policy perspective the question is: Can the European Union (and the Member States) implement policies to increase openness and the benefits from the induced increase in productivity?

Most of the policy advices to liberalise trade are based on macroeconomic or sectoral analyses. Recently, trade economists have shifted their focus towards the characteristics and trading behaviour of individual firms. This new approach is better known as the heterogeneous firms' literature. This literature has shown that firms are very heterogeneous, not only in size, capital and R&D intensity but also in export and import performance.

---

<sup>1</sup> Examples are Badinger (2005), Frankel and Romer (1999), Frankel and Rose (2002), Wacziarg and Horn Welch (2003) and the overview of Nordas et al. (2006).

<sup>2</sup> See Nordas et al. (2006) and Wacziarg and Horn Welch (2003)), among others.

Moreover, foreign direct investment (FDI) also differs a lot between firms, including the importance of capital and knowledge spillovers.

We use this literature to address our two research questions. It deals specifically with the behaviour of individual firms that take decisions on (foreign) investment, innovation, imports and exports. We also study if they experience (or not) trade and investment barriers and how they respond to these barriers. In the past these differences between firms were often not considered, so if they do respond differently to these trade and FDI constraints then we can obtain new policy insights regarding openness and productivity.

In section 2 we discuss the channels between openness and productivity. Section 3 presents stylized facts on the trading and foreign investment behaviour of heterogeneous firms. In particular, the empirical relations between firm productivity and innovation, productivity and trade, and innovation and trade are presented, including the role of multinationals and knowledge spillovers. It concludes that firms face market entry costs at each new export market and for each product. Firms' productivity has to be high to overcome these costs. Section 5 discusses some policies to lower these entry costs.

The trade hampering factors are discussed by analysing trade costs in section 4. First, the economic literature is used to classify all possible trade costs. Second, we analyse the importance of trade hampering factors for EU firms using the Observatory of European SMEs firm-level survey. One of the main conclusions is that lack of knowledge on export markets and regulations in other countries are the main trade barriers. Import tariffs and duties are less important. In addition, EU firms perceive the internal market as very helpful for doing business abroad because of simplifying customs procedures, a common currency and standardised regulations. These results suggest that EU trade policies should be directed to deep integration with other countries, preferably by implementing internal market policies for goods and services trade and foreign direct investment.

## **2. Transmission channels between openness and productivity**

The relation between openness and productivity is a widely researched topic at the macroeconomic level. Many studies have focussed on the empirical relation in particular between trade liberalisation and income.<sup>3</sup> Many of these cross country studies conclude that

---

<sup>3</sup> Edwards (1998) and Lopez (2005) provide some overviews.

there is a positive correlation between (trade) openness and income or productivity. In general, researchers are not able to find a permanent effect on income or productivity *growth* (Nordas, 2006). The causality between openness and income is not undisputed. Most likely it runs from openness to income. Frankel and Romer (1999) tried to pin down the causal relation using sophisticated econometric techniques and their results also point to that direction. Although the positive relation between openness and income is well established, the relation between trade policy and income is less clear. The reason is that openness is affected by many factors like geography, technological progress, transport and communications. Trade policy is only one of these factors.<sup>4</sup> This does not imply however that trade liberalization policies affect income and productivity negatively. Most likely the correlation is positive because trade liberalization increases openness. This conviction is also based on the channels of increased openness to productivity. These channels are described below.<sup>5</sup>

First, increased openness leads to a better allocation of resources. Due to a larger market countries can specialise in products in which they have a comparative advantage. Therefore they are able to use their inputs for production, like labour, and capital, more efficiently. This increases income and productivity. Moreover, competition will also increase as markets are opened up internationally. In a given market the least efficient firms can not compete and resources are reallocated to the more efficient firms. This also increases productivity and income. These mechanisms increase productivity in the economy as a whole and within sectors. The productivity of individual firms can also increase because more competition induces firms to innovate and reduce direct competition from other firms.

Second, openness increases the effective market size for exporting firms. They have more opportunities to specialise and to exploit economies of scale. For importing firms, a bigger variety of imports is available. Often these imported inputs have lower prices and/or better quality. According to the endogenous growth theory this increase in variety of inputs stimulates productivity.<sup>6</sup>

Third, opening up markets does not only increase directly productivity but also via investment. Levine and Renelt (1992) have established a robust link between the investment

---

<sup>4</sup> See Wacziarg and Horn Welch (2003), Lopez, (2005), Nordas (2006) among others. Rodriguez and Rodrik (2001) and Irwin and Tervio (2002) even argue that trade is not a significant determinant of productivity when geography and institutional quality are included.

<sup>5</sup> Some literature resources are Feenstra (2004), Lopez (2005) and Nordas (2006).

<sup>6</sup> See the overview chapters of Feenstra (2004) on increasing returns and endogenous and the references in there.

share and ratio of trade to GDP. First, resource allocation of capital to more better performing sectors increases the productivity of capital and stimulates further investment. This is not only the case at the sectoral level but also at the firm level. Second, increased opportunities for foreign investment (opening up capital markets) also increase the allocation of capital over countries and consequently the return to capital.

Fourth, trade in goods and services and foreign direct investment facilitates the diffusion of knowledge, technology and new ideas. This is one of the contributions of the endogenous growth literature to the trade productivity debate. An open economy (via trade and FDI) has more access to technology and knowledge. Technology and knowledge are embodied in traded goods, services and FDI.

This classification has no clear demarcation and these channels can not be empirically discriminated, except for the knowledge spillovers of trade and FDI. For example, increased export opportunities and import competition can both affect each mechanism separately. Knowledge and technology spillovers can be theoretically attached to exports and imports. For FDI a similar reasoning applies. Knowledge and technology can be embodied in outward and inward direct investment. Inward FDI increases competition (at the home market) and induces a better allocation of factor inputs and productivity and innovation effects. Outward FDI could increase the market for a firm enabling it to exploit better the economies of scale. Of course there are fixed costs in establishing a foreign affiliate.<sup>7</sup>

This heterogeneous firm literature could provide some lessons on the functioning of the channels and their hampering factors. Traditionally, policy options focus on increasing openness via trade measures, trade-liberalisation deals and/or promoting FDI. External trade policies of the EU can help to further increase trade openness. A very relevant policy issue is whether Europe can indeed take the benefits of this openness. Are the channels between openness and productivity working to the net benefit of Europe? Can apt EU policies help to improve the functioning of these channels? The literature of firm level data could identify hampering factors on productivity and export performance at the firm level for different types of firms which cannot be identified using a macro-perspective. This could offer new insights towards targeted policies to increase market access at the sector level or the firm level.

---

<sup>7</sup> FDI and trade are also not independent from each other, see Markusen (2002) for the interplay between the two decisions.

### **3. Stylized facts from the new heterogeneous firms literature**

#### **3.1. Firms and exporting behaviour: the export premia**

The trade literature on heterogeneous firms was largely motivated by the stylized facts for US firms reported by Bernard and Jensen (1995, 1999).<sup>8</sup> These authors found significant differences in firm characteristics between exporting and non-exporting firms. In particular, they state that: ‘Exporters are dramatically larger, more productive, pay higher wages, use more skilled workers, and are more technology- and capital-intensive than their non-exporting counterparts relative to non-exporters.’ The statement that exporters tend to outperform non-exporters on several aspects has proved to hold for longitudinal data and for a number of countries where firm-level data is available.<sup>9</sup>

The differences between exporters and non-exporters are summarized in ‘export premia’. These premia reveals the difference between exporters over the non-exporter, for a specific economy or sector, once other firm characteristics are controlled for (i.e. size, sector, and year).<sup>10</sup>

---

#### **The Melitz model: relation between openness and productivity**

To explain these export premia Melitz (2003) introduced firm-heterogeneity in a trade theoretical model. In his framework only the most efficient firms can overcome fixed entry-costs into foreign markets and become exporters. When these entry-costs (which include tariffs and NTBs, and sunk operation costs) are reduced, exporting firms expand and low-productivity non-exporting firms exit the market. The outcome is an aggregate increase in productivity.\* The channel between openness and productivity in the Melitz model is resource allocation due to more competition at the firm level (bullet 1 in section 2). Intersectoral reallocation due to comparative advantages does not play a role in this model.

---

\*Bernard et al. (2003b), Yeaple (2005), and Melitz and Ottaviano (2008), among others, have followed and extended the theoretical results by Melitz.

---

Two alternative, but not mutually exclusive hypotheses are being used to give a more profound explanation for the export productivity premia:

- Learning-by-exporting hypothesis: firms participating in foreign markets receive knowledge and information and use this to improve productivity.

---

<sup>8</sup> Before some other papers also used firm level data Tybout et al. (1991), but the Bernard and Jensen results on US data attracted much more attention.

<sup>9</sup> See for example, ISGEP (2007) and Mayer and Ottaviano (2007).

<sup>10</sup> The export premia refers to any difference between exporting and non-exporting. However, it is commonly used to denote the export productivity premia, i.e. the differences in competitiveness between both sets of firms.

- **Self-selection hypothesis:** The existence of trade costs in international markets forms a barrier for firms to export, thus only the most efficient firms export. In contrast to the learning-by-export hypothesis, the self-selection hypothesis assumes that the exporting firm has higher productivity before starting to export.
- 

### **Empirical methodology to test empirically self selection and learning-by-exporting hypothesis**

Self selection is empirically tested by using longitudinal data for plants to document differences in levels and growth rates of productivity (labour or total factor) between exporters and non-exporters (following the methodology of Bernard and Jensen, 1995, 1999). The results is an unconditional productivity differential. The exporters premia defined as the *ceteris paribus* percentage change of labour productivity between exporters and non-exporters is estimated form a regression of log labour productivity on the current export status dummy controlled for industry, region, firms size and year. The idea to learning-by-exporting is that exporting firms get access to knowledge at international markets and foreign countries and that tougher competition increases productivity. This is tested by comparing firms or plants starting to export with a hypothetical firms with the same characteristics (based on matching methodologies) to over a period of time starting the period before exporting and including some periods after this start. The crux is to find a good matching methodology and second data samples are much more limited by only selecting those firms which start exporting in the sample. Wagner concludes in his overview that papers using this methodology do not find significant learning-by-exporting effects (Source: Wagner (2007)).

---

Wagner (2007) surveys the results for 45 studies in 33 countries and finds that the main conclusion from this empirical literature is that exporters are more productive than non-exporters, there is strong evidence to support the self-selection hypothesis, weak evidence on learning-by-exporting.<sup>11</sup> For developing and transition countries the learning-by-exporting hypothesis is firmer established.<sup>12</sup> This difference in outcome for developed and developing countries is not well explained. It could be the case that the latter exporters concentrate on other markets and other export products where there is the possibility to learn before being wiped out of the market through fierce competition or that firms from developed countries have already access to all relevant knowledge and that they are already used to fierce competition (see text box). The self selection hypothesis is sometimes is explained by ex ante productivity increases of firms before they start exporting. These productivity increases could be necessary to be competitive.

---

<sup>11</sup> See also Mayer and Ottaviano (2007), and Bernard and Jensen (1999, 2004). The latter also provided evidence that new exporters were already among the best and differed significantly from the average non-exporter.

<sup>12</sup> See Kraay (1999) for Chinese manufacturing firms, Bigsten et al. (2000) for African manufacturing firms, and De Loecker (2007) for Slovenian firms.

### **3.2. EU firms and exporting behaviour: stylized facts**

In many EU countries national firm-level data bases have become available to analyse export behaviour of firms. The coverage and quality of these data bases vary by the years reported, including only manufacturing firms, the minimum size of firms in terms of employment and the degree of under-representation of small firms, and the number of firm characteristics. Moreover, researchers use different methodologies. As a consequence different studies for one country present different numbers on export performance (see table 1). These caveats have to be taken in mind in interpreting and comparing the results of all these studies.

The International Study Group on Exports and Productivity ((ISGEP) has taken the initiative to use a common methodology of presenting and interpreting facts for 14 European countries for which these data base are available for the national researchers.<sup>13</sup> All the methodological problems with respect to the coverage and time span of the databases remain, but at least the same definitions are used. Table 1 presents some stylized facts on the export participation rates (share of exporting firms), export intensity rates (share of exports in production) and export premia. Some interesting conclusions can be drawn.

- The size of a country seems to be negatively related to the export participation rate of the country. Germany, France, UK, Italy and Spain have participation rate in the range of 60%-75%<sup>14</sup>. Sweden, Denmark, Ireland, Belgium, Austria, and Slovenia have export participation rate between 70%-90%.<sup>15</sup> For the EU as whole the (weighted) export participation rate is 70%.
- For the export intensity rate the pattern is similar. The five large EU-countries have export intensity rates of about 30%. In the smaller countries the average firm in the data base exports about 50% of its production, while the not representative average firms export 31% of the production value.

These results are consistent with the fact that large economies are less open. Firms in small countries have to export or import to benefit from large markets. The preliminary results from the heterogeneous firms literature seems to suggest that the higher openness in small countries

---

<sup>13</sup> In 2008 CPB also joined this study group for the Dutch data base. Results of the trading behaviour of Dutch firms will become available later this year.

<sup>14</sup> An exception is the value for the UK of 28%, according to Mayer and Ottaviano (2007). It seems that all firms are included without a restriction on firm size. Smaller firms have a lower probability to export.

<sup>15</sup> Norway has a low rate of 39% which is related to including almost every Norwegian firm into its database, see Mayer and Ottaviano (2007).

can be explained by more exporting firms (higher extensive margin) and by higher export intensity (intensive margin).

Table 1: Characteristics of exporters in various EU countries

Country	Export participation rate (EPR) in %			Export Intensity Rate (EIR) in %		Export premia (%)		FDI Premia
	1 <sup>1</sup>	2 <sup>2</sup>	3	1 <sup>1</sup>	2	Labour Productivity <sup>1</sup>	Value Added <sup>2</sup>	Value Added <sup>2</sup>
Germany	69	59		30		7.2		31.0 <sup>10</sup>
France	75	67	72 <sup>3</sup>	24	21 <sup>3</sup>	7.6 - 1.3 <sup>2</sup>	2.7	22.7
UK	70	28		32		3.9	1.3	
Italy	69	74	72-67 <sup>4</sup>	33	38-30 <sup>4</sup>	3.6	2.1	
Spain	75			31		8.1		
Belgium	80			44		9.8	14.8	24.7
Hungary		48					13.5	
Sweden	83		89 <sup>5</sup>	44	36 <sup>5</sup>	-0.1		17.9 <sup>11</sup>
Austria	71			44		5.3		
Denmark	77			31		6.6		
Norway		39					8.0	11.0
Ireland	70		84 <sup>6</sup>	53		7.3		
Slovenia	81		46 <sup>7</sup>	55 <sup>7</sup>		5.0	29.6 <sup>7</sup>	
EU <sup>8</sup>	69.5			31.3				
US <sup>9</sup>	31			12		12.4	16.9	

<sup>1</sup>Source: ISGEP (2007).The '-0,1' for labour productivity Sweden is not significant. Values for Germany are based on the values for West-Germany.

<sup>2</sup>Source: Mayer and Ottaviano (2007).

<sup>3</sup>Source: Bellone et al. (2006).

<sup>4</sup>Source: Basile (2000) and Serti and Tomasi (2007), respectively.

<sup>5</sup>Source: Hansson and Nan Ludin (2004).

<sup>6</sup>Source: Gleeson and Ruane (2007).

<sup>7</sup>Source:De Loecker (2007).

<sup>8</sup>Own estimates used GDP as weights.

<sup>9</sup> Source: Bernard and Jensen (2004) for EPR1 & EIR1 and Bernard and Jensen (1999) for Export Premia .Labour Productivity is based on a TFP-value.

<sup>10</sup> Own estimate based on Arnold and Hussinger (2005).

<sup>11</sup> Own estimate based on Bandick (2004, 2006).

The export premia based on labour productivity are often in the range from 3% to 10% for the EU Member States, slightly lower than for the US, but given all pitfalls with the data it can be hardly interpreted as a comparable fact.

The national averages on export participation and intensity rates hides remarkable differences at the firm level. Table 2 shows exports are concentrated in a small percentage of firms. Mayer and Ottaviano (2007) call these firms the happy few. These are the largest firms with the highest export intensity rates.

*Table 2: Share of exports for top exporters in 2003, total manufacturing*

Country of origin	Top one percent	top five percent	top ten percent
Germany	59	81	90
France	44 (68)	73 (88)	84 (94)
UK	42	69	80
Italy	32	59	72
Hungary	77	91	96
Belgium	48	73	84
Norway	53	81	91

Source: Mayer and Ottaviano (2007).

A series of papers using micro datasets for France and Slovenia that have export transactions by destination, find that exports values are concentrated in few exporting firms that export many products to many destinations, while many exporting firms export few products to few destinations.<sup>16</sup> In addition, Damijan et al. (2004) find that the incursion of firms into new markets is gradual. On average Slovenian firms export to a new market every two years. Moreover, this export expansion path follows gravity model predictions, i.e. geography (proximity) and size (GDP) condition where exporting firms expand their foreign sales. Moreover, these papers also find evidence that the extensive-margin (more firms exporting different products to different destinations) is more important than the intensive-margin (increases in the value of current exports).

### **3.3. EU firms and import behaviour: stylized facts**

There is less data material on import behaviour of firms than on export behaviour. Recently, Muûls and Pisu (2007) presented results on exports and imports of Belgian firms. For imports they derive the same conclusions as for exports. The most productive firms import. The importer premium in terms of productivity is 17% (compared to non-trading firms), while it is 9% for Belgian exporters.<sup>17</sup> Distinguishing the intensive and extensive margin, most

---

<sup>16</sup> To obtain such conclusions, the firm-level databases have to be combined with international trade transactions data. Trade transactions at the firm level are hard to obtain and only few countries have been studied. Exceptions are Eaton et al. (2004) using French data from 1986 and Damijan et al. (2004) using Slovenian data for the period 1994-2002.

<sup>17</sup> If two-way traders are separately distinguished, the importer and exporter premia are 15% and 6% respectively. The premium for two-way traders is 27%. Their distinction of two-way traders, exporters and importers also suggest that the exporter productivity premia in other studies (in which two-way traders and exporters are combined) may have an upward bias due import productivity premia of two-way traders.

importers only trade with a limited number of countries. The number of importing firms diminishes with the increase of importing countries. We see a similar pattern for the number of products. Most importing firms only buy a limited number of imported products and the number of importing firms decreases with the number of imported products.

In Italy firms two-way traders are bigger than solely importers and exporters, which are also bigger than no-traders in terms of employment. The same ordering applies for the share of non production workers and wages based on a data set of 20000 firms. Serti et al. (2007) do not estimate labour productivity premia, but the results on white collar workers and wages suggest the presence of these premia for two-way traders, exporters and importers and seems to support the results of Muûls and Pisu (2007).

We have to be careful here in interpreting the results. These results are very intuitive with the empirical facts on exporting behaviour of firms in mind, but this does not imply that Belgium and Italy are representative for the EU. Muûls and Pisu (2007) suggest the existence of fixed costs for importing for each origin but do not interpret any causal relation. Transaction costs for international trade are higher than for national trade starting up these transactions and these costs are shared by exporters and importers. The importer premium could be the consequence of self selection as it seems to be the case for exports: importers first have to raise productivity in order to cover the sunk costs of importing. However, endogenous growth theory suggest that firms could raise productivity through increased intermediate deliveries (including imports) and knowledge spillovers from domestic and foreign intermediaries. To our knowledge these theories are not empirically tested at the firm level, but empirical work at the sectoral and macro level suggest a positive relation (see section 3.6). It could be the case that the most productive importing firms are productive because they import many goods from various countries.

### **3.4. EU innovating firms and trade: stylized facts**

Innovation (measured through public, business and foreign R&D)<sup>18</sup> and productivity across firms are positively related in OECD countries (Guellec and van Pottelsberghe, 2001a). The literature on heterogeneous firms also suggests that the more productive firms are the ones which are more technology and capital intensive (section 3.1). Innovating firms are also more

---

<sup>18</sup> Although a considerable proportion of innovations are not produced by firms that have not R&D facilities, R&D is seen in many instances as a good proxy-variable to assess innovative activity in firms, this is specially the case of the high tech sectors.

internationally oriented. Wakelin (1998) shows that innovators are more likely to exports than non-innovators.<sup>19</sup> The more innovations they have the higher the probability of entering the export market. Innovative effort is a more important determinant for trade performance than relative wage costs or relative investments.

*Table 3: firm characteristics for innovators and non-innovators*

	Innovators		Non-innovators	
	Exporters	Non-exporters	Exporters	Non-
Propensity to export	0.43 (0.26)		0.38 (0.31)	
Average capital intensity	0.49 (0.27)	0.39 (0.34)	0.51 (0.49)	0.43 (0.65)
Unit labour costs.	0.22 (0.09)	0.20 (0.11)	0.23 (0.10)	0.26 (0.16)
Number of innovations	3.9 (9.6)	1.7 (2.5)		
Number of observations	355	200	350	180

Source: Wakelin (1998). Standard deviations are in brackets.

Innovators do not only export more, they also export to more destined markets. Rodriguez et al. (2008) suggest that the geographical markets of innovative European firms seem to be larger and more diversified than for non-innovative firms. Innovations seem to stimulate sales of good and services abroad. The results of an analysis with CIS4 data is presented in figure 1.

If innovation fosters exports, then it follows that any hampering factor on innovation could affect, to a certain extent, export activity. In other words, one way of tackling challenges to export activity is by means of solving problems related to innovation activity. As innovation is one of the transmission channels between openness and productivity, it is important that policymakers identify which factors hampering innovation discriminated best among innovative and non-innovative firms. In this respect, making firms more innovative could lead to more diversified markets abroad. A discriminant analysis of Rodriguez et al. (2008) by using CIS4 firm-level data for EU27, Iceland and Norway find that extramural financial sources are a significant discriminatory factor between innovative and non-innovative firms. As a response to the problem of extramural financing for innovation, EU policies have been designed to intervene in the market in the form of loans and grants.

---

<sup>19</sup> Wakelin (1998) in her study used as innovation proxies both R&D expenditure and number of innovations produced and used for exporters and non-exporters.

Figure 1a: Geographical markets for innovative firms in CIS4

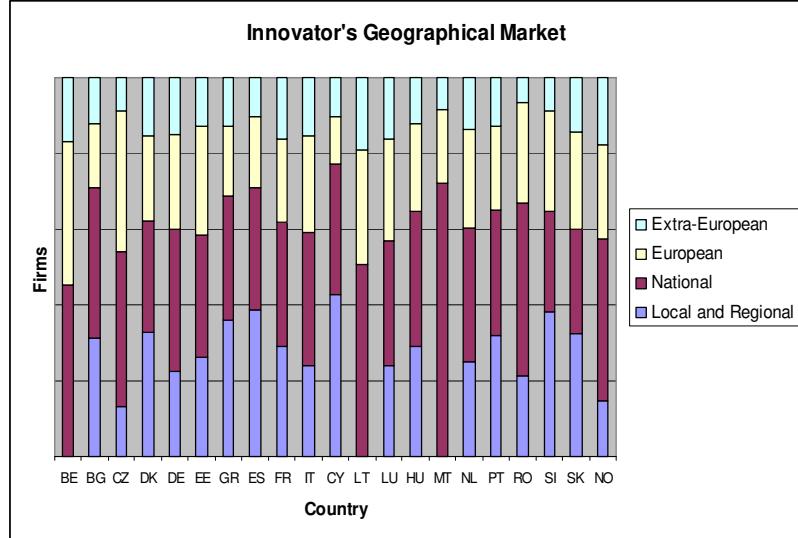
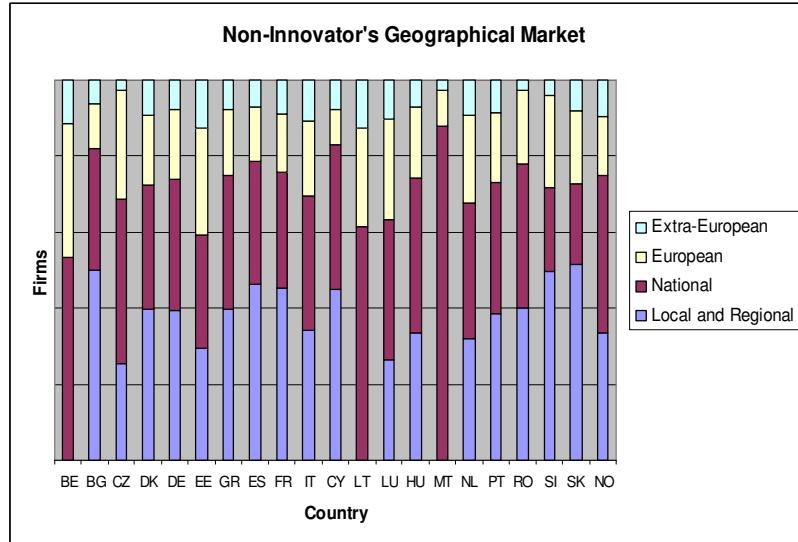


Figure 1b: Geographical markets for non-innovative firms in CIS4



Innovation (proxy by relative R&D and patenting activity) help also to explain the determination of import volumes (Anderton, 1999, for both Germany and the UK), but the causality between innovation and trade runs also the other way. With respect to imports, Lelarge and Nefussi (2007) study French firms' responses to the competitive pressure arising from low wage countries. They find that competition from low wage countries is an incentive for innovation expenditures, specifically for the most productive firms.<sup>20</sup> The results also point out that innovation indeed contributes to the change of firms' activities and to the increase in the quality of exports. This result seems to imply that more intensive import

<sup>20</sup> Note that this is a different mechanism than in section 3.3. Section 3.3 discussed the effects of imported intermediate inputs on the productivity of the firm. This paper discusses the effects through increased competition.

competition increases innovation and productivity (for surviving firms). However, Aghion et al. (2005) and Aghion and Griffith (2005) suggested an inverted U-curve on the relation between competition and innovation by using UK firm-level panel data. If competition becomes too tense, profits will erode away and also the opportunities to finance innovation. For the French case, this seems not to be the case.

Innovation is defined as the exploitation of new technological inventions (Schumpeter, 1939). The notion of innovation underpins the ability of firms to forge ahead and best position themselves in a competitive environment. Contrary to the notion of what international competition was viewed as over the last twenty years, which was one based primarily on cost reduction via the relocation of production centres, the turn of the century witnessed a decline of this model of competition. Currently, innovation and lead markets possessing new technologies and services are seen as the only viable model to sustain growth and the welfare state in advanced economies (Georghiou et al., 2006).

To sum up, the following findings are reported: i) innovators export more, and to more countries; ii) innovation is related to exports; iii) financial constraints hamper innovation; iv) competition from imports increase innovation and probably productivity; v) extreme competition could erode innovation incentives. A tentative conclusion follows: causality links between innovation, exports and productivity require further research. Nonetheless, there exists empirical evidence concerning the causality from imports to innovation and from innovation to productivity as a consequence of increased competition to a certain extent (up to the turning point of the inverted-U curve).

### **3.5. Stylized facts on multinationals and productivity**

Helpman et al. (2004) introduced the role of the multinationals (MNE) into the heterogeneous firm theory and concluded that these companies outperform the non-exporting and (solely) exporting firms in terms of productivity. They estimate that MNE are 15% more productive than other (exporting firms). In addition, Bernard et al. (2005) conclude that multinationals play a key role in US employment and trade patterns. Employment at multinationals accounts for 33.3 million workers in 2000 and is increasing. Multinationals are also responsible for roughly 90 percent of US exports and imports in their sample.

Mayer and Ottaviano (2007) confirm these views for European multinationals. The value added premia of MNEs (compared to non-MNEs) is 11% for Norway, 23 % for France and

25% for Belgium (see table 1). The value added premia for German MNEs is even 31%. These value added premia are much higher than for exporters compared to domestic firms. In studying UK data Harris and Li (2007) conclude that foreign owned companies operating in the UK enjoy higher levels of productivity and foreign owned subsidiaries were almost 12% less likely to close than UK owned firms. Girma et al. (2007) conclude that high-productive firms become on average even 9% more efficient two years after having been acquired in the UK. This is in-line with the theory that multinational firms transfer a range of intangible proprietary assets to their affiliates (Caves, 1996, Markusen, 2002). These affiliates can only absorb this foreign knowledge if the technology and knowledge gaps are not too big. This is also the case for countries: domestic R&D is key for tapping foreign knowledge. Countries that invest in their own R&D benefit most from foreign R&D (Guellec and van Pottelsberghe, 2001b). MNEs may also positively affect productivity in host countries through human capital by training and on-the-job learning. Empirical and anecdotal evidence indicates that MNEs tend to provide more training than domestic firms. Subsidiaries may also have a positive influence on human capital enhancement in other domestic firms with which they develop links (OECD, 2007).

### **3.6 Stylized facts on knowledge and technology spillovers**

The international transmission of R&D knowledge through trade has been a significant contributor to TFP growth.<sup>21</sup> Through imports, domestic producers have thus indirect access to the foreign stock of knowledge which they can draw on to increase productivity. This is the main conclusion of the seminal work of Coe and Helpman (1995). Their methodology has been often criticized,<sup>22</sup> but the overall results that foreign sources of knowledge are important for most countries is widely accepted.

For larger countries foreign sources for technology and knowledge are less important. Coe and Helpman (1995) estimate that for the G-7 countries the relative contribution from foreign

---

<sup>21</sup> Coe et al., 1997; Crespo et al., 2004; Del Barrio-Castro et al., 2002; Engelbrecht, 1997; Guellec and van Pottelsberghe, 2001b and 2004; Keller (2004), Lumenga-Neso et al., 2005.

<sup>22</sup> First of all the role of trade patterns in determining the foreign R&D stocks has been disputed by Keller (1998) showing that randomly generated import ratios can lead to similar or even higher international spillovers. Second, Lichtenberg and van Pottelsberghe (1998) have shown that weighting schemes of Coe and Helpman (1995) biases the measurement of foreign R&D capital stocks and their indexation scheme also biases the estimates of spillover coefficients. Using their own proposed alternative-weighting scheme, they find significant spillovers, although of somewhat reduced magnitude. Third, Kao et al. (1999) do not find evidence of the effect on international spillovers of foreign R&D capital stocks that appears insignificant when they use a dynamic OLS estimator shown to have better power properties. Fourth Extending the analysis of Coe and Helpman (1995) by treating FDI as a channel of technology diffusion, van Pottelsberghe and Lichtenberg (2001) find evidence of significant R&D spillovers

R&D to productivity is about one fifth. Keller (2002) found a similar result analysing the G-7 countries plus Sweden using data at the industry level. For the smaller OECD countries, the relative contribution of foreign R&D is about 60% according to Coe and Helpman (1995). The reason is that smaller countries are more open to trade than larger countries.<sup>23</sup> In the same spirit Biatour and Kegels (2007) provide evidence of the existence of productivity-enhancing R&D spillovers transmitted through both imports and domestic intermediates to Belgian manufacturing sectors. They find a weak productivity effect of industry-own R&D efforts, but this productivity effect is significantly smaller than the effect generated through international R&D spillovers.

Barrios et al. (2007) demonstrate that while domestic plants benefit from local R&D spillovers, these spillovers are spatially bounded. Furthermore, domestic plants do not appear to benefit from R&D done by foreign affiliates. This finding is related to Cassiman and Veugelers (2004) result who find that in Belgium foreign affiliates do in fact generate less local transfers of technology than their domestic counterparts once superior access to international technology markets is accounted for. Crespi et al. (2008) find that the main sources of knowledge in the UK are competitors, suppliers and plants that belong to the same business group. These three sources of knowledge together account for about 50% of TFP growth and the main free information flow spillover is from competitors and MNEs contributes to this spillover.

The OECD (2007) concludes that the evidence of positive spillovers is strongest and most consistent in the case of vertical linkages, in particular as concerns backward linkages with local suppliers. MNEs are found to provide technical assistance, training and other information to raise the quality of suppliers' products. Empirical evidence shows that horizontal spillovers are more important between firms operating in unrelated industries, because foreign affiliates want to avoid knowledge spillovers to immediate competitors (OECD, 2007). In all cases the productivity effect of foreign R&D are also affected by the absorption capacity. Some countries benefit more from foreign technology than others because of their higher absorptive capacity (Acharya and Keller, 2007).

To sum up, the literature on international knowledge spillovers provides aggregate empirical evidence but firm-level tests on the special boundary and time of access to international

---

<sup>23</sup> Frantzen (2002) calculates the elasticity of TFP with respect to domestic R&D capital that is, on average, about 50% larger in the G7 economies compared to the smaller OECD economies.

technology markets set some conditions for the link from inward FDI to productivity gains that enrich the general conclusions.

When dealing with knowledge spillovers, it is important to mention how the protection of knowledge is related to trade and FDI. Weak patent regimes are significant barriers to manufacturing trade, particularly in goods that are sensitive to intellectual property rights (IPRs). Nevertheless, these barriers are only important for industrialising economies that pose credible imitation threats. As these countries strengthen their IPRs regime, they should attract rising import volumes of high-technology goods.<sup>24</sup> FDI representing complex but easily copied technologies is also likely to increase as IPRs are strengthened, because patents, copyrights and trademarks increase the value of knowledge-based assets, which may be efficiently exploited through internalized organisation. Whatever the mode, the likelihood that the most advanced technologies will be transferred raises as IPRs are strengthened. This is particularly the case for capital and knowledge intensive sectors (Maskus, 2000).

### **3.7 Summarizing stylized facts**

This chapter aimed to summarize the firm level literature with respect to the international performance of firms.

1. First of all, Firms are heterogeneous with respect to trade performance. Exporting firms are on average more productive than non-exporting firms and the most productive multinationals are responsible for a large share of international trade.
2. The empirical literature suggests that the causality runs from productivity to exports at the firm level. Exporting firms are ex ante more productive, and firms in developed countries do not seem to learn from exporting in terms of extra productivity.
3. The extensive margin matters. Changes in trade are more affected by exporting more products, exporting to new destinations and new exporting firms.
4. Multinationals are more productive than exporters. The export premium is also higher for multinationals.
5. Innovative firms export more than non-innovative firms. The former also export to more and more destined countries.

---

<sup>24</sup> Maskus, 2000; Maskus and Penuharti, 1995; Smith, 1999.

6. The few studies which investigate the relation between imports and productivity at the firm level suggest the existence of an import premium. Importing firms are more productive than non-importing firms, but the causal relation at the firm level is still unclear.
7. The empirical literature based on sector and macro studies suggests that the causality runs from imports to productivity mainly through competition effects, innovation and knowledge spillovers.

## **4. H ampering factors to trade**

### **4.1 The concept of trade costs**

In an extensive survey of the literature Anderson and van Wincoop (2004) define trade costs as all the costs incurred in getting a good from one country to its final user in the destination country.<sup>25</sup> They divide these costs into three broad categories: transport costs, border costs (which include policy barriers, but also language and currency barriers), and retail and wholesale distribution costs. Combining direct evidence on direct policy costs (tariffs, quotas) and transportation costs with indirect evidence from gravity models, they find a 170% ad-valorem tax equivalent of all trade costs for a developed country. This can be roughly divided into 21% transport costs, 44% border costs and 55% retail and wholesale distribution costs.<sup>26</sup> One of their main conclusions is that policy-related costs (i.e. tariffs and NTBs) cover only 8% of the 44% border costs, while other non-policy border barriers such as language (7%), currency (14%), information costs (6%) and security barriers (3%) are much more important. This suggests that direct trade policy instruments are less important than other policies for trade in developed countries, i.e. regulations, informational institutions, language, law enforcement and related property-rights institutions (including intellectual property rights).<sup>27</sup> For the Internal Market in the EU these border costs are much lower, but not negligible (see below).

---

<sup>25</sup> In this chapter trade and trade costs refer to international trade between two countries. From an EU policy perspective it is important to discriminate internal trade (in the Internal Market) with external trade. For the former the trade barriers are lower in particular the border costs. In the economic literature this difference is often neglected. This is also the perception of firms responding in the survey later on in this chapter. If possible we make explicitly a distinction between internal and external trade, but often the material does not us permit to do so.

<sup>26</sup>  $(1+.21)(1+.44)(1+.55)-1=1.7$ .

<sup>27</sup> Anderson and van Wincoop (2004) also find that overall trade costs vary much between goods and countries. The broad ad-valorem estimates are only an indicator for the relative importance of the different trade costs.

In the literature it is also common to find other categorizations of trade costs. The most common include variable and fixed costs incurred to enter a foreign market. Variable costs include transportation, insurance, and trade policy costs (i.e. tariffs and NTBs). Fixed costs are also called sunk, entry and/or beachhead costs. These include technical barriers to trade (TBTs, which include health, safety and environmental certifications), costs of introducing new varieties, distribution channels, and the information costs related to marketing and policy regulations. In Anderson and van Wincoops' categorisation these fixed trade costs are included in information costs, security barriers and retail and wholesale distribution costs.

The specific country regulations include licences and authorization requirements, insurance liabilities and bank accounts, administrative and tax procedures, and impediments for inputs, suppliers and personnel.<sup>28</sup> In a survey among a large number of business-service firms in the EU 78% of the responding firms mention that setup costs of selling services in other EU countries (that is to say internal trade) are "*significant*" or "*very significant*" trading barriers (CSES 2001:p190). Of those firms that were able to estimate the size of the setup costs, 30 per cent estimated that these are in the order of 3-6 months sales proceeds, and 43 per cent estimated that the cost are more than 6 months of sales proceeds (CSES 2001: 191).The setup-cost effects are largest for small and medium-sized enterprises (SME).

#### **4.2. Empirical linkages between trade costs and productivity**

Firm-level databases do not have information on trade costs. Thus, it is not possible to make a direct assessment of the productivity impact of trade costs changes. However, some papers have estimated trade costs at the macro level and integrated them into firm-level datasets to assess the effects of trade policy on aggregate productivity. As the trade costs fall, two (theoretical) effects are present. First, increased foreign competition in the local market results in low-productivity firms exiting. Secondly, firms that currently were not exporting will begin to export while currently exporting firms will increase their foreign sales. The resulting increase in aggregate productivity is not a result of higher productivity growth from exporting. This feature corresponds with the lack of strong evidence on the learning-by-exporting hypothesis.

The first study using this methodology was for the United States. Bernard et al. (2003b) constructed a measure of trade costs by US industry and found that productivity growth is

---

<sup>28</sup> Kox and Lejour (2005) provide a much longer list, in particular relevant for services.

faster in sectors with decreasing trade costs. The largest growth is present in industries with high levels of imports. This result points to the importance of pro-competitive effects of reduced trade costs. Bernard et al. (2003) also find that within-sector reallocation is driven by low-productivity firms exiting the market and by the production increase of new exporting firms. This suggests that the extensive margin changes have a greater role in the reallocation process than the intensive-margin changes.<sup>29</sup>

For the EU, Del Gatto et al. (2006) have also used macro-level trade costs and calibrated heterogeneous firm models to assess the impact of trade policy on productivity.<sup>30</sup> They simulated two scenarios. In the first scenario, they estimate that average productivity is reduced by 13% if bilateral trade within the EU is eliminated (i.e. the costs of non-Europe). In the second scenario trade barriers within the EU are reduced by 5%, and they estimate a productivity increase of 2%. These numbers point to significant gains from trade in the Internal Market. In a subsequent paper, Corcos et al. (2007) extend the analysis by disaggregating France into 23 regions, in combination with the other 10 EU countries. They obtain a similar result on estimating the costs of non-Europe. When behind-the-border costs (BTBs) are eliminated, it represents a reduction of trade costs of 34% and an average productivity gain of 20%, with considerable heterogeneity across countries (from 1% in Portugal to 60% in Germany).<sup>31</sup> In both papers productivity changes associated with trade may be underestimated given that other important EU trading partners (US, China, India) are not included. On the other hand, the complete elimination BTBs is not practically possible.

For a dataset of UK manufacturing firms Kneller et al. (2008) confirm the previous gravity model findings: hostile business environments in foreign countries (EU and non-EU) represent greater trade barriers than those related to traditional measures of trade costs such as tariffs. An improvement in the business environment of foreign countries leads to an increase in both the export intensity of established exporters and export market entry. These results are driven by the EU component of the trade costs index. New survey data for the UK on the perceived importance of each barrier to trade by individual firms point at the same direction. Trade costs are associated with imperfect information (on export markets, potential customers, decision makers and contact persons): different languages, currencies, law

---

<sup>29</sup> These results are confirmed by Helpman et al. (2007), but seem to contradict the findings of Tybout (2001) who concludes that plants rationalize their production and do not exit because of fixed costs.

<sup>30</sup> First, they obtain firm productivity (TFP) and its distribution using firm-level data from Amadeus and macroeconomic data (i.e. bilateral trade data) to estimate trade costs from a gravity equation for 11 EU countries.

<sup>31</sup> These large country differences are due to country size and level of integration within the EU.

enforcement and property rights, and regulation. On average 30% to 50% of all responding firms identify all these various issues as a trade barrier (Kneller et al., 2008). A subsequent finding is that reported trade barriers are only decreasing with the export experience of the firm, while size, productivity and other firm characteristics do not have a significant impact. This suggests that sunk costs are significant and play an important role in the decision to export by firms.

Rojas-Romagosa (2008) uses the survey “Observatory of European SMEs” (Gallup Organization, 2007) to analyze characteristics of exporting firms and the hampering factors to external and internal trade faced by European firms. A distinctive feature of this survey is that it provides firm-level data for a broad group of countries: each EU member state, Iceland, Norway and Turkey. Despite its name, the survey is representative of the firm population for all size classes. Following the empirical literature on firm heterogeneity we run OLS regressions on labour productivity using export characteristics as explanatory variables.<sup>32</sup> First, we use a dummy variable to identify exporting firms and then, the export intensity ratio. Table 4 concludes that the export premia is positive and highly significant.

*Table 4: Export productivity premia OLS regressions*

	2005		2006	
	Export dummy	Export intensity	Export dummy	Export intensity
Export variable ( )	0.34 [0.04]***	0.23 [0.07]***	0.43 [0.04]***	0.49 [0.08]***
Premia (%)	40.8	26.3	54.3	63.4
Observations	6,392	6,392	6,299	6,299
R-squared	0.04	0.02	0.05	0.03

Constant term, and control variables (country, sector and size class) not reported.  
 Standard errors in brackets: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Source: Observatory of European SMEs and own estimations.

In addition, we also find that exporters are bigger (by number of employees), use more imported inputs and have a higher proportion of skilled workers (defined as the percentage of workers with a university or another higher education diploma).

Information on the percentage of sales generated by new or significantly improved products or services for each firm is used as an indicator of the firm's innovation efforts. Using the

---

<sup>32</sup>see for example, ISGEP (2007).

export dummy variable, we find that exporters have 5 times more sales of new or improved products (Table 5). When export intensity is applied the innovation premia is even higher.<sup>33</sup>

*Table 5: Export innovation premia OLS regressions*

	2005			2006
	Export dummy	Export intensity	Export dummy	Export intensity
Export variable ( )	5.43*** [0.77]	10.75*** [1.42]	5.28*** [0.78]	8.41*** [1.53]
Observations	3,617	3,613	3,690	3,690
R-squared	0.02	0.02	0.01	0.01

Constant term, and control variables (country, sector and size class) not reported.  
 Standard errors in brackets: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Source: Observatory of European SMEs and own estimations.

The survey has information on constraints to exporting (inside and outside Europe) and the importance of the EU internal market for European firms.<sup>34</sup> With this information it is possible to estimate hampering factors to internal and external trade and the impact of some trade policies. There are nine export barriers identified and the question provides a ranking of the export constraints faced by European firms. One addresses specifically IM trade (different regulations in EU countries), two address specifically external trade barriers (import tariffs and duties and regulations in non-EU countries) and the others address both.

Table 6 classifies the answers by NACE sector. Import tariffs have an above average importance for the wholesale and retail sector, while it is not important for hotels and restaurants, and health and social work services. Lack of knowledge of foreign markets is more important for other services. Lack of management resources are a bigger constraint for health and other services. Language problems are more significant for real estate and business activities. For the financial intermediation sector different EU regulations (typically an IM issue) are the main export constraint, while non-EU regulations are the most important export constraints for health and social work, and other services.

A noteworthy result is that information restrictions (i.e. lack of foreign market knowledge) are more important than the traditional policy-based trade constraints of import tariffs and duties. Moreover, the combination of EU and non-EU regulations is the main export restriction,

<sup>33</sup> Since most firm-based datasets do not have information on innovation, it is hard to interpret and compare these results.

<sup>34</sup> There are 17,283 firms sampled and there is information on number of employees, sales, exports for 2005 and 2006, main export destination country, and percentage of imported inputs.

especially for service sectors. These results are consistent with the trade costs findings in Anderson and van Wincoop (2004) and other studies, where import tariffs are only a minor trade hampering factor, and other constraints, such as lack of information, internal regulations and border costs are more significant.

*Table 6: Main constraints to export by NACE sectors*

Main constraint to export	Percentage by NACE sector code								
	1	2	3	4	5	6	7	8	9
Import tariffs and duties	8.6	4.2	10.6	0.0	8.1	7.0	3.7	0.0	5.3
Lack of knowledge of foreign market	10.5	14.6	11.6	2.9	9.0	11.6	14.2	14.3	21.1
Lack of management resources	4.0	4.2	4.4	8.6	4.5	4.7	7.4	14.3	10.5
Language problems	2.5	2.1	2.2	5.7	3.6	0.0	6.8	0.0	5.3
Different regulation in EU countries	5.5	10.4	7.9	5.7	5.4	18.6	9.5	7.1	5.3
Regulations in non-EU countries	8.7	7.3	4.9	2.9	4.5	7.0	4.7	21.4	10.5
Lack of capital	5.9	8.3	5.4	11.4	8.1	2.3	8.4	7.1	5.3
No constraints at all	39.3	28.1	36.2	37.1	39.6	23.3	29.5	28.6	26.3
Product/service not suited to export	2.0	6.3	3.0	2.9	1.8	2.3	2.1	0.0	0.0
DK/NA	13.1	14.6	13.8	22.9	15.3	23.3	13.7	7.1	10.5
Total	100.0	100.0	100.0	100.0	100.0	100.	100.0	100.0	100.0
Sector classification: 1. Manufacturing; 2. Construction; 3. Wholesale and retail; 4. Hotels and restaurants; 5. Transport and communication; 6. Financial intermediation; 7. Real estate and business activities; 8. Health and social work; 9. Other services.									

Source: Observatory of European SMEs and own estimations.

To analyse the relationship between trade barriers and firm characteristics, we run logit regressions on each export constraint category against several possible determinants. These include export intensity in 2005, country-specific dummies, EU membership (i.e. EU25), being a large EU economy (i.e. France, Germany, Italy, Spain and the United Kingdom), being a new member state (does not include Bulgaria nor Romania), production sector, number of employees in 2005 (as an indicator of the size of the firm), and if the main export destination is within the EU. 15

In Table 7 we present these regression results. Given the qualitative nature of the question on trade barriers, we focus only on the sign and significance of the variables and not on the possible size of the effects. For the first export barrier: import tariffs and duties, we find that higher labour productivity and having the main export destination in the EU27 diminishes the probability of considering import tariffs to be the main export constraint. The rest of determinants are not significant, and thus, do not explain the decision to consider the import tariff constraint as the main trade barrier. The same analysis applies to the other trade barriers. Analysing each determinant in turn, we find that export intensity is highly significant to

explain the probability of considering lack of knowledge of foreign markets as the main constraint. Firms with higher proportion of exports in total sales on average find lack of knowledge less important as a trade constraint. They could have learned *to* enter the export market. On the other hand, export intensity increases the probability of finding lack of capital and no constraints as more relevant. The skill level of the firm's employees is only significant to explain an increase in the probability of finding EU regulations as the main export barrier. Sector dummies are not significant for any specification.

*Table 7: Logit regressions for each export barrier*

Export	barrier 1	barrier 2	barrier 3	barrier 4	barrier 5	barrier 6	barrier 7	barrier 8
Export intensity	0.51 [0.32]	1.35*** [0.34]	-0.56 [0.45]	-0.60 [0.64]	0.13 [0.35]	0.50 [0.34]	0.91** [0.36]	0.34* [0.19]
EU member state	-0.66 [0.44]	0.79 [0.45]	1.95* [1.06]		0.93 [0.80]	1.37* [0.78]	1.05* [0.61]	-0.62** [0.27]
EU new member	-0.27 [0.46]	-0.05 [0.38]	-1.56 [1.03]	-0.82 [1.06]	0.31 [0.43]	-0.14 [0.46]	-0.01 [0.42]	-0.02 [0.24]
EU large country	0.41 [0.26]	0.23 [0.23]	0.49 [0.30]	0.66 [0.43]	0.25 [0.26]	-0.19 [0.28]	-0.03 [0.32]	-0.29* [0.15]
Main export destination EU	-0.45** [0.22]	0.41** [0.21]	-0.06 [0.28]	0.64 [0.47]	0.96*** [0.28]	-0.49** [0.23]	0.20 [0.27]	0.31** [0.13]
Skill levels	-0.01 [0.00]	-0.01 [0.00]	0.00 [0.01]	0.00 [0.01]	0.01* [0.00]	0.00 [0.00]	0.00 [0.00]	0.00 [0.00]
Employment in 2005	0.00 [0.00]	0.00 [0.00]	0.00 [0.00]	0.00 [0.00]	0.00 [0.00]	0.0002** [0.00]	0.00 [0.00]	0.00 [0.00]
Labour productivity 2005	-0.18* [0.10]	-0.08 [0.09]	-0.12 [0.14]	-0.34* [0.20]	0.12 [0.11]	0.16 [0.11]	0.43*** [0.12]	0.05 [0.06]
Observations	1203	1244	1244	1114	1239	1244	1239	1244

Constant term, country and sector dummies are not reported. None of the sectoral dummies were significant in any specification. Standard errors in brackets: \* significant at 10%; \*\* significant at 5%; \*\*\* significant at 1%

Export barriers are: 1. Import tariffs and duties; 2. Lack of knowledge of foreign markets; 3. Lack of management resources; 4. Language problems; 5. Different regulation in EU countries; 6. Regulations in non-EU countries; 7. Lack of capital; 8. No constraints.

Source: Observatory of European SMEs and own estimations.

It is important to note that firm size (proxied by the number of employees in 2005) is only significant for increasing the probability of non-EU regulations. This means that the size of the firm is not an important determinant on the perception of most trade constraints. This is a counter-intuitive result, since SMEs are expected to have a different set of trade constraints

than larger firms.<sup>35</sup> Finally, labour productivity significantly lowers the probability for three barriers: import tariffs, language problems and lack of capital. This negative impact is in accordance with the self-selection theoretical predictions that more efficient firms have higher probability of overcoming sunk trade costs.

Most of the other results are intuitive and present a straightforward interpretation for some export barriers. For example, larger firms have usually a bigger number of export destinations and thus, are more concerned about regulations in non-EU countries than smaller EU firms, which export mainly within the EU's single market.

Firms were also asked to determine the level of importance of five different EU internal market policies for their ability to do business within the EU27. We define approval percentages as the number of firms that consider each policy as very important and/or rather important. Using these we can then rank each of the four internal market policies as follows: Same currency in most member states (71%), Single market legislation (69%), No border controls (59%), and Hire workers from other EU countries (40%). These results reiterate the previous results that differences in regulation, border controls, and different currencies are important trade barriers. To assess these interpretations, we run probit regressions on each EU internal market policy. Table 8 presents the results.

*Table 8: Probit regressions for each EU internal market policy*

	Border controls	Same currency	EU workers	Single market
Exporter in 2005	0.18* [0.09]	0.36*** [0.12]	-0.14* [0.08]	0.21** [0.11]
EU member state	0.25*** [0.08]	0.46*** [0.09]	0.17** [0.08]	0.02 [0.10]
EU new member	-0.03 [0.10]	-0.21* [0.11]	-0.03 [0.09]	0.02 [0.11]
EU large country	-0.06 [0.06]	-0.09 [0.06]	0.00 [0.05]	-0.08 [0.06]
Main export destination EU	0.08 [0.10]	-0.05 [0.13]	0.16* [0.09]	-0.01 [0.12]
Labour productivity 2005	-0.04* [0.02]	-0.05* [0.02]	0.00 [0.02]	-0.04* [0.03]
Imported inputs	0.003*** [0.001]	0.01*** [0.001]	-0.001 [0.01]	0.0003** [0.0001]

Constant term , sectoral dummies and non significant coefficients not reported. Standard errors in brackets: \*\*\* p<0.01, \*\* p<0.05, \* p<0.1. Number of observations 3808.

<sup>35</sup> This was also the conclusion found by Kneller and Pisu (2007).

As expected, being an exporter increases the probability of considering the internal market policies very important, except for the hiring of other EU workers. Moreover, having a higher proportion of imported inputs has the same effects as being an exporter. Finally, higher labour productivity –as with export constraints– reduces the perceived importance of the internal market. Since we also find that exporters are significantly more productive than non-exporting firms, these results suggests that these three internal market policies benefit mostly those exporters with lower than export-average productivity. In other words, those European exporters can probably only overcome the sunk trade costs in the EU, but not in other markets.

## **5. Concluding comments and policy implications**

### **5.1. What has the heterogeneous-firm literature delivered?**

Many empirical studies using plant or firm-level data have shown that exporting firms are more productive than non-exporting firms. Moreover, most firms only export to a few destinations and a few products. The results also suggest that exporting firms are already more productive before entering the export market. Although some productivity improvements due to exporting are not excluded (but hard to identify in most data bases), this increase cannot explain the productivity premia of exporters versus non-exporters. A related result is that (fixed) market entry costs seem to matter more for trade than tariffs. To overcome these entry costs firms have to increase productivity before entry. This reasoning suggests that the causality runs from productivity increases to exports. The macro-economic results on causality between openness and growth are not undisputed but the hypothesis that trade increases productivity seems to be the most likely relation. Does the micro and macro literature deliver contradictory results with respect to the relation between openness and productivity? Not necessarily.

First, Lopez (2005) argues that self-selection is a conscious decision of firms that determinedly increase their productivity with the purpose to enter export markets (at least in developing countries). He also presents some anecdotal evidence from developing countries that supports this idea. If this is the case, the desire to expand internationally is prior to the productivity increase, necessary to overcome market entry costs. Then trade-liberalisation policies aimed at lowering market entry costs are still useful. Lopez (2005) concludes that the

causal link runs from trade openness to income and productivity, although his explanation runs from perceived openness to productivity increases to trade.

Second, even if firm-level productivity is exogenous for exporting, aggregate productivity may still rise through trade liberalisation. Intensified competition drives out less efficient firms and reallocates resources to more productive firms. According to the self-selection hypothesis reallocation is the main transmission channel between exports and productivity.

Third, the new literature focuses mainly on exports. The openness-income debate in the macro literature considers imports and exports together (in one openness indicator). As discussed above, Muûls and Pisu (2007) show that importers are more productive than non-importers but do not comment on the causality. It could be the case that firms become more productive through importing as the endogenous growth literature suggests: a larger variety of inputs and knowledge spillovers attached to imports increase productivity. The productivity premia for importers also suggests that entering a market to import does also entail some fixed costs. This would be in line with the transaction costs theories. Moreover, importing increases also aggregate productivity through competition and reallocation.

Fourth, Sieber and Silva-Porto (2007) show that a 1% increase in the import penetration ratio increases labour productivity growth by 0.027% for manufacturing sectors in the EU and US. If exports increase by 1%, labour productivity only grows by 0.016%. From this result we can tentatively conclude that importing could be more important for productivity growth than exporting. The lack of proof that exports do not raise firm's productivity in developed countries could be interpreted as support for the Sieber and Silva-Porto results.

Fifth, openness in the form of FDI also increases productivity. Inward FDI at the home market increases aggregate productivity through reallocation of inputs to more productive firms and foreign knowledge spillovers. Foreign knowledge also spills over from inward FDI to competitors and suppliers of intermediate inputs. Often the foreign affiliates stem off from high productive and high tech firms. The relevance of these spillovers depend on distance from the headquarter countries and absorption capacity (human capital and innovation) at the host market. Outward FDI also increases competition at the host market.

A superficial overview of this new literature could easily lead to the conclusion that reallocation at the exports markets is the main transmission channel between openness and productivity. As the five arguments above point out, this is not the case. The new literature

mainly concentrated on exports and less on imports and FDI. It focussed on heterogeneity between firms and export behaviour and not pointing to the most important transmission channel. It suggests that economies of scale related to exporting are not that important at the firm level. At least it could not be established so far by identifying raising firm productivity levels due to exporting. The importance of other transmission channels and openness channels like imports and FDI are not well covered in the context of the heterogeneous firm literature. This debate just started.

## **5.2. Proposed trade policies**

### *5.2.1 Extending market integration*

Traditional trade policies, like import tariffs, have become less relevant at least in the industrial countries for manufacturing goods. This can be seen as the success of negotiation rounds on trade liberalisation starting in 1948 (WTO, 2007). Of course for some sectors –such as textiles and agriculture– and for trade with some developing countries import tariffs are higher, but this does not challenge the overall trends towards low tariffs. Nowadays, other trade costs are much more important. The results in the literature and in this study point at other factors: information costs, non tariff barriers, country-specific regulation, customs procedures, exchange rate risks and cultural barriers. Baldwin (2000) concludes that differences in technical standards and regulation are the eye-catching trade barriers for industrial countries.

EU trade policy should concentrate on reducing behind-the-border costs.<sup>36</sup> The results of the Gallup survey (2007) stressed the importance of the Single Market, a common currency and eliminating border controls for doing business within the EU. These measures could act as an example for external trade policy. However, the results also suggested possible improvements within the internal market. In addition, the literature on knowledge spillovers stresses the role of proximity of technology advanced countries to benefit from other ideas and knowledge. These are other Member States. Simplified and standardized regulation procedures could help to integrate markets further, as is the intention of the services directive.

The second emphasis of EU trade policy should be in countries bordering the EU and technologically advanced countries such as US, Canada and Japan and other Asian countries,

---

<sup>36</sup> The list below does not want to suggest that this is all new and EU external trade policy is out of date. On the contrary, many points are an integrated part of EU trade policy as section 5.3 also argues.

where again, tariffs are less important than other border and internal distribution costs. An “internal market” with these countries would effectively reduce trade costs. A competitive own internal market. If this is not possible one could think of bilateral trade agreements with these countries, focussing on bilateral market entry. Deep RTAs should be the aim, i.e. include services, NTBs, trade facilitation and foreign direct investment. More ambitious elements in these RTAs are information (electronically) contact points for exporters and investors on regulation and market access, but also on distribution networks, and intermediary agencies. For many neighbouring countries this could be developed in the context of the European Neighbourhood Policy (See CPB/SCP, 2008). With the US the recent initiative for a Transatlantic Economic Council could be an important vehicle (see Hamilton and Quinlan, 2007).

Finally, the reduction of tariffs and NTBs and elimination of FDI restrictions with the rest of the world can significantly reduce the trade costs for exports to developing countries. Currently, trade and FDI volumes with these countries are lower than with most developed countries, but these can expand in the future.

### *5.2.2 Export promotion*

From the heterogeneous firms literature we know that firms face fixed costs of market entry for each export market and for each product. Moreover, we know that total exports increase mainly by increasing the number of exporters, exported products and export markets (extensive margin). The volume of exports to a particular market for a particular product is not so sensitive to changing market conditions. This suggests that it could be more effective focussing export promotion on market entry of new firms, new markets and products than focussing upon existing export relations.

Very productive firms have overcome the market-entry costs and trade to many destinations, but for low-productive firms these market entry costs can represent substantial hurdles. The export potential is for firms within a certain range of productivity for which the market entry costs are a constraint that can be overcome if these costs would be reduced to some extent. A part of these hindrances consist of lack of information on the markets, country-specific regulations, and distribution channels, among others. Governments can help reduce these information costs. This is a kind of intermediary function and can be important for prospective exporters to find new markets, foreign contacts, distribution networks, customers, etc. These foreign information services should not be for free. At the EU level the activities of

national export promotion agencies could be coordinated or supplemented (to benefit from scale effects).

It is a challenge to design effective promotion policies. Evaluations of past export promotion programmes leads to various outcomes.<sup>37</sup> Alvarez (2007) concludes that export promotion policies have to be accompanied by complementary policies aimed to improve firm characteristics. The study of Görg et al. (2008) confirms this view. Large grants (e.g. for capital, training, technology acquisition etc) seem to lead to additional exports. These grants seem to have primarily the aim to improve productivity instead of increasing exports directly and this fits within the self-selection hypothesis. The conclusion of Rodríguez et al. (2008) on the constraints of innovating firms points out in the same direction.

Finally, export promotion policies can be successful if these are targeted to the right firms, and aimed at reducing information costs. The heterogeneous firms' literature delivers some indications for identifying firm characteristics, although the literature is still developing. Second, these policy programmes should be complemented by policies to increase firm productivity in order to sustain a competitive position at the export market.

### *5.3.3 IPR regimes as incentives to innovate and trade*

For more than a century innovation has been protected to limit imitation (Rodríguez, 2003). Because the previous standards of the Paris Convention were weak, the Agreement on Trade-related Aspects of Intellectual Property Rights (TRIPs) was established within the scope of the World Trade Organisation. Developing countries that are not least-developed had to apply the TRIPs Agreement's provisions by January 1<sup>st</sup> 2000. However, TRIPS is not everywhere effectively implemented and the stylized facts above showed that this hampers exports from developed countries to developing countries. It also reduces FDI into the latter countries and limits the flows of royalties and license fees to the developed countries. The EU should strive for an effective protection of innovations in high threat-of-imitation markets within the WTO. In addition, violations of TRIPs should be monitored and EU-based firms should easily approach an EU office (electronically) for complaints and questions. This policy is of particular importance with growing markets in South-East Asia and China.

---

<sup>37</sup> Alvarez (2004) finds that trade shows and missions have no significant effect on exports. Bernard and Jensen (2004) conclude the same on state expenditures on export promotion. In the US. On the other hand, the World Bank (2006) concludes that export promotion agencies are very successful in generating extra exports.

### **5.3. Concluding remarks**

Some of the proposed policies have the aim to increase exports. These include export promotion policies and the strengthening of the IPR system. Other policies, such as innovation policies, have increased exports as a side effect like innovation policies and other policies to increase firm productivity.

Many of these policies are not new. In October 2006 the European Commission published its strategy for a new external trade policy. This is a framework for putting trade policy at the service of EU competitiveness. The new strategy<sup>38</sup> focuses on a multilateral trade-liberalisation agreement within the WTO, bilateral free trade agreements with key partners concentrating on market access, China, intellectual property rights, public procurement and trade defence instruments. Within the bilateral free trade agreements the Commission is aware of the importance of services trade, FDI, non-tariff barriers and other behind-the-border mechanisms.

Many policy issues have also been addressed in this paper. Considering this EU's strategy the focus seem to be on export market access abroad. Within the WTO and bilateral trade negotiations, opening up own markets will also be discussed. It is also stated by the EU that imports are necessary because supply chains are global, but as an important argument for open home markets it is mentioned that the EU can also negotiate market openness in other countries.

Of course this is true, but can open home markets not an aim in itself? This paper tentatively concludes that the benefits of openness on productivity and income stem to a large extent from imports and inward FDI. This argument is not often heard in policy circles. More (foreign) competition at the home markets implies also reallocation including firms which have to exit and employees who loose their job. These reallocation processes are at the individual level not painless. However, the overall benefits are clear: lower prices, larger variety of inputs and consumption goods, higher productivity, stimulus for innovation and better accessibility of foreign knowledge and technology. These benefits of opening up own markets further could underpin a unilateral trade and inward FDI policy. This would not only consist of eliminating remaining import tariffs but also simplifying customs procedures, reducing NTBs, opening offices and information points for potential foreign investors and

---

<sup>38</sup> [http://ec.europa.eu/trade/issues/sectoral/competitiveness/pr041006\\_en.htm](http://ec.europa.eu/trade/issues/sectoral/competitiveness/pr041006_en.htm).

importers, etc. Many of the initiatives to promote exports could also be used for stimulating imports and inward Foreign Direct Investment.

We do not want to suggest that nothing is happening in this respect. In particular, many countries are keen to attract foreign companies, but the new EU trade policy and most of the policy debate emphasize much more the relevance of expanding market access for EU exporters than increasing access to their own markets. This strategy does deliver benefits even if productivity would not increase at the firm level and well-targeted export promotion could be helpful for this aim. However, many arguments in this paper suggests that open home markets could deliver substantial benefits.

## References

- Acharya, R. and Keller, W. (2007), Technology transfer through imports, NBER Working Paper 13086.
- Aghion, P., and R. Griffith (2005), Competition and Growth: reconciling theory and evidence, MIT Press.
- Aghion, P., N. Bloom, R. Blundell, R. Griffith and P. Howitt (2005), Competition and innovation – an inverted U relationship. *Quarterly Journal of Economics*, May 2005: 701-728.
- Alvarez, R. (2004), Sources of export success in small and medium-sized enterprises: The impact of public programs, *International Business Review*, 13, 383-400.
- Alvarez, R. (2007), Explaining export success: firm characteristics and spillover effects, *World Development*, 35, 377-393.
- Anderson, J. E. and van Wincoop, E. (2004). .*Trade Costs*., *Journal of Economic Literature* 42(3): 691.751.
- Anderton, B. (1999), Innovation, product quality, variety, and trade performance: an empirical analysis of Germany and the UK, *Oxford Economic Papers*, 51, 152-167.
- Arnold, J. M. and K. Hussinger (2005), Export versus FDI in German manufacturing: firm performance and participation in international markets, Centre for European Economic Research, ZEW Discussion Papers 05-73.
- Badinger, H. (2005), Growth Effects of Economic Integration: Evidence from the EU Member States (1950-2000), *Review of World Economics* vol. 141(1), p. 50-78.
- Baldwin, R. (2000), Regulatory protectionism, developing nations and a two-tier world trade system, CEPR DP 2574.
- Baldwin, J. and Gu, W. (2004), Trade Liberalization: Export-market Participation, Productivity Growth, and Innovation, *Oxford Review Of Economic Policy*, 20, 3, 372-392.
- Bandick, R. (2004). Do Workers Benefit from Foreign Ownership? Evidence from Swedish manufacturing. FIEF Working Paper Series 2004, No 201.
- Bandick, R. (2006), Multinationals and plant survival in Swedish manufacturing, Örebro University, available from <http://www.etsg.org/ETSG2006/papers/bandick.pdf>
- Basile, R. (2001). Export behavior of Italian manufacturing firms over the nineties: the role of innovation. *Research Policy* 30(8), 1185–1201
- Barrios, S., Bertinelli, L. and Strobl, E. (2007), Exploring the link between local and global knowledge spillovers, *Knowledge for growth: Role and dynamics of corporate R&D*, Seville.
- Bellone, F., P. Musso, L. Nesta and M. Quéré (2006), the U-shaped productivity dynamics of French exporters, Working paper 2007-01, Università de Nice Sophia-Antipolis.
- Bernard, A. B., Eaton, J., Jensen, J. B. and Kortum, S. (2003a), Plants and Productivity in International Trade., *American Economic Review* 93(September): 1268.1290.
- Bernard, A. B. and Jensen, J. B. (1995), Exporters, Jobs, and Wages in US Manufacturing: 1976-87, *Brookings Papers on Economic Activity: Microeconomics*, pp. 67-119.
- Bernard, A.B. and J.B Jensen (1999), Exceptional exporter performance: cause, effect, or both? *Journal of International Economics*, 47, pp. 1-27
- Bernard, A. B. and Jensen, J. B. (2004), Why Some Firms Export, *Review of Economics and Statistics* 86(2): 561-569.
- Bernard, A. B., Jensen, J. B. and Schott, P. K. (2003b), Falling Trade Costs, Heterogeneous Firms and Industry Dynamics, Working Paper 9639, National Bureau of Economic Research.
- Bernard, A. B., Jensen, J. B. and P. K. Schott (2005), Importers, exporters, and multinationals: a portrait of firms in the US that trade goods., NBER Working Paper 11404, National Bureau of Economic Research.
- Biatour, B. and Kegels, C. (2007), R&D and the multifactor productivity growth: The role of externalities in a small European open economy, *Knowledge for growth: Role and dynamics of corporate R&D*, Seville.
- Bigsten, A., Collier, P., Dercon, S., Fafchamps, M., Gauthier, B., Gunning, J., Habarurema, J., Oostendorp, R., Pattillo, C., Soderbom, M. Teal, F. and Zeufack, A. (2000), Exports and firm-level efficiency in African manufacturing. Working Paper Series, 2000-16, Centre for the Study of African Economies.
- Cassiman, B. and Veugelers, R. (2004), Importance of international linkages for local know-how flows: Some econometric evidence from Belgium, *European Economic Review*, 48, 2, 455-476.
- Caves, R.E. (1996), Multinational enterprise and economic analysis, Second Edition, Cambridge University Press, Cambridge.

- Cie•lik, A. and M. Ryan (2004), Firm heterogeneity, foreign market entry mode and ownership choice: the case of Japanese direct investment, available at <http://www.etsg.org/ETSG2007/papers/cieslik.pdf>.
- Coe, D.T., and H. Helpman, international R&D spillovers, European Economic Review Volume 39, Issue 5, May 1995, Pages 859-887
- Coe, D., Helpman, E. and Hoffmaister, A. (1997), North-south R&D spillovers, Economic Journal, 107, 134-149.
- Corcos, G., Del Gatto, M. D., Mion, G. and Ottaviano, G. I. (2007), Productivity and Firm Selection: Intra- vs International Trade, Working Paper, CRENoS, University of Cagliari and Sassari, Sardinia.
- CPB/SCP (2008) The New neighbours, European Outlook 6, the Hague.
- CSES, (2001), Barriers to international trade in business services - final report, study commissioned by the European Union, CSES/ European Commission, Brussels.
- Crespi, G., Criscuolo, C., Haskel, J. and Slaughter, M. (2008), Productivity growth, knowledge flows, and spillovers. NBER Working Paper, 13959.
- Crespo, J., Martín, C. and Velázquez, F. (2004), The role of international technology spillovers in the economic growth of the OECD countries, Global Economy Journal, 4, 1-18.
- Damijan, J. P., Polanec, S. and J. Prasnikar (2004), Self-selection, export market heterogeneity and productivity improvements: firm level evidence from Slovenia, discussion paper 148/2004, LICOS Centre for Transition Economies, Katholieke Universiteit Leuven.
- De Loecker, J. (2007), Do exports generate higher productivity? Evidence from Slovenia, Journal of International Economics 73, 69–98.
- Del Barrio-Castro, T., López-Bazo, E. and Serrano-Domingo, G. (2002), New evidence on international R&D spillovers, human capital and productivity in the OECD, Economics Letters, 77, 41-45.
- Del Gatto, M., Mion, G. and Ottaviano, G. I. P. (2006), Trade Integration, Firm Selection and the Costs of Non-Europe”, CEPR Discussion Paper No. 5730.
- Eaton, J., Kortum, S. and Kramarz, F. (2004), Dissecting Trade: Firms, Industries, and Export Destinations., American Economic Review 94(2): 150.154.
- Eaton, J., S. Kortum and F. Kramarz (2007), An anatomy of international trade: evidence from French firms, working paper.
- Edwards, S. (1998), Openness, productivity and growth: what do we really know?, The Economic Journal 108 (March), p. 383-398.
- Engelbrecht, H. (1997), International R&D spillovers, human capital and productivity in the OECD economies: An empirical investigation, European Economic Review, 41, 1479-1488.
- Feenstra, R.C. (2004), Advanced International Trade: theory and evidence, Princeton University Press.
- Frankel, J. and A. Rose (2002), An Estimate of the Effect of Common Currencies on Trade and Income, Quarterly Journal of Economics 117(2), p. 437-66.
- Frankel, J. A. and D. Romer (1999), Does Trade Cause Growth, American Economic Review 89(3), p. 379-399.
- Frantzen, D. (2002), Intersectoral and international R&D knowledge spillovers and total factor productivity, Scottish Journal of Political Economy, 49, 3, 280-303.
- Gallup Organization , 2007, Observatory of European SMEs, Flash Eurobarometer Series no. 196.
- Ginarte, J. and Park, W. (1997), Determinants of patent rights: A cross-national study, Research Policy, 26, 3, 283-301.
- Girma, S., R. Kneller and M. Pisu, 2005, Export versus FDI: an empirical test, Weltwirtschaftliches Archiv, 12, pp. 855-66
- Girma, S., Kneller, R. and M. Pisu, 2007, Do exporters have anything to learn from foreign multinationals? European Economic Review, vol. 51, page 981-998.
- Gleeson and Ruane (2007), Irish manufacturing export dynamics: evidence of exporter heterogeneity in boom and slump periods, Review of World Economics, 143, 2, 355-388.
- Görg, H., Henry, M. and Strobl, E. (2008), Grant support and exporting activity: Evidence from Irish manufacturing, Review of Economics and Statistics, 90, 1, 168-174.
- Greenaway, D. and Kneller, R. (2007), Firm heterogeneity, exporting and foreign direct investment, Economic Journal, 117, 517, F134-F161.
- Guellec, D. and van Pottelsberghe, B. (2001a), R&D and productivity growth: Panel data analysis of 16 OECD countries, OECD Science, Technology and Industry Working Papers, 3.

- Guellec, D. and van Pottelsberghe, B. (2001b), The internationalization of technology analysis with patent data, *Research Policy*, 30, 1253-1266.
- Guellec, D. and van Pottelsberghe, B. (2004), From R&D to productivity growth: Do institutional setting and the source of funds of R&D matter?, *Oxford Bulletin of Economics and Statistics*, 66, 353-378.
- Hansson, P. and N. Nan Lundin (2004), Exports as an indicator on or promoter of successful Swedish manufacturing firms in the 1990s. *Review of World Economics*, 140, 3, 415–45, 2004.
- Hamilton, D. and J.P. Quinlan (2007), Sleeping giant; awakening the transatlantic services economy, center for transatlantic relations.
- Harris, R. I. D. and Q. Li (2007), Firm level empirical study of the contribution of exporting to UK productivity growth. Report to UK trade and investment, available at <http://www.uktradeinvest.gov.uk/UKTI/fileDownload/FAMEFinalReport2007v2.pdf?cid=401169>
- Helpman, E., M. Melitz and S. Yeaple (2004), Export versus FDI with heterogeneous firms, *American Economic Review*, 94(1), pp. 300-316.
- Helpman, E., M. Melitz and Y. Rubinstein (2007), Trading partners and trading volumes, *NBER Working Paper* 12927.
- International Study Group on Exports and Productivity (2007). Exports and Productivity – Comparable Evidence for 14 Countries, ZEW Discussion Paper 07-069, ZEW Centre for European Economic Research.
- Irwin, D. and Tervio, M. (2002), Does trade raise income?: Evidence from the twentieth century, *Journal of International Economics*, 58, 1-18.
- Kao, C., Chiang, M. and Chen B; (1999), International R&D spillovers: an application of estimation and inference in panel cointegration, *Oxford Bulletin of Economics and Statistics*, 61, s1, 691-709.
- Keller, W. (1998), Are international R&D spillovers trade-related? Analyzing spillovers among randomly matched trade partners, *European Economic Review*, 42, 1469-1481.
- Keller, W. (2002), Trade and the transmission of technology, *Journal of Economic Growth*, 7, 5-24.
- Keller, W. (2004), International technology diffusion, *Journal of Economic Literature*, XLII, 752-782.
- Kneller, R. and Pisu, M. (2007), Export Barriers: What Are They and Who Do They Matter To?, *Research Paper* 2007/12, University of Nottingham.
- Kneller, R., Pisu, M. and Yu, Z. (2008), Overseas Trading Costs and Firm Export Performance, *Canadian Journal of Economics* 41(2): 639-669.
- Kox, H. and A. Lejour (2005), Regulatory heterogeneity als obstacle for international services trade, *Discussion Paper* 49, CPB, The Hague.
- Kraay, A. (1999), Exportations et performances économiques: Etude d'un panel d'entreprises chinoises. *Revue d'Economie du Développement* 0, 183-207.
- Lelarge, C. and Nefussi, B. (2007), Exposure to Low-wage competition, activity changes and quality upgrading: An empirical assessment, *Knowledge for growth: Role and dynamics of corporate R&D*, Seville.
- Levine, R., and D. Renelt (1992), A sensitivity analysis of cross-country growth, *American Economic Review* 82, 942-963.
- Lewer, J., and H. Van den Berg, (2003), How large is international's trade effect on economic growth? *Journal of Economic Surveys* 17(3), p. 363-396.
- Lichtenberg, F. and van Pottelsberghe, B. (1998), International R&D spillovers: A comment, *European Economic Review*, 42, 1483-1491.
- Lopez R.A., 2005, Trade and growth: reconciling the macroeconomic and microeconomic evidence, *journal of Economic surveys* 19(4), p. 623-648.
- Lumenga-Neso, O., Olarreaga, M. and Schiff, M. (2005), On ‘indirect’ trade-related R&D spillovers, *European Economic Review*, 49, 1785-1798.
- Maican, F. (2007), Productivity dynamics, R&D, and competitive pressure, *Knowledge for growth: Role and dynamics of corporate R&D*, Seville.
- Markusen J. (2002), *Multinational Firms and the Theory of International Trade*, MIT Press, Cambridge (Mass.).
- Maskus, K. (2000), Intellectual property rights in the global economy, Institute for International Economics, Washington, DC.
- Maskus, K. and Penubarti, M. (1995), How trade-related are intellectual property rights?, *Journal of International Economics*, 39, 227-248.

- Mayer, T. and G. Ottaviano (2007), The Happy Few. the internationalisation of European Firms Bruegel blueprint series Vol III. Brussels.
- Melitz, M.J. (2003), The impact of trade on intra-industry reallocations and aggregate industry productivity, *Econometrica*, 71(6), pp. 1695-1725.
- Melitz, M. J. and Ottaviano, G. I. P. (2008). Market Size, Trade, and Productivity., *Review of Economic Studies* 75(1): 295.316.
- Muûls, M. and M. Pisu (2007), Imports and exports at the level of the firm: evidence from Belgium, CEP Discussion Papers dp0801, Centre for Economic Performance, LSE
- Nordas, H., Miroudot, S and Kowalski, P. (2006), Dynamic gains from trade, OECD Trade Policy Working Paper 43.
- OECD (2007), Staying competitive in the global economy: Moving up the value chain, OECD, Paris.
- Papaconstantinou, G., Sakurai, N., Wycoff, A., Fagerberg, J. and Ioannidis, E. (1995), Technology diffusion and international competitiveness, Report for DG 13, European Commission, Brussels.
- Rodriguez, V. (2003), Stimuli to adopt and enforce patent systems in Argentina and Canada in the multilateral trade framework, *Journal of World Intellectual Property*, 6, 3, 507-523.
- Rodriguez, V., C. Montalvo, and . van der Zee (2008), On productivity and openness: innovation and knowledge spillovers as transmission channels, background report for Competitiveness report 2008.
- Rodriguez, F. and Rodrik, D. (2001), Trade policy and economic growth: A skeptic's guide to the cross-national evidence, in B. Bernanke and K. Rogoff (Eds.), *NBER Macroeconomics Annual 2000*, MIT Press, Cambridge, MA.
- Rojas-Romagosa, H. (2008), Trade barriers and productivity: Empirical evidence from firm-level data, mimeo.
- Serti, F., Tomasi, C. and A. Zanfei (2007), Exporters, importers and two-way traders: the links between internationalization, skills and wages. Working Papers 0713, University of Urbino Carlo Bo, Department of Economics, revised Oct 2007.
- Serti F. and C. Tomasi (2007), Self selection and post-entry effects of exports, evidence from Italian manufacturing firms, available from [http://www.freit.org/EITI/2008/SubmittedPapers/94Chiara\\_Tomasi.pdf](http://www.freit.org/EITI/2008/SubmittedPapers/94Chiara_Tomasi.pdf)
- Sieber, S. and M. Silva Porto (2007), Chapter 10 Openness and barriers to trade, mimeo.
- Smith, P. (1999), Are weak patent rights a barrier to US exports?, *Journal of International Economics*, 48, 151-177.
- Tybout, J., De Melo and Corbo (1991), The effects of trade reforms on scale and technical efficiency, *Journal of International Economics* 31(3-4).
- Tybout, J. (2001), Plant- and firm-level evidence on "new" trade theories, *NBER Working Paper* 8418.
- van Pottelsbergh, B. and Lichtenberg, F. (2001), Does investment transfer technology across borders?, *Review of Economics and Statistics*, 83, 490-497.
- Wacziarg, R. and K. Horn Welch (2003), Trade liberalisation and growth, *NBER working paper* 10152.
- Wagner, J. (2007), Exports and productivity: A survey of the evidence from firm-level data, *World Economy* 30(1): 60-82.
- Wakelin K. (1998), The role of innovation in bilateral OECD trade performance, *Applied Economics*, 30, 10, 1335-1346.
- World Bank, 2006, Exporter promotion agencies; what works and what does not, *Trade Note* 30, Washington.
- WTO (2007), *World Trade Report 2007*, Geneva.
- Yang, G. and Maskus, K. (2001), Intellectual property rights and licensing: An econometric investigation, *Review of World Economics*, 137, 1, 58-79.
- Yeaple, S. (2005), Firm heterogeneity, international trade and wages, *Journal of International Economics* 65: 1-20.