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Trade barriers and productivity: Empirical evidence from firm-level data

We combine our empirical results obtained from a firm-level database for European countries: The Observatory of European SMEs, with the latest findings in the heterogeneous firm literature. The aim is to obtain empirical linkages between trade costs, export activities and productivity. In line with previous studies, we find that traditional trade policy barriers, such as import tariffs and NTBs are not the main trade barriers faced by European exporters. Instead, lack of foreign market information and networks, as well as within-country regulations are the main trade barriers. For the European Union, we find that a common currency, expanding the single market and eliminating border controls are all perceived as important or very important by a majority of firms; but the possibility to hire workers from other EU countries is not. Being an exporter or having a higher proportion of imported inputs increases the probability that these internal market policies are considered beneficial. On the other hand, firms with higher labour productivity decreases the probability of considering these policies relevant, while the size of the firm does not explain differences in these internal market perceptions.

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1 Introduction

In this paper we combine our empirical results obtained from a firm-level database for European countries: The Observatory of European SMEs, with the latest findings in the heterogeneous firm literature. The aim is to obtain empirical linkages between trade costs, export activities and productivity.

It is extremely difficult to estimate direct quantitative linkages between trade costs and productivity gains. This is the result of two main constraints. First, firm-level databases are not publicly available. Second, trade barriers are numerous, complex and difficult to estimate. However, using micro-data sets on the perception of trade barriers by individual firms, we obtain a qualitative assessment of the main trade barriers and the relations between these trade constraint perceptions with particular firm characteristics, such as export and import activities, size, economic sector and productivity.

There is massive empirical evidence that open economies are richer and more productive than closed economies. In an overview of studies to the income effects of openness Lewer and van den Berg (2003) found that a 1% increase in the growth of exports increases the growth rate of the economy by 0.2%. These macroeconomic results are a compound of several mechanisms. Even when the theoretical channels between openness and productivity are well established (e.g. reallocation of resources, pro-competitive effects, economies of scale, larger product an input variety, increased innovation, knowledge spillovers), the quantitative importance of each mechanism is less clear. Moreover, the recent findings of the heterogeneous firm literature point to average sectoral productivity gains associated with trade cost reductions. This is a theoretical finding that has empirical support in the firm-level data, but the quantitative linkage between trade cost reductions and the productivity gains is harder to obtain.

To assess these linkages, this paper surveys the recent literature that uses micro-data sets and then, presents our own empirical estimations using the Observatory of European SMEs firm-level survey. Kneller and Pisu (2007) use a similar dataset for the UK, where they can identify perceptions on trade barriers. However, to the best of our knowledge, Observatory of European SMEs is the only multi-country dataset that combines firm-level variables with information on trade constraints and EU policy perceptions.

The identification and quantification of the main trade barriers has clear policy implications. For policy makers it is important to know which trade-hampering factors are most relevant, which can be in fact changed by policy instruments, and what are the potential benefits these instruments may have.

In line with previous studies, we find that traditional trade-policy barriers, such as import tariffs and NTBs are not the main trade barriers faced by European exporters. Instead, lack of

foreign market information and networks, as well as within-country regulations are the main trade barriers. However, it is hard to find a relation between perceiving an export constraint as "important" and firm characteristics. Only when the main export destination is within the EU, can we find some different perceptions in the present dataset. For the European Union, we find that having the same currency, expanding the single market and eliminating border controls are all perceived as "important" and "very important" by a majority of firms. Moreover, these positive perceptions are significantly related to the export activity and the proportion of imported inputs used by the firm. On the other hand, firms with higher labour productivity find these internal market policies less relevant, while the size of the firm does not have a significant influence on these perceptions. Finally, the possibility to hire workers from other EU countries is not perceived as important by most European firms.

This paper is organized as follows. In section 2 we give a short overview of the heterogeneous firm literature. Section 3 presents a survey on the firm-level studies that link trade costs and productivity. We then present our own empirical findings in section 4 and conclude in section 5.

2 Overview of the heterogeneous firm literature

The trade literature on heterogeneous firms started with the stylised facts for US firms reported by Bernard and Jensen (1995, 1999). These authors looked into microeconomic firm-level data for the US and found significant productivity differentials between exporting and non-exporting firms. Moreover, not only were export firms more productive, they were also bigger (in terms of sales, value-added, and employment), more capital intensive and paid higher wages. These differentials are referred to as "exporter premia", i.e. exporting firms have –on average– higher values for some key economic indicators. The most mentioned is the export productivity premia, defined as the higher labour productivity or TFP that characterises firms that export.

Subsequent papers used similar firm-level databases for other countries and consistently found the same results. Wagner (2007) surveys the results for 45 studies in 33 countries and concludes that exporters are more productive than non-exporters. The latest papers also look into the productivity of MNEs and found that MNEs are even more productive than non-MNE exporting firms. In addition, recent studies also found that importers are also more productive than non-importers (see for example, Muûls and Pisu, 2007).

A series of papers using micro datasets for the US, France and Slovenia 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. To obtain such conclusions, the firm-level databases have to be combined with international trade transactions data.

However, trade transactions at the firm level are hard to obtain and only few countries have been studied. Bernard et al. (2005) analyse the US case from 1993 to 2000.¹ Eaton et al. (2004) use French data from 1986 and find the same pattern of concentration of many firms exporting to few countries and few large firms exporting to many destinations and providing the largest share of export value.

Damijan et al. (2004) provides evidence on the Slovenian case for the period 1994-2002. In addition, they find that the incursion of firms into new markets is gradual, on average Slovenian firms export to a new market every two year. Moreover, expansion path follows gravity model predictions, i.e. geography (proximity) and size (GDP) condition where exporting firms expand their foreign sales. In the case of Slovenia this meant exporting first to countries of Ex-Yugoslavia, other emerging economies in Europe and then western market. 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).

¹ They also have MNEs transactions available, divided by intra-firm and external trade transactions.

Table 2.1 taken from Mayer and Ottaviano (2007), summarizes the high concentration of the export value in a small percentage of firms, i.e. the happy few.

Table 2.1 Share of exports for top exporters in 2003, total manufacturing

Country of origin	Top 1%	Top 5%	Top 10%
Germany	59	81	90
France	44	73	84
United Kingdom	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 limitation to analyse these micro transmission channels is that firm-level databases are not publicly available and thus, it is not possible to conduct cross-country studies. In an attempt to overcome this problem, the International Study Group on Exports and Productivity (2007) has joined teams from 14 countries to conduct comparable cross-country analysis. They report the same broad results specified before, and with a meta-analysis they find that more open countries, with more effective government, report higher productivity premia. Of the 14 countries, 11 are EU members (i.e. Austria, Belgium, Denmark, France, Germany, Ireland, Italy, Slovenia, Spain, Sweden and the UK).²

Two hypotheses have been formulated to explain the export productivity premia. The first hypothesis is self-selection. There are significant barriers to export (usually as sunk costs) and only the most productive firms can overcome these trade costs and become exporters. The second hypothesis is learning-by-exporting. Firms that engage in international trade become more productive after they begin to export. It is important to note that these are not competing hypothesis. A remarkable conclusion of the literature, which is surveyed by Wagner (2007), is that there is strong evidence to support the self-selection hypothesis, but weak evidence on learning-by-exporting.

To explain the empirical relevance of the self-selection hypothesis, Melitz (2003) introduced firm-heterogeneity in a theoretical trade 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

² CPB has joined the ISGEP group and in a forthcoming study, uses the same methodology to compare results with other countries using firm and plant-level data for the Netherlands.

firms expand and low-productivity firms exit the market. The outcome is an aggregate increase in productivity. Other recent theoretical models have followed and extended the results by Melitz, e.g. Bernard et al. (2003a), Yeaple (2005), and Melitz and Ottaviano (2008).

Some empirical papers use the past export status of a firm to estimate the probability of exporting. This is an indirect way of assessing the importance of fixed entry costs for exporting firms. Bernard and Jensen (2004) find that firms currently exporting have a 39% higher probability to continue exporting. The main implications of this paper, however, are policy oriented. Their econometric results find no geographic or industry spillovers from exporting firms and moreover, they conclude that US states export promotion has no effect on the probability of a firm to export.³ These findings, supported by the work of Kneller and Pisu (2007), point to another stylised fact, that firms "learn to export". In other words, the export experience of firms helps to reduced the sunk costs of exporting.⁴

³ However, in their firm-level dataset mostly large firms are represented and this conditions their results, since export promotion is usually focused to help small and medium firms.

⁴ However, this does not imply that firms become more productive with exporting experience. Thus, this is a separated finding from the learning-by-exporting hypothesis.

3 Empirical linkages between trade costs and productivity

Although the theoretical relation between trade costs and average productivity is well studied, the empirical links have been barely quantified. However, by linking overall openness to trade costs, it is possible to obtain a transmission mechanism between openness and productivity. There are two main approaches in the literature to assess the impact of trade costs on average productivity:

- Combining gravity estimations of trade costs with calibrated firm-level models and data.
- Direct micro-level information on trade costs and other hampering factors to export

Before analysing these empirical approaches, we first survey the literature that has analysed and quantified trade costs.

3.1 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. 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 construct and estimate a 170% ad-valorem tax equivalent of all trade costs for a developed country. This total amount can roughly be divided into 21% transport costs, 44% border costs and 55% retail and wholesale distribution costs. One of the main conclusions of their survey is that policy-related costs (i.e. tariffs and NTBs⁵) are only 8% of the 44% border costs, while non-policy border barriers such as language (7%), currency (14%), information costs (6%) and security barriers (3%), are much more important. This reflects that direct trade policy instruments are less important than other policies in developed countries, such as within-country regulations, informational institutions, language, law enforcement and related property-rights institutions. However, they also find that these overall trade costs vary much between goods and countries. Thus, these ad-valorem estimates are only a rough guide into the relative importance of the different trade costs involved. The main conclusions of this paper are that trade costs are large and economically significant, while tariffs and NTBs account only for a small fraction of these costs.

⁵ NTBs may also have a fixed/sunk component.

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 a new variety into a market, meeting country-specific standards and regulations, establishing a brand name, setup-up distribution channels, and the information costs related to marketing and policy regulations. These sunk costs also include institutional settings, such as economic and political uncertainty, administrative and tax procedures, insurance liabilities and bank accounts, among others. Using the categories of Anderson and Van Wincoop (2004), these fixed trade costs are mainly included within information costs, security barriers and retail and wholesale distribution costs.

3.2 Combining gravity estimations of trade costs with calibrated heterogeneous firms models

Firm-level databases usually do not have information on trade costs.⁶ Thus, it is not possible to make a direct assessment of the productivity impact of trade cost changes. However, some papers have estimated trade costs at the macro level using gravity models and integrated them into firm-level datasets to assess the effects of trade policy on aggregate productivity. Following the predictions of the theoretical firm-heterogeneity models, aggregate productivity will increase due to within-industry reallocations associated with decreasing trade costs. As these costs fall, two effects are present. First, increased foreign competition in the local market results in the exit of low-productivity firms. Secondly, firms that currently were not exporting will begin to export while currently exporting firms will increase their foreign sales. Finally, it is important to note that aggregate productivity increases are 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 that used 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 faster in sectors with decreasing trade costs. However, productivity changes are not affected equally for all industries. The largest growth is present in industries with high levels of imports. This results points to the importance of pro-competitive effects of reduced trade costs. Moreover,

⁶ To the best of our knowledge, the only exceptions are Kneller and Pisu (2007) and the Gallup Organization (2007) which we discuss below.

Bernard et al. (2003b) 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 margin⁷ changes has a greater role in the reallocation process than the intensive-margin changes. These results are confirmed by the study of Helpman et al. (2007).

In the case of the EU, Del Gatto, Ottaviano and coauthors have also used macro-level trade costs and calibrated heterogeneous firms models to assess the impact of trade policy on productivity. These papers calibrate the theoretical model by Melitz and Ottaviano (2008) using two datasets. 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. The theoretical model includes firm heterogeneity, trade and monopolistic competition with different product varieties.

In their first paper, Del Gatto et al. (2007) run two separate simulations. First, when they assume that there is no bilateral trade within the EU (i.e. the costs of non-Europe) they estimate that average productivity is reduced by 13%. Secondly, when trade barriers are reduced by 5%, they estimate a productivity increase of 2%. These figures point to significant gains from trade, although the trade barriers decrease can be obtained by other means than direct trade policy.

In a subsequent paper, Corcos et al. (2007) extend their previous analysis to disaggregate France into 23 regions, in combination with the other 10 EU countries. Once the model is calibrated, they run three simulations: costs of non-Europe (no international trade in the EU), costs of non-France (no intra-regional trade in France) and United Europe, where they completely eliminate the behind the border (BTB) costs obtained from the gravity estimations. They find that the costs of "non-Europe" (i.e. no trade between EU countries) is a loss in average productivity of around 12%. Eliminating BTB costs reduces trade costs by an additional 34%, resulting in an average productivity gain of 20%. There is considerable heterogeneity across countries (from 1% in Portugal to 60% in Germany).⁸ It is important to note that 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 reduction of BTB costs is not practically possible, and in any case, there is still debate on how border effects can be interpreted.⁹

Kneller et al. (2008) use a data set of UK manufacturing firms and confirm the previous gravity model findings: hostile business environments in foreign countries represent greater trade barriers than those related to traditional measures of trade costs such as tariffs. Controlling

⁷ The extensive margin refers to the number of firms exporting, while intensive margin is the volume of exports by firm.

⁸ These large country differences are due to country size and level of integration within the EU.

⁹ In particular, there are doubts if this methodology is appropriate to identify sunk trade costs.

for firm and industry level covariates they find that improvement in the business environment of foreign countries led to an increase in the export intensity of established exporters rather than additional export market entry, and multinationals responded disproportionately to these changes. It is important to notice that their results are driven by the EU component of the index.

3.3 Direct micro-level information on trade barriers

The first attempt to use direct trade barriers information from firm-level data was provided by Kneller and Pisu (2007). They use new survey data for the UK to investigate the relative magnitude of trade costs, measured as the barriers to exporting encountered by firms. They have information at the firm-level on the perceived importance of each barrier to trade. In addition, there is also information about the intention of the firm to export and the actual export status.

Table 3.1 reproduces the percentage of firms considering a certain issue as a barrier to export.

Table 3.1 Barriers to Exporting

Barrier	Percentage of firms identifying this as a barrier
Group 1: Networks and marketing	
Obtaining basic information about an export market	29.8
Identifying who to make contact with in the first instance	53.7
Building relationships with key influencers or decision-makers	43.5
Establishing an initial dialogue with prospective customers or business partners	42.8
The marketing costs associated with doing business in an overseas market	51.3
Group 2: Procedural en exchange rates	
Dealing with legal, financial and tax regulations and standards overseas	42.2
Logistical problems	35.0
Exchange rates an foreign currency	41.7
Group 3: Cultural	
Language barriers	36.5
Cultural differences (not language)	32.4
Not having an office or site in an export market	37.2
A bias or preference on the part of overseas customers for doing business with firms established in their own country	45.2

Source: Kneller and Pisu (2007)

In many cases these impediments to export reported by firms offer a close comparison to the barriers identified using gravity equations. These results are in line with the estimations of Anderson and Van Wincoop (2004), who conclude that trade costs are significantly large and are

associated with imperfect information, different languages and currencies, law enforcement and property rights, and regulation. Moreover, Kneller and Pisu (2007) also find 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. Therefore, sunk costs are significant and play an important role in the decision to export by firms. As mentioned before, this suggests a "learning-to-export" process where exporting firms overcome or reduce sunk costs over the years.

Combining the results of the trade costs literature with the exporting firm pattern and its expansion path (first close trading partners and then broader markets) there are important implications for the EU trade policy. Since direct trade policy costs (i.e. tariffs) within the EU are almost zero and most of the current exports –and future exports for smaller firms–, are within the EU. Trade policy can only concentrate in reducing behind-the-border costs. This will require a deepening of the internal market, mutual recognition of national regulations, and/or a harmonization of regulations and the institutional settings within the member states. In order of importance (given trade volumes) the second emphasis of EU trade policy should be in countries bordering the EU and other OECD countries, where again, import tariffs and duties are less important than other border and internal distribution costs. Finally, the reduction of tariffs and NTBs with the rest of the world can significantly reduce the trade costs for exports to the rest of worldwide destinations, for which the EU has relatively lower trade volumes, but which can expand in the future.

4 Empirical findings using the Observatory of European SMEs survey

In this section we use the firm-level survey "Observatory of European SMEs" (Gallup Organization, 2007) to analyse the characteristics of exporting firms and the hampering factors to trade.

Despite its name, the survey is representative of the firm population for all size classes (i.e. not only SMEs, but also large firms) for each EU member state, Iceland, Norway and Turkey. A distinctive feature of this survey is that it provides firm-level data for a broad group of countries.

There are 17,283 firms sampled and there is information on number of employees, sales, exports, main export destination country, and percentage of imported inputs, among other data. Unlike most firm-level datasets, the Observatory of European SMEs has data for only two years: 2005 and 2006. Hence, we cannot conduct time-series analysis, nor test the self-selection and learning by exporting hypothesis.

However, there is data on firm's export activities, labour productivity (sales/employees) and export intensity (exports/sales). In addition, the survey has information on constraints to exporting and the importance of the EU internal market for European firms. With this information it is possible to estimate hampering factors to trade and the potential impact of some policy instruments.

In Table 4.1 we present the distribution of exporting and non-exporting firms by employment size class and industry (by NACE code). There are 2,044 exporting firms in the sample. However, almost 30% of the total firm observations lack information on exports. Thus, for these firms we are unable to identify exporter, and this is an important limitation of this survey.¹⁰ By sector we find that 44% of exporting firms are in the manufacturing sector, while the services sector has export participation rates of less than 20%. By size class larger firms have higher participation rates, while less than 10% of small firms (with 9 employees or less) export.

From Table 4.2 we observe that firm coverage is representative of country size. In accordance, we also find relatively low export participation rates (number of exporting firms/total firms). The average is 18.9% while international studies find significantly higher values of around 70% for EU countries (International Study Group on Exports and Productivity, 2007).

¹⁰ We do not use these data in our regressions. In addition, the missing information on exports is not evenly distributed between countries. New member states have much higher percentages of missing observations than old member states.

Table 4.1 Exporting and non-exporting firms by sector and size class, 2005

Sectors, by NACE code	Non-exporter	Exporter	Export status not available	Total firms	Sectoral %	Export participation rate
Manufacturing	1,176	932	1,012	3,120	18.1	44.2
Construction	1,504	117	471	2,092	12.1	7.2
Wholesale and retail	2,226	488	1,048	3,762	21.8	18.0
Hotels and restaurants	995	42	337	1,374	7.9	4.1
Transport and communication	629	129	381	1,139	6.6	17.0
Financial intermediation	723	54	257	1,034	6.0	6.9
Real estate and business activities	1,716	231	746	2,693	15.6	11.9
Health and social work	734	18	280	1,032	6.0	2.4
Other social and personal service	711	33	293	1,037	6.0	4.4
Total	10,414	2,044	4,825	17,283	100.0	12.9
Size class, by number of employees						
1 to 9	5,522	503	2,372	8,397	48.6	8.3
10 to 49	2,588	576	1,257	4,421	25.6	18.2
50 to 249	1,341	663	679	2,683	15.5	33.1
250 or more	449	271	185	905	5.2	37.6
DK/NA	514	31	332	877	5.1	5.7
Total	10,414	2,044	4,825	17,283	100.0	20.6

The export participation rate is the ratio of exporting firms to total firms. DK/NA: Don't know/not available.

Source: Observatory of European SMEs and own estimations.

4.1 Export productivity premia

Following the empirical literature on firm heterogeneity we run OLS regressions on labour productivity using export characteristics as explanatory variables (see for example, International Study Group on Exports and Productivity, 2007). First, we use a dummy variable to identify exporting firms and then, the export intensity ratio.¹¹ For both specifications we use country, sectoral and size class dummies as control variables. The estimating equation is then:

$$LP_i = \alpha + \beta X_i + \gamma C + \varepsilon_i \quad (4.1)$$

where LP_i is labour productivity of firm i defined as total sales per employee, X is either the

¹¹ This is defined as the ratio of export to total sales.

Table 4.2 Exporting and non-exporting firms by country, 2005

Country name	Non-exporter	Exporter	Export status not available	Total firms	Country %	Export participation rate
Belgium	283	88	145	516	3.0	23.7
Czech Republic	196	47	267	510	3.0	19.3
Denmark	219	82	200	501	2.9	27.2
Germany	733	114	88	935	5.4	13.5
Estonia	75	41	186	302	1.7	35.3
Greece	373	96	54	523	3.0	20.5
Spain	781	37	136	954	5.5	4.5
France	665	77	169	911	5.3	10.4
Ireland	482	92	26	600	3.5	16.0
Italy	698	97	114	909	5.3	12.2
Cyprus	191	12	97	300	1.7	5.9
Latvia	117	16	175	308	1.8	12.0
Lithuania	170	42	93	305	1.8	19.8
Luxembourg	200	29	98	327	1.9	12.7
Hungary	185	49	283	517	3.0	20.9
Malta	173	22	112	307	1.8	11.3
Netherlands	407	73	124	604	3.5	15.2
Austria	360	132	119	611	3.5	26.8
Poland	484	68	353	905	5.2	12.3
Portugal	363	85	81	529	3.1	19.0
Slovenia	44	52	210	306	1.8	54.2
Slovakia	156	51	293	500	2.9	24.6
Finland	320	147	38	505	2.9	31.5
Sweden	297	115	95	507	2.9	27.9
United Kingdom	699	91	117	907	5.2	11.5
Bulgaria	257	28	229	514	3.0	9.8
Romania	640	55	225	920	5.3	7.9
Turkey	391	59	497	947	5.5	13.1
Norway	286	95	120	501	2.9	24.9
Iceland	169	52	81	302	1.7	23.5
Total	10,414	2,044	4,825	17,283	100.0	18.9

The export participation rate is the ratio of exporting firms to total firms.

Source: Observatory of European SMEs and own estimations.

exporter identifier or the export intensity ratio, and \mathbf{C} is the vector of control variables, which include country, sector and size. The productivity premia is defined as: $(exp(\beta) - 1) * 100$.

In Table 4.3 we show that the labour productivity premia for exporters is positive and highly significant for both years. Using a similar econometric specification, 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). The tables for these export premia are presented in the Appendix.

Table 4.3 Export productivity premia OLS regressions

	2005		2006	
	Export dummy	Export intensity	Export dummy	Export intensity
Export variable (β)	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.

Finally, we also have information on the percentage of sales generated by new or significantly improved products or services for each firm. This percentage can be used as an indicator of the firm's innovation efforts. Since most firm-based datasets do not have information on innovation, we run again the same econometric specification to quantify if there is an export innovation premia. Table 4.4 shows the econometric results, where there is a very sizeable and significant innovation premia. Using the export dummy variable, we find that exporters are more innovative and have 5 times more sales of new or improved products. When export intensity is applied the innovation premia is even higher.¹²

4.2 Barriers to exporting

The survey also asks each firm about the main constraint to exporting. Nine export barriers are identified. In Table 4.5 we show the percentage of firms classifying a category as the main trade hampering factor.¹³

Since the question is constructed to obtain a single answer, choosing a specific constraint as

¹² In addition, we also find that our innovation indicator is positively related to the export status and the proportion of imported inputs, after controlling for country, firm size and sector. However, the causal relation is difficult to disentangle in this case.

¹³ However, this information has been provided only by 1,716 exporting firms. Thus, we cannot identify the export constraints for non-exporting firms. This also explain why the most common answer is "no constraints at all", with 36% of the observations.

Table 4.4 Export innovation premia OLS regressions

	2005		2006	
	Export dummy	Export intensity	Export dummy	Export intensity
Export variable (β)	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.

Table 4.5 Main constraint to export by employment size class

Main constraint to export	Frequency	Percent	% by size class			
			1 to 9	10 to 49	50 to 249	250 or more
Import tariffs and duties	136	7.9	7.5	9.2	7.5	8.1
Lack of knowledge of foreign markets	194	11.3	15.5	11.5	10.9	5.2
Lack of management resources	82	4.8	5.6	4.7	4.8	3.6
Language problems	51	3.0	3.1	4.3	2.9	0.8
Different regulation in EU countries	122	7.1	5.6	8.3	6.6	7.7
Regulations in non-EU countries	120	7.0	4.6	7.7	7.2	8.5
Lack of capital	109	6.4	8.9	6.0	5.5	4.8
No constraints at all	621	36.2	35.0	33.5	38.8	38.3
Product / service not suited to export	42	2.5	2.4	3.2	2.0	2.4
DK/NA	239	13.9	11.8	11.7	13.8	20.6
Total	1,716	100.0	100.0	100.0	100.0	100.0

Size classes are given by the number of employees. DK/NA: Don't know/not available.

Source: Observatory of European SMEs and own estimations.

the most important does not mean that other constraints are relevant for the export decisions of the firm.¹⁴ However, the question does provide a ranking of the export constraints faced by European firms. Thus, we find that the main trade hampering factor is the lack of knowledge of foreign markets, followed by import tariffs, and EU and non-EU regulations.

When we classify the constraints by employment size class in Table 4.5, we find that there are some differences in the importance of each constraint. In particular, the lack of knowledge of foreign markets is more important for smaller than for larger firms. This is also true for language

¹⁴ Without these data we cannot estimate trade costs as done in Kneller and Pisu (2007).

problems and lack of capital. On the other hand, EU and non-EU regulations are more important for larger firms. Finally, import tariffs have a similar importance across size groups.

In Table 4.6 we classify the answers by NACE sector. Here we find more heterogeneity in the importance of each constraint. For example, 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 are the main export constraint, while non-EU regulations are the most important export constraints for health and social work, and other services.

Table 4.6 Main constraint to export by NACE sector code

Main constraint to export	% by sector								
	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 markets	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 or 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	100.0	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.

DK/NA: Don't know/not available.

Source: Observatory of European SMEs and own estimations.

We have also classified each constraint by country. However, the low representativeness of the new member states is not satisfactory and we do not present these results here.

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, specially 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.

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 4.7 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. On the other hand, export intensity increases the probability of finding lack of capital and no constraints as more relevant.

Belonging to the EU increases the probability of finding lack of management resources as the main export constraint. Being a new member state is not significant for any export constraint. The determinant that is significant for most export barriers is the location of the main export destination. When it is within the EU27, this increases the probability of finding lack of knowledge of foreign markets, different EU regulations, and no constraint at all, as the main export barriers. On the other hand, it decreases the probability of qualifying tariffs and duties, and regulations in non-EU countries as the main export constraint. 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.

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

¹⁵ We also used the percentage of sales from foreign subsidiaries and joint ventures with respect to total sales, as well as the percentage of imported inputs. However, both variables were not significant in any specification.

Table 4.7 Logit regressions for each export barrier

	Export barrier 1	Export barrier 2	Export barrier 3	Export barrier 4	Export barrier 5	Export barrier 6	Export barrier 7	Export 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	1,203	1,244	1,244	1,114	1,239	1,244	1,239	1,244

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.

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. However, this was also the conclusion found by Kneller and Pisu (2007).

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.

An interesting result is that some firm-specific characteristics (e.g. skill levels of the employees, employment levels and labour productivity) can alter the probability of considering a particular export constraints as important. Although there are few cases where this happens, it

does suggest that specific exporter premia in size, productivity and skills can be important to overcome certain trade costs.

4.3 Perceptions on the EU internal market

Firms were also asked to determine the level of importance of five different EU internal market policies in their ability to do business within the EU27:

- Elimination of border control
- Same currency in most member states
- Hire workers from other member states
- Expand single market legislation including harmonised technical standards

In addition, a question was formulated about the importance for each firm of replacing national regulations with EU standards. In Table 4.8 we present the number of respondents to each question by order of importance and by the export status. As expected, eliminating border controls, having the same currency, single market harmonisation and EU standards all are perceived as more important by exporting firms than for non-exporting firms. On the other hand, hiring worker from other EU countries is perceived as more important for non-exporting enterprises.

We define approval percentages as the number of firms that consider each policy as very important and/or rather important, against those firms that consider them to be not important at all and/or rather not important. Using these approval percentages we can then rank each of the four internal market policies as follows:

1. Same currency in most member states: 71%
2. Single market legislation: 69%
3. No border controls: 59%
4. Hire workers from other EU countries: 40%

Therefore, except for hiring other EU workers, the other three internal market policies are regarded as important for their business by most firms.

To assess these interpretations, we run probit regressions on each EU internal market policy against the same set of determinants used in the previous analysis: country-specific and firm-specific characteristics.¹⁶ Table 4.9 presents the results. As expected, being an exporter increases the probability of considering the internal market policies very important, except for hiring of other EU workers. Moreover, having a higher proportion of imported inputs has the

¹⁶ We changed the estimation technique to account for the multiple response nature of the EU internal market questions. In particular, very important has a value of 4, while not important at all has a value of 1.

same effects as being an exporter. Employment and skill levels have no significant effects in the evaluation of any of the internal market policies. In this case there are many sectoral dummies that are significant, with different effects depending on the specific question. Finally, higher labour productivity –as with export constraints–reduces the perceived importance of the internal market.

When we include our product innovation indicator, the sample size is reduced by a quarter and thus, these non-reported regressions are not fully comparable with those in Table 4.9. In these estimations the export dummy is only significant for the same currency policy, while labour productivity is still significant and our innovation indicator is positive and significant for the same currency and single market legislation.

Table 4.8 EU internal market perception by export status

	Non-exporter	Exporter	Export status not available	Total firms	Non-exporters %	Exporters %
Border controls						
Not important at all	2,102	269	326	2,697	20.2	13.2
Rather not important	1,116	256	233	1,605	10.7	12.5
Rather important	1,441	505	450	2,396	13.8	24.7
Very important	1,988	904	790	3,682	19.1	44.2
No business in EU / not relevant	3,427	79	260	3,766	32.9	3.9
DK/NA	340	31	136	507	3.3	1.5
Total	10,414	2,044	2,195	14,653	100.0	100.0
Same EU currency						
Not important at all	1,528	150	224	1,902	14.7	7.3
Rather not important	923	187	172	1,282	8.9	9.1
Rather important	1,729	555	483	2,767	16.6	27.2
Very important	2,822	1,079	976	4,877	27.1	52.8
No business in EU / not relevant	3,141	55	221	3,417	30.2	2.7
DK/NA	271	18	119	408	2.6	0.9
Total	10,414	2,044	2,195	14,653	100.0	100.0
Hire workers from EU						
Not important at all	2,764	610	572	3,946	26.5	29.8
Rather not important	1,438	502	395	2,335	13.8	24.6
Rather important	1,384	425	396	2,205	13.3	20.8
Very important	1,154	339	421	1,914	11.1	16.6
No business in EU / not relevant	3,380	125	283	3,788	32.5	6.1
DK/NA	294	43	128	465	2.8	2.1
Total	10,414	2,044	2,195	14,653	100.0	100.0
Single market						
Not important at all	1,442	152	219	1,813	13.8	7.4
Rather not important	987	238	206	1,431	9.5	11.6
Rather important	1,993	672	585	3,250	19.1	32.9
Very important	2,218	843	740	3,801	21.3	41.2
No business in EU / not relevant	3,213	71	242	3,526	30.9	3.5
DK/NA	561	68	203	832	5.4	3.3
Total	10,414	2,044	2,195	14,653	100.0	100.0
EU standards replacing national regulation						
Yes	3,215	1,070	828	5,113	30.9	52.3
No	5,138	693	807	6,638	49.3	33.9
Depends	1,097	191	212	1,500	10.5	9.3
DK/NA	964	90	348	1,402	9.3	4.4
Total	10,414	2,044	2,195	14,653	100.0	100.0

DK/NA: Don't know/not available.

Source: Observatory of European SMEs and own estimations.

Table 4.9 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]
Skill levels	0.00 [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]
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]
Sectors: if coefficient at least 10% significance and its sign	1, 3 & 5 positive	all but 6 & 9 positive	1, 3, 6 & 7 negative	9 negative
Observations	3,808	3,808	3,808	3,808

Constant term and sectoral dummies not reported.

Standard errors in brackets * significant at 10%; ** significant at 5%; *** significant at 1%

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.

5 Conclusions

In accordance to the extensive literature on heterogeneous firms, we find the exporting firms are more productive, larger, use more skilled workers and a higher proportion of imported inputs than non-exporting firm. In addition, using an indicator of product innovation we also find that exporters have a significantly higher proportion of sales from innovative products or services.

From the information on main constraints to export, and given the single-answer nature of the data, the main message we obtain is that lack of knowledge and information on foreign markets, as well as within-country regulations for EU and non-EU countries are more important than import tariffs. This evidence is consistent with the findings by Anderson and Van Wincoop (2004) and Kneller and Pisu (2007).

Most information is extracted from the internal market perceptions. In this case we have a ranking of each policy by its relevance and hence, we can determine the level of importance of each policy independent of the importance of the other three policies. Using this information, we find that three of the four internal market policies examined are perceived as beneficial by European firms. In particular, having the same currency, expanding the single market and eliminating border controls are all perceived as rather important and very important by a majority of firms.

Probit regressions have shown that the positive perceptions on the three internal market policies are significantly related to the export activity and the proportion of imported inputs used by the firm. This is an expected result, since expanding the internal market will benefit mainly those enterprises already doing business in the EU. However, firms with higher labour productivity find these internal market policies less relevant. A reason for this result may be that the most productive firms already have overtaken the sunk costs of trading within the EU and thus, they give less importance to these trade barriers with respect to other export constraints. An interesting result is that the size of the firm does not have a significant influence on the perceptions on the EU internal market. In other words, small and big firms both expect to gain from an expansion of the internal market. Finally, the possibility to hire workers from other EU countries is not perceived as important by most European firms.

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Appendix A Additional export premia

Table A.1 Export employment premia OLS regressions

	2005		2006	
	Export dummy	Export intensity	Export dummy	Export intensity
Number of employees (β)	101.95*** [17.99]	203.95*** [34.84]	77.24*** [21.40]	144.65*** [43.51]
Observations	6,396	6,392	6,299	6,299
R-squared	0.01	0.01	0.01	0.01

Constant term, and control variables (country and sector) not reported.

Standard errors in brackets * significant at 10%; ** significant at 5%; *** significant at 1%

Source: Observatory of European SMEs and own estimations.

Table A.2 Export imported-inputs premia OLS regressions

	2005		2006	
	Export dummy	Export intensity	Export dummy	Export intensity
Imported inputs (β)	12.35*** [0.92]	17.08*** [1.75]	12.70*** [0.92]	18.58*** [1.86]
Observations	5,220	5,216	5,317	5,317
R-squared	0.08	0.06	0.08	0.06

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.

Table A.3 Export skills premia OLS regressions

	2005		2006	
	Export dummy	Export intensity	Export dummy	Export intensity
Skilled workers (β)	4.18*** [0.99]	9.13*** [1.88]	4.11*** [1.00]	9.21*** [2.02]
Observations	4,596	4,593	4,670	4,670
R-squared	0.06	0.06	0.06	0.06

Skilled workers is the percentage of workers with a university or another higher education diploma.

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.
