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ECONOMIC PERFORMANCE AND INTERNATIONAL TRADE ENGAGEMENT: THE CASE OF PORTUGUESE MANUFACTURING FIRMS

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Economic performance and international trade engagement: the case of Portuguese manufacturing firms*

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Abstract

By combining economic and financial data for Portuguese manufacturing firms with data of their exports and imports, we uncover some aspects of the relationship between international trade engagement and firms' performance. In line with recent theoretical and empirical developments in the international trade literature: (i) we testify that Portuguese international trade is highly concentrated, especially on the import side, and both in inter- and intra-sector terms; (ii) we corroborate previous studies and theses according to which two-way traders outperform only importers, only exporters and above all domestic firms; (iii) we find that the greater the diversification of markets and goods (especially with regard to imports) the better the performance achieved by internationalized firms; (iv) we also present evidence that destination markets, for exports, and, origin markets, for imports, are also important in explaining the performance of firms.

Keywords: International trade, Firm performance, Diversification.

JEL classification: C20, F14, F23.

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1. Introduction

There is an emerging empirical literature examining international trade at firm level. This microeconomic international-trade literature, pioneered by Bernard and Jensen (1995) and Aw and Hwang (1995), recognises that international trade affects the performance of firms. Initial works began by studying the superior performance of exporters with regard to productivity, value added or wages (e.g., the International Study Group on Export and Productivity, 2007). Afterwards, the analysis was extended to study the effects of importing activities (e.g., Kasahara and Lapham, 2008) and the connections with the advantages arising from exports.

In general this literature studied neither the heterogeneity of exporters/importers in terms of their geographical diversification – destination of exports or origin of imports – nor their development level, nor yet their heterogeneity in the number of traded goods. Indeed, only a limited number of recent papers have undertaken such a study: Bernard et al. (2009) for the U.S.; Eaton et al. (2004) for France; Andersson et al. (2008) for Sweden; Muûls and Pisu (2007) for Belgium; Castellani et al. (2008) and Serti and Tomasi (2008) for Italy; Damijan et al. (2004) for Slovenia; Altomonte and Békés (2008) for Hungary; McCann (2009) and Lawless (2009) for Irish firms. These studies have confirmed that firms which are internationally engaged enjoy better results than the purely domestic ones.

The international trade general equilibrium models of Bernard et al. (2003) and Melitz (2003) show how the most productive firms self-select into export markets, but do not explain how they achieve that superior productivity and without even allowing intra-firm changes in productivity.[1] Recent theoretical models of heterogeneous firms and trade (e.g., Chaney, 2008; Lawless, 2009; Helpman et al., 2008) have tried to overcome those inabilities by considering that extensive and intensive margins change across markets, since bilateral trade

[1] In most previous empirical works this limitation was mainly due to dataset limitations that blocked theoretical models from reaching the full spectrum of firms' trading activities.

is affected by trade costs, which, in turn, reflect market-specific fixed costs which interact with firm heterogeneity in productivity. This indicates that firms with better results could trade with a larger number of countries and with countries denoting higher entry-costs.

Using a large database of Portuguese manufacturing firms from 1996 to 2003 that merges two distinct databases – one using economic, financial and structural data and other using external trade data –, we study the heterogeneity of firms' performance and connect it with their international trade engagement. We add two main contributions to this literature. We compare the Portuguese case with other countries for which there are comparable studies (e.g., Sweden, France, the U.S., Italy, Ireland, and Hungary). We perform a panel-data study to discuss: the export and import *premiums* and their origins; the level of trade self-selection of Portuguese firms from market to market (as productivity thresholds vary from market to market); the differences in the diversification levels – goods and markets – between importers and exporters concerning the intensive *versus* the extensive margin, and also the connections between productivity or other variables' *premiums* and the diversification mentioned.

We used both descriptive statistics and regression techniques, OLS pooled regressions, Fixed-Effects models (FE) and a dynamic panel data specification. Our main finding is that the growing commitment to international trade is associated with better firm performance, thus suggesting that import and export activities may be responsible for intra-firm gains. These gains could result from two non mutually exclusive origins: (i) a self-selection origin probably related with a conscious effort to improve performance so as to internationalize and prepare for more demanding markets; and/or (ii) a learning ability obtained after the beginning of exports or imports and generated by the superior competitive pressure and technological advantage of some foreign markets.

In line with several studies – Muuls and Pisu (2007), on Belgium; Andersson et al. (2008), on Sweden; Vogel and Wagner (2008), on Germany; Altomonte and Békes (2009), on

Hungary – we found that two-way traders (TWT), firms that export and import, outperform firms engaged only in importing (OI) or only in exporting activities (OE) and both of these groups outperform the purely domestic ones. This could be the result of complementarities between export and import premiums.

In addition, we found that: (i) firms which export or import more goods with more markets perform better, in line with Bernard et al. (2009), for the US firms, Andersson et al. (2008), for Sweden, Mayer and Ottaviano (2007), for European firms, among others; (ii) firms trading (exporting and/or importing) with multiple markets presented a superior performance (as found by Serti and Tomasi, 2007).

Moreover, in a novel approach we analysed the particular effect on firms' performance of trading with specific countries/markets. In particular we studied the impact of trade with Spain and Germany (the two main markets for Portuguese firms), the impact of trade with Portuguese speaking countries (PL) and with those which may be considered the most difficult markets for Portuguese firms. The results suggest that there is a significant correlation between the requirements and costs involved in trading with certain countries and the level of performance achieved by firms that actually trade in those markets.

The rest of the paper is organized as follows. Section 2 presents the database and some conceptual definitions. Section 3 provides evidence on trade propensity, intensity, persistency and concentration for Portuguese firms and compares it with the other available cases. Section 4 computes and relates international trade premiums with internationalisation levels and for diverse types of markets. Section 5 summarizes the main results and concludes the paper.

2. Data description

The database merges two data sources developed by The Portuguese National Statistics Institute (INE): balance-sheet information (IAE) and external-trade information (ECE). The

two databases are linked by firms' fiscal numbers.[2] Unfortunately, from 1996 to 2003 IAE only used a survey sample,[3] which limits full integration with ECE database. ECE provides information for all Portuguese exporters and importers over the 1996-2003 period, supplying data on trade volume (exports and imports), aggregated by year and country (destination of exports and origin of imports) and on several types of good/sector traded for each transaction.[4] There is also information on the volumes (kilograms) involved.

We use on variables': number of employees, turnover, value added, labour cost, capital assets, foreign capital participation, workers devoted to R&D, investment or earnings.[5] Firms are classified along with their main activity, as identified by INE standard codes for sectoral classification of business activities (CAE rev.2.1), which has a high correlation with Eurostat NACE 1.1 taxonomy. Market entry and exit of firms over the period, the possibility that a firm is not surveyed during the whole period and missing values in some variables makes the dataset unbalanced and short.[6] Indeed, the working database (containing only firms with regular information for all variables of interest) represents an average of 4500 firms per year.[7]

Moreover, since IAE included a significant number of registers of individual firms on behalf and independent workers, for which only the turnover value was available, we defined an active-firm criteria, which includes three conditions: at least 2 employees, a global turnover of at least 1,000€ and a positive net fixed asset register. We also defined "exporter"

[2] The data was made available under the mandatory condition of censorship of any individual information.

[3] Since 2004, INE has changed its methodology and works with the entire universe of Portuguese manufacturing firms. However, for before 2003, we used the only data available.

[4] Our data includes 18 different sectoral types of traded goods.

[5] We do not have other useful data, such as: innovation output, labour composition (skilled and unskilled), educational level of labour force and information on foreign affiliates of Portuguese multinational firms.

[6] As shown in Bottazzi and Grazzi (2007), despite the unbalanced nature thus generated, the validity of the database is largely supported by its census nature and by the methodological uniformity between 1996 and 2003, which avoids possible biases in the data collection process. Moreover, we confirmed the inexistence of particular trends or changes in the structure and performance of firms that disappear and reappear in the database.

[7] The non-treated database comprised about 10,000 firms per year.

as a firm that exports at least 1% of its turnover. Capital is proxied by tangible fixed assets at book value (net of depreciation). All nominal variables are measured in 1996 Euros.[8]

At another level, we measured firm-level productivity using two concepts: value-added per employee, Labour Productivity (LP) and Total Factor Productivity (TFP). Since productivity and input choices are likely to be correlated, TFP estimation involves endogeneity problems. In line with, e.g., Levinshon and Petrin (2003) and Maggioni (2009), our TFP measure is estimated by a semi-parametric method as the residual of two-inputs (labour and capital) Cobb-Douglas production function, using as proxy variable for unobserved productivity shocks, the firms' use of intermediate inputs (incorporated in the data as "supplies and services from thirds" at book value). Production function is estimated for every 2-digit sector separately.

3. Evidence of firms' heterogeneity in relation to international trade

3.1. International-trade propensity, intensity and persistency

The propensity to export of the Portuguese firms studied is 63%, which is lower than their propensity to import, which is about 69% (Table 1). Muûls and Pisu (2007) show that, in Belgium, the relative standing is similar. On the other hand,, results available for Italy (Castellani et al., 2009) and Sweden (Andersson et al., 2008) show, a higher export propensity than import propensity. International comparisons are quite complex, as propensity to trade relies on the sample dimensions, and differences in samples are large.[9] Bearing that in mind, Portuguese firms seem to be slightly less internationalised than Italian and Swedish firms and more internationalized than Belgian and Hungarian firms. US firms are the least

[8] Variables are deflated using 2 digit sector-level price indices provided by INE; for capital stock, we use a unique deflator for all sectors.

[9] Castellani et al. (2009) present a survey on this issue showing that conclusions are highly dependent on the number of employees of firms in the sample.

internationalized in the reported studies, thus suggesting that trade propensity may be a function of the domestic market dimension.

Table 1 – International trade participation rate

	Country						
	Portugal	France	Belgium	Hungary	Italy	Sweden	The US
% exporters	63	67	41	36	71	71	27
% Importers	69	.....	43	46	69	60	14
Time, Sources	2003, specific sample	2003, All firms	2007, all firms	2003, all firms	1997, > 20 employees	2004, > 10 employees	2002, all firms

Source: Own calculations, Castellani et al. (2009), Mayer and Ottaviano (2007).

Table 2 organizes the exporting firms in our sample into seven groups, according to their exporting intensity, which is defined as the percentage of exports in the turnover. Only 14.3% (10.8%+3.5%) of 2003 Portuguese exporting firms had an export intensity which was higher than 90% of their turnover - we call them the "elite group". However, in Portugal these more internationalised firms represent a higher share than in every other known study (see Appendix A for details). About one third of Portuguese exporting firms export less than 10% of their global turnover.

Table 2 – Distribution of Portuguese exporters by export intensity levels, *X* (%)

year	% of Firms						
	Group 1 $X<10$	Group 2 $10<X<25$	Group 3 $25<X<50$	Group 4 $50<X<75$	Group 5 $75<X<90$	Group 6 $90<X<100$	Group 7 $X=100$
1996	33.9	14.9	14.7	11.3	9.0	11.7	4.5
2003	32.9	15.9	14.5	13.2	9.3	10.8	3.5

Source: Own calculations.

The export intensity of exporting firms is on average 52% of their global turnover for the 1996-2003 period but this indicator fell persistently from 56% in 1996 to 51% in 2003. This may result from contrasting behaviour between persistent exporting firms and occasional

exporting firms. Computing the time persistency of our exporting firms we conclude that, on average, they report exports for less than 50% of the time period (3,8 over 8 years of our sample data-time lag). Thus, while 18% were exporters for every single year of the whole period, "persistent exporters", 25% exported in only one single year.[10] Table 3 shows that the intensity of exports for "persistent exporters" is higher than average and that it increases over time, widening the gap between their export performance and that of occasional exporters.

Table 3 – Export intensity of all exporting firms and of persistent exporting firms, %

	Year							
	1996	1997	1998	1999	2000	2001	2002	2003
Persistent Exporters	58.2	58.9	58.2	58.5	58.4	58.7	59.5	60.1
All exporters	55.5	54.2	52.8	52.9	52.1	51.6	51.8	51.0

Source: Own calculations.

3.2. International trade concentration

Recent empirical evidence (e.g., Mayer and Ottaviano, 2007) has documented the general idea that trade is highly concentrated in a few firms, but those firms are very diversified, trading several goods with several countries.

Existing theories of firms and international trade consider concentration the result of several causes (e.g., Bernard et al., 2007): (i) a possible unequal distribution of productivity across firms that would lead to a similar unequal distribution of trade; (ii) a high elasticity of substitution between varieties of goods from distinct firms that would enable small differences in productivity and prices to generate large differences in exports; (iii) the existence of economies of scale to overcome costs of international distribution; (iv) differences in sunk costs in specific markets, thus making it impossible for less productive firms to deal with those costs. Besides, concentration could also be the result of product

[10] Almost 20% of our working database firms were "never exporters" during 1996-2003 period.

differences in productivity demands as only more efficient producers could support a wider range of diversity.

3.2.1. Internationalization for few firms

The concentration of trading activities arises since only a percentage of firms perform exports or imports (Table 1). Not only do the vast majority of exporters export a small share of their global sales, as seen in Table 2, but also the majority of exports are concentrated in a small group of firms. Table 4 shows that in 2003 the top 1% of biggest exporters, the "superstar firms", were responsible for 40% of exports. As in 1996 those firms were responsible for 43% of the aggregate value of exports, a slight reduction of concentration of exports in Portuguese firms is evident. Besides, considering the top 5% of the biggest exporters, they represent 63% of all exports for the whole period 1996-2003 and the top 10% are responsible for 76% of total exports. Comparing Portugal with the 7 countries in the Mayer and Ottaviano (2007) study, the Portuguese "superstar firms" have a similar weight. Thus, exports of all these countries rely heavily on a small group of firms (Table 4).

Table 4 – Importance of "superstar firms"

Country	2003, Share of exports for top 1% exporters – "superstar firms"	2003, % of firms exporting more than 90% of turnover – "elite"
Portugal	40	14.3
Germany	59	1.0
France	44	1.4
UK	42	1.5
Italy	32	2.9
Hungary	77	11.1
Norway	53	1.3
Belgium	48	....

Source: Own calculations, Castellani et al. (2009) and Mayer and Ottaviano (2007).

Additionally, we also noticed that, in 2003, "superstar firms" presented an average export intensity of 81% and half of them also belong to the "elite group" of firms, showing

the high correlation between the most important exporting firms (in terms of the value exported) and their superior export intensity. Thus, and unlike other countries (e.g., Mayer and Ottaviano, 2007), top Portuguese exporters also exhibit top export intensity. Moreover, 78% of "superstar firms" were exporters from 1996 to 2003, showing the strong connection between top exporters, trade intensity and trade persistency.

Table 5 – Dimension of firms and of exporting firms, %

	Micro	Small	Medium	Large
Total firms in sample	39.5	39.5	17.5	3.5
Total Exporters	12.6	40.9	37.1	9
Superstar firms	0	0	4	96

Source: Own calculations.
Note: Firms' classification based on European commission recommendation 2003/361/EC, May 6.

In terms of size, export firms are larger than non-exporters (Table 5). On average, firms on our database are mainly micro and small firms as each group represents about 40% of all firms. However, the sub-sample of exporters mostly involves small and medium size firms; micro firms only represent 12.6% of all exporters.[11] Finally, the vast majority (96%) of the top 1% of exporters are large firms.

With regard to imports, the table revealed that 88% of all "superstar firms" were always importers during the whole period. Additionally, in 2003, they represented 41% of the value of all imports, showing that there is also a high import concentration in Portuguese firms, in general and especially in those firms that also concentrate export values.

3.2.2. Concentration of international trade: intra- and inter-sectors

For Portuguese firms, international trade is clearly more concentrated than employment or sales; the same is true for Italy, the US and Belgium – as shown by Castellani et al. (2009), Bernard et al. (2007) and Mûuls and Pisu (2007), respectively. Using Theil indexes for the

inequality assessment, we observed that trade concentration is even more marked than in Italy.[12] Table 6 also shows that Portuguese imports are more concentrated than exports – unlike Belgium, but similar to Italy. This suggests that only a group of firms are able to face the costs related with both export and import activities.

Table 6 – Concentration of Portuguese firms' employees, sales and trade (1996 and 2003)

Theil Index	1996	2003
Employees	0.71	0.66
Sales	1.53	1.33
Exports	2.57	2.28
Imports	2.61	2.54
Total International Trade	2.41	2.22

Source: Own calculations.

Furthermore, unlike other cases (e.g., Belgium), trade concentration in Portuguese firms decreased over time as both export and import Theil indexes declined from 1996 to 2003.

In terms of sectors, despite the natural heterogeneity, the higher concentration of international trade is evident for every Portuguese sector, in 2003. Additionally, in half the cases, Theil indexes of imports are higher than the export ones (see Appendix B).

At another level, trade concentration may be the result of two complementary forces: (i) inter-sector effect, when exports and imports are concentrated in few sectors; (ii) intra-sector effect, when within the sector, some firms account for most trade activities. To test the weight of each component, we computed the decomposition of the Theil index into inter- and intra-sector effects. Both Cowell and Jenkins (1995) and Castellani et al. (2009) assume that overall trade concentration can be explained by the simple sum of inter- and intra- concentration; the

[11] Moreover, of all large firms, only 13% are non-exporters – data available upon request.

[12] In our sample of Portuguese firms the Theil índex for trade is 55% higher than for sales..For Italian firms, that difference was 4% in 1993 and disappeared in 1997. Italy is compared with Portugal since to our knowledge it is the only study with the same methodology.

former assuming every firm within a certain sector replicates the average sector value of that variable and the latter being a weighted average of sectoral Theil indexes. Table 7 shows that, especially for exports, the concentration is mainly the result of a set of firms within each sector rather than the outcome of a sectoral specialization.

Table 7 – Concentration of Portuguese firms (average 1996-2003)

	Theil index	Theil decomposition (% inter)	Theil decomposition (% intra)
Employees	0.70	8.7	91.3
Sales	1.45	19.1	80.9
Exports	2.10	8.8	91.2
Imports	2.13	15.0	85.0
Total Trade	2.26	22.2	77.8

Source: Own calculations.

Despite the low weight of inter-sectors share, it is clear that exporters concentrate predominantly in five sectors that represent around 50% of all exporters and 35% of the exported value: food and beverages, textiles, wearing apparel, machinery and metallic goods (see Appendix C).

3.2.3. Concentration along the extensive margins

Several authors, including Eaton et al. (2004), for France and Mûuls and Pisu (2009) for Belgium, have claimed that trade concentration along the extensive margin reveals itself by the number of firms involved in trading activities and by the good and country diversification of each exporter. All those studies found a negative correlation between the number of markets and goods involved in trade (exports and imports) and the number of firms able to act in those conditions. This can be done by computing the elasticity of goods or markets relative to the number of firms. Tests for Portuguese firms produced the expected results (Table 8).

Table 8.1 – Elasticity of the number of firms with respect to the number of country destinations and goods exported

	Country		
	Portugal	Sweden	France
Number of country destinations	-6.7*	-1.7	-2.5
Number of goods exported	-4.1**	-1.4	---

Source: Own calculations.
Notes: * means variation from 1 to 15 destinations; ** means variation from 1 to 14 goods.

Table 8.2 – Elasticity of the number of firms with respect to the number of country origins and goods imported

	Country	
	Portugal	Sweden
Number of country origins	-10,1*	---
Number of goods imported	-6.2**	-1.4

Source: Own calculations.
Notes: see Table 8.1.

The frequency with which more markets are served declines monotonically until just one single firm serves the maximum number of markets. Nevertheless, the concentration along the extensive margin of imports is clearly superior to that observed in exports.

On average in 1996 a Portuguese firm exported goods of 2 aggregated sectors[13] and to 7 countries,[14] while in 2003 those numbers had improved slightly as the average firm exported goods of 2 sectors but to 8 different countries[15], respectively. In 2003, the very few "complete exporters" that represented less than 0,12% of all exporters, managed to export to more than 50 countries and also sold more than 5 distinct sectors/groups of goods. As for imports, in 2003, the average importer imported 3 different sectors/groups of goods from 6 countries. This result was in line with other studies that show that exporters generally export fewer goods per firm than importers import (e.g., Bernard et.al, 2005, for the US firms where, in

[13] Our data involved a maximum of 18 different types of groups/sectors of goods.

[14] Our data involved a maximum of 214 different destination countries.

[15] Lawless (2008) reports for Irish firms, in the period 2000-2004, an average number of 6 countries.

2003, an average US firm imported 66% more different goods than it exported). This gap is, however, narrowing over time for both Portuguese and the US firms.

Table 9 shows that in 2003, 16% of all exporters sold just one type of good to a single country. This is an inferior weight than for Hungary, 20%, in 1999 (Békes et. al, 2009) or for France, 30%, for the same year[16] (Mayer and Ottaviano, 2007). This suggests, at first sight, that the level of extensive margin of our Portuguese trading firms is superior to that observed in France and in Hungary. Moreover, the extensive margin of Portuguese firms seems to be highly stable, as the previous indicator in 2003 was quite similar to 1996.

Table 9.1 – Distribution of export firms (2003) by number of goods and destinations, %

Number of Products	Number of countries			Total
	1	2-5	> 5	
1	16.3	15.1	9.5	41
2-5	5.7	18.6	30.7	55
> 5	0.3	0.5	2.7	4
Total	21.3	34.2	42.9	100

Source: Own calculations.

Table 9.2 – Distribution of export values (2003) by number of goods and destinations, %

Number of goods	Number of countries			Total
	1	2-5	>5	
1	1.4	3.1	7.5	12
2-5	1.2	7.2	58.1	67
>5	0.3	0.2	21.0	21
Total	2.9	10.5	86.6	100

Source: Own calculations.

However, Table 9 shows a different situation. Considering firms that export more than 5 goods to more than 5 markets, in Portugal such firms represent only 3% of all exporting firms. In Sweden this number is around 50%, in Italy near 70%, in France 35%, and in Hungary, about 20%, which suggests that, after all, extensive margins of Portuguese firms are lower

[16] Even taking into account the fact that the breakdown of data is not comparable.

than those in other countries. Although these results hinge critically on the dimensions of the sample studied, in terms of both imports (Table 10) and of exports a high concentration is observed. Indeed, 3% of all exporting firms selling more than 5 goods to more than 5 countries represent 21% of all exported value. On the import side, 9% of all importing firms buying more than 5 goods from more than 5 markets represent 55% of all imported value.

Those results show the importance of top exporters and top importers and their superior diversification performance, in goods traded and in markets linked. In fact, top exporters also have superior extensive margins as they export more goods to more countries: in 2003, the "elite group of exporters", exported on average to 11 countries and goods of 3 distinct sectors.

Table 10.1 – Distribution of import firms (2003) by number of goods and destinations, %

Number of goods	Number of countries			Total
	1	2-5	>5	
1	11.5	10.1	8.0	30
2-5	10.1	20.0	9.5	41
>5	9.0	9.0	8.8	28
Total	32	38	27	100

Source: Own calculations.

Table 10.2 – Distribution of import values (2003) by number of goods and destinations, %

Number of goods	Number of countries			Total
	1	2-5	>5	
1	0.6	1.0	2.1	4
2-5	1.5	2.4	28.7	33
>5	2.0	7.2	54.5	63
Total	4.1	10.6	85.3	100

Source: Own calculations.

3.2.4. Concentration along the intensive margin

In 2003, the ten markets with the highest value exported by exporter concentrated 35% of the total number of Portuguese exporters and 75% of all exported value.[17] In 1996, the

[17] With at least 100 firms exporting to that market (to exclude some particular operations involving only one firm and a single transaction).

corresponding group represented 39% of all exporting firms and 73% of all value exported. In both years, seven of the ten markets referred to (with superior exporter intensity) were composed of European Union (EU) partners (Appendix D).

Moreover, the real growth (19%) of export values between 1996 and 2003 was mainly (75%) explained by the growth in the intensity of exports (average value exported by each exporter) rather than by the extensive margin (growth in the number of exporters). This outcome seems to fit the main "predictions" of Melitz (2003) and Lawless (2009). One of those "predictions" is that there should exist a "hierarchy" of markets with firms entering export markets in the order of some productivity cut-off points. Another "prediction" of those models relates to how a firm's sales should grow as they enter more export markets. In line with those models, it is expected that firms will tend to sell progressively less in each additional market as they move towards more difficult markets. In addition, as productivity increases, it is more likely that firms will increase their sales in those complex markets. This means that export growth, at the firm level, would more likely come from additional sales in existing markets than from new sales in new markets.

Our results are clearly in accordance with such "predictions". In 2003, with the exception of Angola, the ten most frequent destination markets of Portuguese exports[18] always present superior growth in the intensity of exports in comparison with extensive growth (Appendix E).

3.3. International trade status persistency

In line with other studies (e.g., Tucci, 2005, for India), we analyzed firm heterogeneity in association with trade status, considering exporting and importing activities. For that purpose, in each year, all firms were classified into four mutually exclusive categories/groups: Non-Traders (NT), Only Exporters (OE), Only Importers (OI) and Two-Way Traders (TWT). In

our database around 74% of firms are engaged in international activities. As in the case of Italy, Castellanni et al. (2009), the large majority (68%) of Portuguese internationalized firms are TWT. To uncover the trading status dynamics, we computed the trade status transition matrix for two sub-periods: 1996-1999 (Table 11) and 2000-2003 (Table 12).

Table 11 – Trade status transition matrix from 1996 to 1999, %

1999 1996	NT	OE	OI	TWT
NT	82	6	8	3
OE	13	60	5	22
OI	12	1	38	50
TWT	1	4	6	89

Source: Own calculations.

Table 12 – Trade status transition matrix from 2000 to 2003, %

2003 2000	NT	OE	OI	TWT
NT	84	5	8	3
OE	16	59	4	21
OI	8	1	61	31
TWT	1	1	5	93

Source: Own calculations.

In the whole period, 1996-2003, the degree of global engagement of Portuguese firms grew considerably. In 1996, TWT represented 45% of firms, but in 2003 they already corresponded to 53%. Moreover, NT decreased their weight from 29% to 22% of firms. Since the transition dynamics is similar in both periods, NT and TWT status appear to be highly stable, while the OE and OI status seem to be more unstable. This is in line with Altomonte and Békes (2008), who found that OI and OE is not a steady-state equilibrium strategy of internationalized firms. Additionally, firms that are firstly OI or OE have similar probability of remaining in that status or of changing to a NT or TWT category. On the other hand, some

[18] Selected by the absolute number of firms exporting to each destination country.

firms have a transitory experience of trading (about 25% of firms trading at the beginning of the period are not trading in the final year), while others (mainly OI) tend to complete the full spectrum of the trading status. Indeed, half of the OI firms, in 1996, became TWT in 1999, suggesting that imports are a pre-condition for an export experience decision.

At a sectoral level, the highest share of TWT firms is in radio, TV and communication, textiles, wearing apparel, leather, rubber and plastic, and electrical machinery (see Appendix F for further details).

4. Measuring traders' *premium*

4.1. Trader status

In line with other studies, e.g., Andersson et al. (2008), Vogel and Wagner (2008), we found that increased international involvement is associated with better performance (Table 13). These results rely on: (i) non-traders are less productive, smaller in terms of sales, less capital intensive and pay smaller wages; (ii) among internationalized firms, two-way traders outperform firms only engaged in exporting or in importing activities; (iii) only importers outperform only exporters in all domains, namely in efficiency and capital intensity. In fact, the performance of only exporters is much closer to the outcome of domestic firms than that of only importers.

Table 13 – Trading status different average performances, 1996-2003 (values: 10^3 Euros)

	NT	TWT	OE	OI
LP	27.7	50.5	37.8	47.6
TFP	7.8	13,6	9.6	9.9
Sales	2,102	16,878	2,524	6,097
Wages	10.4	14.4	10.2	14.0
Capital intensity	49.6	95.6	58.4	83.0
% of firms	26	50	9	15
Number of employees	57	147	91	68

Source: Own calculations.

This positive relation between trade engagement and firms' performance requires further analysis, as the unconditional differences shown could be due to a sectoral composition effect, in line with sectoral differences shown in Appendix F. Thus, and like other studies (e.g., Castellani et al., 2009), we estimated the relationship between firms' heterogeneous performance and internationalization status by running the regression:

$$y_{it} = \alpha + \beta_1 D_{it}^{TWT} + \beta_2 D_{it}^{OI} + \beta_3 D_{it}^{OE} + \varphi\, controls + \upsilon_{it}\,, \qquad (1)$$

where: (i) y_{it} measures in logarithms (*ln*) firms' labour productivity (LP), total factors productivity TFP, sales, capital intensity or number of employees; (ii) D_{it}^{TWT}, D_{it}^{OI} and D_{it}^{OE} denote, respectively, mutually exclusive dummy variables for a two way trader, a firm engaged only in importing and a firm engaged only in exporting activities – the reference group (omitted in the regression) are the non-trading firms; (iii) *Controls* is a vector including the log of firm's employment[19] together with five digit sector codes, a dummy for the existence of foreign capital share, a dummy for the existence of workers in R&D activities and also year dummies.[20]

The results of the pooled OLS regression, in Table 14,[21] show a relevant degree of heterogeneity across firms with different degrees of internationalization concerning all dependent variables, even after controlling for sector, foreign capital, time and dimension. It is clear that: (i) more internationally engaged firms are larger, more productive and more capital intensive than the less engaged ones; (ii) a hierarchy is observed between the internationalized firms, given the superiority of two-way traders, followed closely by only importers that outperform only exporters as in Muûls and Pisu (2009) for Belgian firms.

[19] Except when the dependent variable is the log of firms' employees.

[20] There are important firm characteristics that would be appropriate to control for, such as the share of the intra-firm trade (e.g., Haller, 2009), but they are not available in the database.

[21] Since the dependent variable is in logs and the independent variables are dummies, the exact percentage differentials are obtained by: $(e^{\beta}-1)$ x100.

Table 14 – Firm heterogeneity and internationalized status, Pooled OLS (1996-2003)

	Dependent variable				
	*ln*LP	*ln*TFP	*ln*Sales	*ln*Cap. Intens.	*ln*employees
TWT	0.28	0.182	0.42	0.328	0.792
	(0.017)	(0.015)	(0.019)	(0.023)	(0.018)
OE	0.027^{+}	0.025^{+}	0.077	0.024^{+}	0.282
	(0.023)	(0.022)	(0.028)	(0.033)	(0.028)
OI	0.28	0,183	0.37	0.311	0.108
	(0.025)	(0.021)	(0.027)	(0.032)	(0.027)
Observations	30,968	30,968	30,968	30,968	30,968
R squared	0.35	0.35	0.61	0.05	0.14
Prob > F	0	0	0	0	0

Source: Own calculations.

Notes: Robust standard errors appear below the coefficient estimates in parenthesis. * and ** mean statistical significance at 10% and 5%, respectively; $^{+}$ means not statistically significant; if nothing is mentioned, estimates are statistically significant at 1% level. Regressions include the log of employment, a dummy for foreign capital, a dummy for R&D workers, sector dummies and year dummies as controls. Estimations obtained with Stata 10 software.

Meanwhile, as the decision to export or to import may be driven by firm specific (time invariant) fixed effects, it is wiser to test a Fixed-Effect model, FE, as an alternative to the pooled OLS. Estimates in Table 14 translate differences in productivity, size or capital intensity across firms with different trading status but ignores the role of firm specific effects. Thus, assuming there are unobservable factors that are correlated with the variables used in the regression, the use of FE estimation is recommended in order to deal with omitted variable bias. The FE estimation (Table 15) will now show a correlation between a change in the trade status (beginning by NT) and a change in the dependent variable, conditioned by fixed firm specific effects. Despite the conceptual superiority of the FE, a causal interpretation of the estimated coefficients by FE is still risky, since possible random shock at the firm level would, at the same time, generate a change in the international status and a variation in the dependent variable. Nevertheless, if differences in independent variable coefficients arise between both estimations it suggests that firms' (time invariant) characteristics are correlated with their internationalisation status. Moreover, if estimates of coefficients of the FE model are not relevant but were significant in pooled OLS it may mean that correlations between

international status and firms' performances are driven by self-selection mechanisms and do not reflect learning effects.

In addition, and in order to decide which model was the better choice, we computed two sequential tests. Firstly, the Breusch-Pagan (BP) test for the relevance of firm specific effects to be incorporated in a panel model. For all dependent variables, BP tests rejected the null hypothesis that the residuals are homoskedastic, thus rejecting the pooled OLS model. Then, we performed the Haussman test in order to understand if the individual effects are correlated with the other regressors. Hausman tests clearly indicated that FE is the better choice. Besides, F tests in all FE estimation confirm that FE was the most appropriate model to use.

Table 15 – Firm heterogeneity and internationalized status, FE (1996-2003)

	Dependent variable				
	*ln*LP	*ln*TFP	*ln*Sales	*ln*Cap. Intens.	*ln*employees
TWT	0.043	0.04*	0.054	0.026	0.028
	(0.024)	(0.019)	(0.009)	(0.008)	(0.008)
OEXP	-0.002+	-0.004+	0.038	0.020	0.019*
	(0.029)	(0.029)	(0.012)	(0.009)	(0.010)
OIMP	-0.002+	-0.011+	0.016**	-0.015**	-0.005+
	(0.027)	(0.029)	(0.011)	(0.009)	(0.009)
Observations	30,968	30,968	30,968	30,968	30,968
R squared	0.22	0.52	0.59	0.03	0.05
Prob > F	0	0	0	0	0

Source: Own calculations.
Notes: see Table 14.

Since differences in performance between firms with different trading status sharply decline once time invariant firm heterogeneity is erased (Table 15) and only TWT status is still significant in explaining TFP changes, we concluded that firms' performances are mainly related with time invariant specific firm characteristics. This may suggest that the decision to enter international markets may be mainly a function of a firm's characteristics, in a self-

selection type phenomenon. Nevertheless, as a firm changes its status from NT to TWT an improvement in TFP and in LP can be observed, suggesting the existence of learning effects and improvement of efficiency, through imports and/or exports.

Robustness checks

The previous test was replicated for 5 different cohorts. We aggregated the initial 23 two-digit codes and 201 five-digit codes (the original INE desegregation) into a five sectoral classification of sectors based on technological sophistication (in line with Pavitt, 1984 - adapted): Group 1, Gr1, with the lowest technical sophistication (Food & Beverages + Tobacco); Group 2, Gr2, (Textiles, Wearing apparel and Leather); Group 3, Gr3, (Wood, Pulp & Paper, Printing, Furniture); Group 4, Gr4, (Chemicals, Rubber & Plastic, Non metallic goods, Basic metallic goods, fabricated metallic goods and Recycling sectors); Group 5, Gr5, with the highest technical sophistication (Machinery, Office machines & Computers, Electrical machinery, Medical Instruments, Motor vehicles and other transport equipment).

We regressed Equation (1), considering (ln)TFP, separately for each of the 5 different groups using an FE model.[22] The coefficients on OE and OI were always not statistically relevant and thus are not reported in Table 16. On the other hand, TWT coefficients were significant for Groups 1 and 2, thus suggesting that firms in the less technologically sophisticated groups evolving from NT to TWT are able to improve their efficiency.

Table 16 – TWT coefficients for TFP and each group of firms

Group 1	Group 2	Group 3	Group 4	Group 5
0.136**	0.078**	0.0001+	-0.092+	0.015+

Source: Own calculations
Note: See Table 14.

A second robustness test relates with the dimension of firms. We observed that working with a sub-sample of larger firms (number of employees > 50) the coefficient, on (ln)TFP, of

TWT is almost twice as large (0.074) and becomes significant at 1% level. Similar tests performed with smaller firms proved to be not significant, as all internationalization coefficients become negative and without statistical significance. Finally, we combined larger dimension firms with firms belonging only to Group 1, which allowed us to observe the higher coefficient in the TWT variable: 0.22 and significant at 1% level.

4.2. Trader extensive margins

We found that firms which trade multiple goods with multiple markets perform better, in terms of productivity. Table 17, compares the performance, in terms of both TFP and LP of: i) TWT firms that trade one good versus TWT firms that trade ten goods and ii) TWT firms that trade with one market versus TWT firms that trade with thirty markets. The results show that more internationally involved firms present better levels of efficiency, especially in LP. These results are in line with several studies for exports (e.g., Bernard et al., 2007, for the US firms; Andersson et al., 2008, for Sweden; and Mayer and Ottaviano, 2007, for European firms).

Table 17 – LP and TFP superiority (%) of TWT with high extensive margins

	NSE	NCE	NSI	NCI
TFP ratio	17	15	23	17
LP ratio	79	114	209	100

Source: Own calculations.
Notes: NSE, NSI, NCE and NCI stand for the number of goods exported, the number of goods imported, the number of countries exported to, and the number of countries imported from. See also Appendix G.

However, these results are unconditional values, which may be affected by size, sectoral composition or time differences. Thus, in order to present more reliable results, we had to use parametric regressions where those aspects can be properly controlled.

$$y_{it} = a + \alpha_1 x_{it}^{nse} + \alpha_2 x_{it}^{nsi} + \alpha_3 x_{it}^{nce} + \alpha_4 x_{it}^{nci} + \beta controls + \upsilon_{it} \,. \quad (2)$$

[22] We used TFP as dependent variable as it has a wider ability to capture efficiency changes than LP.

In equation (2), the *x*'s denote respectively the logarithm of the number of: sectors exported (*NSE*), sectors imported (*NSI*), countries where exports go (*NCE*) and countries from where imports are bought (*NCI*); *controls* is again a vector including the log of the firm's employment together with a dummy for foreign capital share, a dummy for R&D workers and sector and a year dummies. Each regression refers to the sample of firms which are TWT throughout the period. We estimated the previous regression either by pooled OLS (Table 18) or by the FE (Table 19). Applying the previous tests, we evaluated FE as the better choice. Estimated α are elasticities measuring the diversification premium of TWT.

Table 18 shoes that, after controlling for size, foreign capital, R&D workers, sector and time effect, more diversified firms are also larger, more productive and more capital intensive.

Table 18: Firm heterogeneity along sector and country extensive margins, Pooled OLS

	Dependent variable				
	*ln*LP	*ln*TFP	*ln*Sales	*ln*Cap. Intens.	*ln*employees
lnNSE	-0.028^{+}	0.052	0.023^{+}	-0.083	0.154
	(0.076)	(0.011)	(0.017)	(0.019)	(0.016)
lnNCE	0.132	0.005^{+}	0.187	0.119	0.248
	(0.042)	(0.005)	(0.010)	(0.011)	(0.008)
lnNSI	0.921	0.135	0.541	0.400	0.453
	(0.084)	(0.011)	(0.019)	(0.021)	(0.017)
lnNCI	-1.015	0.080	0.231	0.140	0.144
	(0.061)	(0.008)	(0.014)	(0.015)	(0.013)
Observations	16,043	16,043	16,043	16,043	16,043
R squared	0.11	0.21	0.50	0.13	0.36
Prob > F	0	0	0	0	0

Source: Own calculations.
Notes: see Table 14.

In particular, diversification of imports (goods/sectors) has the strongest association with firm heterogeneity. For example, a 10% increase in *NSI* is associated with 9.2% higher LP, 1.4% higher TFP, 5.4% higher turnover and 4.0% higher capital intensity. The premiums associated with *NCI* are smaller, but still sizable (except for LP). Besides, since the

coefficients for the capital intensity are positive and statistically significant especially for the import side it suggests that, to enter new import markets, firms need to have the ability to value, assimilate and apply new knowledge incorporated in imports of high capital intensity.

Using the FE model, the estimated premiuns reduce substantially and in terms of TFP have almost no relevance. Nevertheless, we still find a relevant effect on TFP of the number of goods exported and on LP in the sector extensive margin of imports. In general, Table 19 shows the greater significance of imports in explaining firms´ superior performances.

Table 19 - Firm heterogeneity along sector and country extensive margins, FE

	Dependent variable				
	*ln*LP	*ln*TFP	*ln*Sales	*ln*Cap. Intens.	*ln*employees
lnNSE	-0.030^{+}	0,017*	0.021*	0.001^{+}	0.014
	(0.176)	(0.010)	(0.009)	(0.008)	(0.006)
lnNCE	-0.030^{+}	- 0,010^{+}	0.076	0.027	0.052
	(0.164)	(0.009)	(0.008)	(0.007)	(0.006)
lnNSI	0.847	0,001^{+}	0.051	0.044	0.05
	(0.203)	(0.012)	(0.010)	(0.009)	(0.007)
l NCI	-1.96	0.004^{+}	0.008*	0.024^{+}	-0.003^{+}
	(0.096)	(0.006)	(0.004)	(0.004)	(0.003)
Observations	16,043	16,043	16,043	16,043	16,043
R squared	0.05	0.06	0.41	0.003	0.23
Prob > F	0	0	0	0	0

Source: Own calculations.
Notes: see Table 14.

Robustness checks

As with the first equation, we also retested the differences of the 5 cohorts of firms (Table 20). The coefficients of NSE are positive and statistically relevant only for Groups 1 and 2, suggesting that firms from those sectors become more efficient as they diversify their range of exported goods. Firms from more technologically sophisticated sectors do not improve efficiency as they diversify the number of goods either in exports or in imports.

Table 20 – TWT coefficients for TFP and each group of firms

	Group 1	Group 2	Group 3	Group 4	Group 5
*ln*NSE	0.089*	0.034*	-0.006+	0.033+	-0.06
*ln*NCE	-0.060+	-0.014+	-0.009+	-0.024+	0.015+
*ln*NSI	-0.40+	0.039*	0.005+	-0.026+	0.013+
*ln*NCI	0.012+	0.003+	-0.063*	0.011+	0.009+

Source: Own calculations.
Notes: See Table 14.

With regard to the dimension of the firms we noticed that for smaller firms (up to 50 employees) the NSE effect is the only one significant but is four times stronger (0.039) than for larger firms (0.011), thus suggesting firms may have limits in order to profitably expand the number of goods exported.

4.3. Trader market heterogeneity

Heterogeneity in the performance among traders also relies on the destinations of exports and on the origin of imports, Serti and Tomasi (2008). Indeed, we can use two main arguments: (i) differences in each country of competitive pressures, income, distance, technological competences, language or institutional and legal structures that cause different sunk costs to access different markets; (ii) there may be differences between firms trading with the same countries but with different good composition. In this case it may arise as an effect of different networks created or of different legal barriers, such as trade policies and differences in market structure inherent to each good.

4.3.1. Assessing traders' heterogeneity

To test how each firms' performance differs according to the type of market they trade with, we separated firms exporting status into 4 mutually exclusive groups of export destinations: (i.1) only to European Union countries (E_EU); (i.2) only to PL countries (E_PL); (i.3) only

to other Developed countries (E_ODEV);[23] (i.4) only to Non-Developed countries (E_NDEV). Additionally, we considered firms that export to more than one group of markets, namely to: (ii.1) EU and PL countries (E_EU+PL); (ii.2) EU and ODEV countries (E_EU+ODEV); (ii.3) all other possible combinations of markets (E_Multiple).

For imports, we considered five groups: (i) only from EU countries (I_EU); (ii) only from ODEV countries (I_ODEV); (iii) only from PL countries (I_PL); (iv) only from NDEV countries (I_NDEV); (v) other possible combinations of countries (I_Multiple).

Then, we computed the means of the various performance measures for each of seven groups of exporting firms and for each of the five groups of importing firms; finally, we performed regressions for some performance variables on these groups of trade partners, controlling for the usual variables. Table 21 shows that exporters that sell to many types of countries (called as "Multiple") present the best performances.

Table 21 – Exporter's different average performance, 1996-2003 (values: 10^3 Euros)

	EU	PL	EU+PL	ODEV	EU+ODEV	NDEV	Multiple
LP	17.7	23.2	24.3	16.2	14.5	15.8	24.9
TFP	0.405	0.444	0.368	0.404	0.357	0.398	0.402
Sales	6,504	3,785	11,834	3,277	8,455	6,026	19,962
No Employees	92	58	90	61	121	59	208
No goods	1.8	1.9	2.4	1.6	2.0	1.9	2.8
No countries	3.4	1.8	4.5	1.7	3.0	2.1	14.6
Earnings	73	115	169	4	58	-120	596
Cap. Intensity	50	47	79	42	37	38	80

Source: Own calculations.

In fact, in line with the theoretical models of Channey (2008), Lawless (2009) and Helpman et al. (2008) firms with higher productivity levels are better prepared to trade with a

[23] In this group we included: The USA, Japan, Australia, New Zealand, South Korea, Singapore, Hong-Kong, Canada, Israel, Taiwan, Switzerland, Kuwait, Oman, Qatar, UAE, Bahrain, Saudi Arabia.

larger number of diversified countries and to face a larger sum of different sunk entry costs. According to those models, firms begin to export to markets with lower productivity than their own level; this argument would explain why firms with "low" productivity would be able to export only to a limited group of destinations. Moreover, the models referred to also assume that the alleged productivity thresholds (different sunk costs) vary across markets as a result of distance, income, language, historical familiarity, legal and institutional structures.

At another level, there are few studies connecting traders' characteristics and extensive margin diversification in imports. In the case of Italian firms, in a rare work on the subject Serti and Tomasi (2008) found that importers from EU countries had the highest performance levels. We also observed the same outcome for Portugal (Table 22).

Table 22 – Importers' performance differences (1996-2003) (values: 10^3 Euros)

	EU	ODEV	PL	NDEV	Multiple
LP	18.5	14.3	13.0	13.1	23.0
TFP	0.42	0.41	0.35	0.32	0.41
Sales	6,653	4,575	3,525	2,519	22,902
No Employees	84	65	62	44	191
No goods	2.8	1.7	1.5	1,4	4,2
No countries	3.8	1.4	1.8	1,8	9,6
Earnings	401	-52	43	-60	459
Cap. Intens.	52	35	33	32	69

Source: Own calculations.

Both Table 21 and Table 22 seem to confirm these assumptions, as exporters to the more global group, classified as "Multiple", present the best performances for all indicators (but TFP) and importers from several sources (also classified as "Multiple") also present the best performances, followed by importers from EU countries. This could possibly support the thesis of the higher sunk entry costs in different countries, given the need to have a certain level of prerequisites. Besides, the moderate performance levels presented by exporters to the

EU could be due to exports to a "local market" given the familiarity and short distance between Portugal and EU countries.[24] In addition, exports to PL countries are associated with better performance. This may be a consequence of the distance and of higher transaction costs that Portuguese firms face when trading with those markets. In fact, despite linguistic, cultural and historical closeness between Portugal and PL countries, there are bigger geographical, economic and institutional differences to be overcome in order to reach those markets.

In order to present a more precise and detailed analysis (in line with Serti and Tomasi, 2008), it is imperative to perform regressions of the following type:

$$y_{it} = a + \alpha_1 E_{it}^{EU} + \alpha_2 E_{it}^{PL} + \alpha_3 E_{it}^{EU+PL} + \alpha_4 E_{it}^{ODEV} + \alpha_5 E_{it}^{NDEV} + \alpha_6 E_{it}^{EU+ODEV} + \\ + \alpha_7 E_{it}^{Multiple} + \alpha_8 I_{it}^{EU} + \alpha_9 I_{it}^{ODEV} + \alpha_{10} I_{it}^{NDEV} + \alpha_{11} I_{it}^{PL} + \alpha_{12} I_{it}^{Multiple} + \beta\, controls + \upsilon_{it} \quad (3)$$

where *E*'s and *I*'s denote the dummies for exporters and importers, respectively, trading with the categories of countries already mentioned. Each α translates the percentage premia for exporters or importers with the various markets and with respect to NT. We estimate the previous regression either by pooled OLS (Table 23) or by the FE model (Table 24). We also confirmed that the FE is the better choice given the methodology adopted.

These results confirm that: exporters to several groups of destinations ("Multiple") are the most labour productive, the biggest and the most capital intensive ones. Importers from the EU and from several groups of countries ("Multiple") present the best performances; moreover imports from NDEV countries are always not relevant for the explanation of firms' performances. This means that high-tech capital goods are bought precisely from the EU countries (near 90% of the total imports of that type come from EU countries) and also from other developed countries, such as the US and Japan; as an example, imports of machinery and capital goods are from Germany (33%), Spain (17%), Italy (14%) and France (10%). Firms that import should have developed a proper absorptive capacity to integrate such inputs

[24] Especially with Spain, France and Germany that are the main commercial partners and are near Portugal.

and goods into their production. It is interesting to note that a comparison between the import and the export side, counting the number of relevant coefficients and averaging their levels, reveals that importing matters rather more than exporting in explaining trading premia.

Table 23 – Trade premia by type of country development, 1996-2003; Pooled OLS

	Dependent variable				
	*ln*LP	*ln*TFP	*ln*Sales	*ln*Cap. Intens.	*ln*employees
$E^{EU} \equiv E1$	-0.175	-0.09	-0.074**	0.135	-0.289
	(0.026)	(0.243)	(0.016)	(0.034)	(0.043)
$E^{PL} \equiv E2$	-0.016	0.052	-0.015*	-0.068+	-0.223
	(0.064)	(0.054)	(0.039)	(0.086)	(0.105)
$E^{EU+PL} \equiv E3$	0.081*	-0.016+	0.11	0.697	0.200
	(0.053)	(0.045)	(0.032)	(0.070)	(0.087)
$E^{DEV} \equiv E4$	-0.066*	0.003+	0.024*	-0.018+	-0.213
	(0.047)	(0.044)	(0.029)	(0.064)	(0.078)
$E^{NDEV} \equiv E5$	-0.002+	-0.009+	0.125	-0.11+	0.054+
	(0.091)	(0.078)	(0.055)	(0.110)	(0.147)
$E^{EU+DEV} \equiv E6$	-0.251	-0.124+	-0.217	0.345	-0.375
	(0.026)	(0.021)	(0.016)	(0.035)	(0.042)
$E^{Multiple} \equiv E7$	0.074	0.007+	0.058	0.645	0.195
	(0.023)	(0.020)	(0.014)	(0.030)	(0.038)
$I^{EU} \equiv I1$	0.239	0.011	0.116	0.256	0.397
	(0.023)	(0.020)	(0.014)	(0.031)	(0.038)
$I^{DEV} \equiv I2$	0.085*	0.047*	0.133	0.226*	0.093+
	(0.047)	(0.040)	(0.029)	(0.111)	(0.078)
$I^{PL} \equiv I3$	0.019+	-0.013+	-0.064+	0.111+	0.075+
	(0.126)	(0.118)	(0.078)	(0.171)	(0.212)
$I^{NDEV} \equiv I4$	0.037+	0.052+	-0.048*	0.046*	0.019+
	(0.084)	(0.078)	(0.051)	(0.111)	(0.132)
$I^{Multiple} \equiv I5$	0.354	0.185	0.169	0.65	0.489
	(0.022)	(0.019)	(0.013)	(0.027)	(0.035)
Observations	26,208	26,208	26,208	26,208	26,208
R squared	0.22	0.25	0.15	0.27	0.20
Prob. > F	0	0	0	0	0

Source: Own calculations.

Notes: Since the dependent variable is in logs and the explanatory variable are dummies, the exact percentage differential is given by $(e^{\alpha}-1)x100$. See also Table 14.

In Table 24, once time invariant firm heterogeneity is removed, the differences between internationalized firms and non-traders are sharply reduced and in most cases become non-

statistically relevant. Indeed, on the export side, the premia associated with destinations is not relevant, except for "sales" and for "multiple" type destination, indicating that previous OLS premia in some exporting destinations is mainly related with a self-selection phenomenon. In addition, looking at TFP regression, which could indirectly and roughly indicate the existence of learning effects associated with exports, all coefficients are not statistically relevant.

Table 24 – Trade premia by type of country development, 1996-2003; FE Model

	Dependent variable				
	*ln*LP	*ln*TFP	*ln*Sales	*ln*Cap. Intens.	*ln*employees
$E^{EU} \equiv E1$	0.012^{+}	-0.017^{+}	0.027*	0.007^{+}	0.127
	(0.042)	(0.043)	(0.019)	(0.047)	(0.043)
$E^{PL} \equiv E2$	0.055^{+}	0.027^{+}	0.040*	0.091*	0.050^{+}
	(0.056)	(0.061)	(0.030)	(0.063)	(0.050)
$E^{EU+PL} \equiv E3$	0.054^{+}	-0.045^{+}	0.711	0.027^{+}	0.257
	(0.056)	(0.062)	(0.027)	(0.063)	(0.055)
$E^{DEV} \equiv E4$	-0.016^{+}	0.037^{+}	0.033^{+}	-0.079^{+}	0.017
	(0.072)	(0.079)	(0.034)	(0.081)	(0.055)
$E^{NDEV} \equiv E5$	(0.061)$^{+}$	-0.039^{+}	0.057^{+}	0.023^{+}	0.009^{+}
	(0.112)	(0.134)	(0.057)	(0.132)	(0.127)
$E^{EU+DEV} \equiv E6$	0.030^{+}	0.051^{+}	0.042	-0.022^{+}	0.241
	(0.043)	(0.048)	(0.021)	(0.049)	(0.044)
$E^{Multiple} \equiv E7$	0.043^{+}	-0.046^{+}	0.059	0.014^{+}	0.267
	(0.040)	(0.045)	(0.042)	(0.046)	(0.042)
$I^{EU} \equiv I1$	0.011*	0.010^{+}	0.078	0.17	0.139
	(0.042)	(0.048)	(0.021)	(0.049)	(0.015)
$I^{DEV} \equiv I2$	-0.046^{+}	-0.014*	0.023^{+}	0.144*	0.117*
	(0.073)	(0.081)	(0.035)	(0.082)	(0.076)
$I^{PL} \equiv I3$	0.004^{+}	-0.040^{+}	-0.025^{+}	0.052^{+}	-0.19^{+}
	(0.146)	(0.16)	(0.071)	(0.167)	(0.154)
$I^{NDEV} \equiv I4$	0.050^{+}	-0.069^{+}	-0.001^{+}	-0.037^{+}	-0.033^{+}
	(0.152)	(0.168)	(0.072)	(0.177)	(0.159)
$I^{Multiple} \equiv I5$	0.108*	-0.011^{+}	0.077	0.21	0.191
	(0.044)	(0.049)	(0.021)	(0.051)	(0.046)
Observations	26,208	26,208	26,208	26,208	26,208
R squared	0.16	0.01	0.11	0.01	0.13
Prob > F	0	0	0	0	0

Source: Own calculations.
Notes: see Table 14 and Table 23 comments.

On the import side, OLS versus FE comparisons show the existence of a self-selection phenomenon in all markets, since all FE estimations are less statistically relevant. However, in EU markets and multiple origin markets, in most cases relevant coefficients can be observed in FE regressions. These facts advise the presence of learning-by-importing effects for imports from EU and those multiple markets. In this line, the high OLS premia associated with EU and multiple imports could be explained by self-selection and by learning effects.

4.3.2. Robustness checks

Sectoral desegregation

Overall, the previous results seem to confirm that differences among firms are partly explained by the diversity of destinations of exports and origins of imports. Nevertheless, it is wise to perform a finer level of desegregation in order to observe if the previous picture is extended to the manufacturing system as a whole or is the misleading effect of aggregation, disregarding the true reasons. For that purpose, we used the usual group desegregation of five sectoral classification based on technological sophistication level.

Table 25 – Trade premium of TFP by type of country: sectoral analysis, 1996-2003

	*E*1	*E*2	*E*3	*E*4	*E*5	*E*6	*E*7	*I*1	*I*2	*I*3	*I*4	*I*5	Obs
Gr1	.094^{+}	.01^{+}	.14^{+}	-.02^{+}	.07^{+}	.23*	.18*	.14*	.04	-.31^{+}	-.12^{+}	.30**	3220
Gr2	.033^{+}	-.04^{+}	.29**	.01^{+}	.04^{+}	.02^{+}	.09*	.02^{+}	.03**	.26*	.09^{+}	.12*	7860
Gr3	-.17*	.11^{+}	-.13^{+}	.08^{+}	-.28^{+}	-.17*	-.11*	.22**	.22*	-.54*	.41^{+}	.37*	4322
Gr4	.002^{+}	.17^{+}	-.07^{+}	.13*	-.07^{+}	-.19**	-.11**	.11**	.03^{+}	.01^{+}	-.11^{+}	.25*	7392
Gr5	-.08^{+}	-.64^{+}	-.17*	.34**	.50^{+}	-.99*	-.10**	.02^{+}	.00^{+}	.07^{+}	.11^{+}	.07*	4110

Source: Own calculations by Pooled OLS.
Notes: see Table 14.

The results of Table 25 show that exporters to several groups of destinations ("Multiple") are always statistically significant and have a positive correlation in the case of firms belonging to the lower levels of sector technological sophistication (Gr 1 and 2). On the

other hand, more evolved technological firms present more productive levels when trading to more developed destinations. Importers from the EU and from several groups of countries ("Multiple") once again present the best performances, as happened in the general aggregated estimation.

The particular case of exports to Spain and of imports from Germany

Given the high weight of Portuguese exports to Spain, we created an additional mark to separate the firms exporting only to that country: (E_SPA) and accordingly we rearranged the previous mark for firms exporting only to other European Union countries (E_EU).

An analysis for the TFP variable shows that: firms exporting to Spain, to other European Union countries and simultaneously to other developed countries and to the European Union present the lowest TFP level, thus suggesting they face fewer barriers and lower costs to export to those destinations. Other results follow the pattern observed before (Table 26).

Table 26 – Trade premia by type of country development, 1996-2003

(Exports to Spain detached)

ln*TFP*	E^{SPA}	*E*1	*E*2	*E*3	*E*4	*E*5	*E*6	*E*7	*I*1	*I*2	*I*3	*I*4	*I*5
OLS	-.001^{+}	-.10**	.06*	.17*	.00^{+}	.008^{+}	-.121**	.009*	.09**	.05*	.013^{+}	-.05^{+}	.17**

Source: Own calculations by Pooled OLS.
Notes: see Table 14; Obs = 24576; R sq = 0.25.

In a second extension of the detailed analysis of trade we created an additional mark for firms that import only from Germany ($I\_^{GER}$) and accordingly we adjusted the mark for European Union country imports ($I\_^{EU}$). The general pattern (Table 27) still holds and in the case of firms importing from Germany we observed that they display positive import premium, suggesting it represents a prerequisite to benefit from their trading activities. Imports of German technologically complex goods, machinery and similar inputs need an adequate absorptive ability which in turn demands superior TFP levels.

Table 27 – Trade premia by type of country development, 1996-2003; Pooled OLS

(Exports to Spain and imports from Germany detached)

ln*TFP*	I^{GER}	E^{SPA}	*E*1	*E*2	*E*3	*E*4	*E*5	*E*6	*E*7	*I*1	*I*2	*I*3	*I*4	*I*5
OLS	.02*	-.001+	-.10**	.06*	.17*	.00+	-.12**	.008+	.009*	.09**	.05*	.013+	-.05+	.17**

Source: Own calculations.
Notes: see Table 14; Obs = 24572; R sq = 0.26.

We also performed an FE version of the previous equation (Table 28). Since this model takes a "causal flavour", as it estimates a correlation between a change in the trading status and a change in TFP, we can see that only for Spain and for exports with more than one group of countries (EU+PL and "Multiple") there is a sign of possible LBE effects, thus excluding similar probable LBE with less developed countries or even with only PL countries. On the import side, those made from Germany maintain the importance.

Table 28 – Trade premia by type of country development: 1996-2003; FE model

(Exports to Spain and imports from Germany detached)

ln*TFP*	I^{GER}	E^{SPA}	*E*1	*E*2	*E*3	*E*4	*E*5	*E*6	*E*7	*I*1	*I*2	*I*3	*I*4	*I*5
FE	.01*	.11+	.03	.08+	.10**	.01	-.05**	.005+	.07*	.05+	-.1+	.05+	.07+	.04+

Source: Own calculations.
Notes: see Table 14; Obs = 24572; R sq = 0.18.

The special case of exports to difficult markets

The hardest destination markets for Portuguese firms are the most "distant" ones in terms of geography, politics, legal structure, economic structure, culture and language. Firms that trade with those markets may have to overcome the highest sunk costs of trade entry. In order to test this hypothesis, we classified as difficult countries (DC) those to which fewer than 50 Portuguese firms exported in 2003 (Appendix H). In 2003, there were 461 fearless firms (FF) in our working database that had managed to export to at least one market of this type.[25]

[25] In 2003 the exports to those countries represented 0,6% of all exported value and the firms involved were 3% of all exporting firms.

Comparing those firms' performances, in 2003, with the average of all firms of our working database, the clear superiority of firms selling to those destinations is evident (Table 29).

Table 29 – Fearless firms' superiority

2003	TFP	Employees	Investment	Capital	Sales
% premia	31	121	205	205	167

Source: Own calculations.

In order to further test this thesis, we rearranged Table 23 by including "fearless firms". Thus, it is observable that firms exporting to the mentioned *Difficult Countries* (DC) have the best performances, with all firms exporting to more than one group of countries. On the other hand, firms that present lowest TFP are those selling to EU and other developed countries.

Table 30 – Trade premiums by type of country development, 1996-2003; Pooled OLS

(Exports to Spain and to Difficult Countries are detached)

ln*TFP*	E^{DC}	E^{SPA}	*E*1	*E*2	*E*3	*E*4	*E*5	*E*6	*E*7	*I*1	*I*2	*I*3	*I*4	*I*5
OLS	.107	.068^{+}	-.06	.034^{+}	.041^{+}	-.01^{+}	-.04^{+}	.056*	.106	.15	.06^{+}	-.03^{+}	.00^{+}	.31

Source: Own calculations.
Notes: see Table 14; Obs = 24572; R sq = 0.18.

Looking for additional insight we also performed an FE model estimation (Table 31).

Table 31 – Trade premiums by type of country development, 1996-2003; FE model

(Exports to Spain and to Difficult Countries are detached)

ln*TFP*	E^{DC}	E^{SPA}	*E*1	*E*2	*E*3	*E*4	*E*5	*E*6	*E*7	*I*1	*I*2	*I*3	*I*4	*I*5
FE	0.03*	0.12**	.02^{+}	.022^{+}	.121	.07^{+}	.05^{+}	.10*	.12	.07*	-.04^{+}	-.03^{+}	-.01^{+}	.08^{+}

Source: Own calculations.
Notes: see Table 14; Obs = 24572; R sq = 0.14.

Firms that export to DC now have a non significant coefficient in the regression, thus suggesting that those firms have high correlation with TFP as they self-select for those markets but do not learn with them. The highest coefficient levels are detected in firms exporting to more than one group of countries, to Spain and to both EU and PLOP. In the

latter cases it is reasonable to admit that possible "learning effects" associated with exports to Spain and PL countries may be connected with firms of lower technological level.

Sectoral desegregation for all cases

Using an FE model we decomposed the previous structure of analysis for the five Group sectors already known. As we have stated, exports to Spain seem to improve efficiency only for less technologically sophisticated firms, while exporting to several groups of markets ("Multiple") has a more generalised positive effect. On the import side only medium and high level technological firms seem able to benefit from the imports coming from the EU and from Germany, which is in accordance with their superior learning by importing propensity.

Table 32 – Trade premium of TFP by type of country: sectoral analysis, 1996-2003

	E^{DC}	E^{SPA}	*E*1	*E*2	*E*3	*E*4	*E*5	*E*6	*E*7	*I*1	*I*2	*I*3	*I*4	*I*5	Obs
Gr1	-.11^{+}	.03**	-.03^{+}	.02^{+}	-.01^{+}	.02^{+}	.07^{+}	.07^{+}	.15*	-.13^{+}	.04	-.39	-.12^{+}	.30^{+}	3220
Gr2	.01^{+}	.09*	-.04^{+}	.04^{+}	-.29^{+}	.13^{+}	.16^{+}	.01^{+}	.07^{+}	.03^{+}	.07^{+}	-.14	.05	.08^{+}	7860
Gr3	.09*	.08*	-.10^{+}	-.24	.03^{+}	.23*	-.02^{+}	.04^{+}	-.04^{+}	.08^{+}	-.15^{+}		-.02^{+}	.14*	4322
Gr4	.07*	.08*	.05^{+}	.14^{+}	.14^{+}	.01^{+}	.02^{+}	.10^{+}	.10*	.24	-.03^{+}	.02^{+}	-.02^{+}	.11*	7392
Gr5	.01*	.18*	.02^{+}	-.05^{+}	.16^{+}	-.10^{+}	.23^{+}	.07^{+}	.09^{+}	.22*	-.16^{+}	.18^{+}	-.05^{+}	-.15^{+}	4110

Source: Own calculations by Fixed Effects model.
Notes: see Table 14.

4.3.3. Dynamic specification

Although previous empirical studies do not suggest a dynamic specification, we decided to introduce a dynamic variant of the static model, since in this static model there may be issues with serial correlation of dependent variables and with endogeneity of some explanatory variables (e.g., the number of goods traded or the ability to export to "difficult countries" may cause changes in TFP but the inverse causality is also possible). Then, in each Equation (1), (2) and (3), and for each dependent variable we included an additional explanatory variable: the one time lagged dependent variable, always controlling for the usual variables.

For the regressors we tested two hypotheses: of strictly exogenous regressors and of predetermined regressors with a lag of one year. We used both the Arellano-Bond (1991) and the Arellano-Bover (1995), Blundell-Bond (2000) regressors (with one step). For Equation 2 and 3, the Sargan test[26] rejects the validity of the instruments used and so we abandoned the dynamic specification. In the dynamic version of Equation 1, the Sargan test confirmed the validity of the instruments and we also confirmed that there is no serial correlation in the first differences;[27] none of the internationalization coefficients are significant.

Nevertheless, a more disaggregated analysis allows us to obtain significant coefficients for TWT and for the sub-sample that combines firms with higher dimension and inferior technological skills (Table 33).

Table 33 – Dynamic panel data model for equation 1

Dependent variable: ln TFP

	Gr 1 and 2 Dim.>50	Gr 1 and 2 Dim.<50	Gr 3, 4 and 5 Dim.>50	Gr 3, 4 and 5 Dim.<50
TWT	0.133**	-0.062+	-0.015+	-0.052+
	(0.065)	(0.149)	(0.051)	(0.083)
OEXP	0.022+	-0.142+	0.022+	-0.024+
	(0.082)	(0.166)	(0.07)	(0.094)
OIMP	-0.045+	0.024+	0.030+	-0.098+
	(0.079)	(0.133)	(0.070)	(0.084)
lnTFP t-1	-0.98	-0.98	-0.99	-0.99
	(0.009)	(0.002)	(0.002)	(0.000)
Observations	2716	4652	3608	1550
Prob > Chi2 (Wald Test)	0.000	0.000	0.000	0.000
Prob > Chi2 (Sargan Test)	0.0003	0.0230	0.0048	0.0072

Source: Own calculations.
Notes: see Table 14.

[26] The hypothesis being tested with the Sargan test is that the instrumental variables are uncorrelated to some set of residuals, and therefore they are acceptable instruments.

[27] Using Arellano-Bond test for zero autocorrelation in first-differences errors, where this is possible.

The dynamic panel data analysis provides more reliable results and confirms the main static panel data findings, in particular, the positive effect of internationalization (exports and imports) on productivity, suggesting the existence of dual learning (by exporting and by importing) in the sub-sample of firms with more than 50 employees and belonging to less sophisticated sectors (Groups 1 and 2).

5. Conclusions

Exploiting a database that combines data on a representative sample of the economic and financial performance of Portuguese firms with data on their exporting and importing activity, for the first time for Portugal we present a picture of firms that were involved in international trade for the period 1996 to 2003.

In line with some recent studies and theories, we confirmed that: (i) trade is highly concentrated in a small group of firms; (ii) firms with different international-involvement levels have different performances, regarding productivity, sales, number of employees and capital intensity. Generally, the stronger the firms' international engagement, the better the performances. This paper highlights and supports recent theories and models of international trade with heterogeneous firms, at variance with the traditional theories founded on the comparative advantage of countries.

We analysed trade concentration in Portuguese firms inter and intra-sectors and found that it is more evident on the import side than with regard to exports, although it is declining and doesn't appear to be higher than in other countries. An important trade concentration is observed both in intensive and in extensive margins.

Using panel data linear static models and also, when possible, dynamic panel data analysis, our study evolved at three distinct levels: the international trading status, the extensive margin performance (both at country and good levels) and the heterogeneity of markets involved in international activities. We found that two way traders are the best

performers and that only importers outperform only exporters. We noticed that geographical and sectoral diversification, both in exports and imports, is positively correlated with firms' economic performance. We also revealed that exporters selling only to European countries appear to be the least efficient ones, suggesting that firms self-select to markets in which the productivity level is lower than their own. In turn, importers from European countries revealed higher performances (especially in German imports) since they import mainly high-tech capital goods that demands a higher previous efficiency from firms in order to benefit from those shopping. We also reveal the superior productivity of a limited number of firms managing to export to difficult markets. Finally, in a robustness and validation action, we divided our database according to sectoral groups of firms and also firms´ dimension, aiming to uncover even more specificities in the connections between trade involvement and firms´ ability and efficiency.

Altogether, the main contribution of this paper may be the fact that it suggests that future studies aiming to uncover the connections between the performance of Portuguese firms and their international trade involvement must take into consideration the specificities of the markets that firms trade with and of the diversity of goods involved.

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Appendix A – Share of firms exporting more than 90% of turnover (2003)

Country						
Portugal	Germany	France	UK	Italy	Hungary	Norway
14%	1%	1%	2%	3%	11%	1%

Source: Own calculations and Mayer and Ottaviano (2007).

Appendix B – Sectoral Theil Index

Sector	Employment	Sales	Exports	Imports	Total Int. Trade
15	0.57	1.08	1.89	1.95	1.62
16	0.43	1.07	1.23	1.26	1.16
17	0.59	0.73	1.32	1.27	1.17
18	0.37	0.63	0.85	1.54	0.91
19	0.70	0.74	1.20	1.64	1.41
20	0.51	0.94	1.59	2.01	1.52
21	0.69	1.61	2.51	1.78	2.23
22	0.51	0.89	1.89	1.57	1.14
24	0.51	0.91	2.13	1.19	1.44
25	0.48	0.96	2.17	1.59	1.80
26	0.58	1.36	1.62	2.19	1.60
27	0.49	1.12	1.50	1.65	1.38
28	0.42	0.82	1.51	1.62	1.57
29	0.51	0.88	1.68	1.85	1.52
30	0.44	0.46	1.18	0.56	0.56
31	1.56	1.36	2.16	1.51	1.87
32	0.87	1.27	1.64	1.69	1.59
33	0.56	0.79	1.25	1.23	1.13
34	1.01	2.13	2.85	2.25	2.45
35	1.10	1.38	1.97	1.95	1.85
36	0.60	1.24	2.35	3.21	2.62
37	0.12	0.43	1.16	1.22	0.95
Mean	0.70	1.45	2.10	2.13	2.28

Source: Own calculations.

Appendix C – Between sectors concentration of exports

Sector	Number of firms(share of each sector)	Value of exports(share of each sector)	Export intensity (%)
15	10.1	6.1	25
16	0.1	0.4	56
17	12.6	9.2	47
18	9.6	5.8	63
19	5.5	4.2	54
20	5.1	4.9	42
21	1.9	6.8	25
22	3.0	0.2	7
24	4.7	5.6	27
25	4.1	4.4	34
26	8.5	4.4	42
27	2.2	1.7	31
28	7.2	4.1	29
29	8.3	4.9	36
30	0.3	0.1	24
31	2.9	7.6	38
32	1.3	9.3	42
33	1.3	0.6	41
34	2.3	14.2	51
35	1.8	1.9	45
36	6.3	3.5	25
37	1.0	0.1	39
Total	100	100	36

Source: Own calculations.

Appendix D – Export intensive margin

Year 1996 Destination	1996: Value of export per firm (10^3 euros)	Year 2003 Destination	2003: Value of export per firm (10^3 euros)
Liberia	10,916	Botswana	1,768
Chad	1,664	Germany	1,278
Germany	1,086	Singapore	1,000
UK	770	Spain	979
France	562	UK	927
Spain	490	San Marino	918
Singapore	381	France	813
Italy	366	Belgium	629
Netherlands	357	Italy	521
Belgium and Lux,	337	USA	505

Source: Own calculations.

Appendix E – Export growth (1996-2003) to the 10 most frequent destinations

Country	Overall growth	Intensive growth (value exported per firm)	Extensive growth (number of firms)
Spain	159	98	31
France	46	45	1
Germany	2	18	-13
UK	43	38	3
USA	98	68	18
Angola	113	8	98
Netherlands	19	31	-9
Italy	107	61	28
Switzerland	-6	-4	-1
Belgium	68	87	-10

Source: Own calculations.

Appendix F – Trade participation rates of Portuguese firms, by sector

NaceE	Description	Share of TWT	Share of NT
15	Food & beverages	42	31
16	Tobacco	75	25
17	Textiles	68	13
18	Wearing apparel	73	9
19	Leather	73	11
20	Wood	45	29
21	Pulp, Paper	61	12
22	Printing	33	35
24	Chemicals	68	14
25	Rubber, plastic	72	11
26	Non-metalic mineral prod	40	29
27	Basic metals	69	20
28	Fabricated metal products	45	32
29	Machinery	44	31
30	Office machinery and computers	60	40
31	Electrical machinery	76	15
32	TV&Communication	82	9
33	Medical, precision and optical instruments	69	9
34	Motor vehicles	71	11
35	Other transport equipment	59	18
36	Furniture	49	28
37	Recycling	53	13
Total		56	22

Source: Own calculations.

Appendix G – Firm perfomance and extensive margins of trade (products and markets) – average 1996 – 2003; Unit: Thousands euros

	LP	TFP	Sales	Capital Intensity	Employees
NCE = 1	14	0.13	6,367	65	100
NCE= 30	30	0.15	68,030	117	530
NSE = 1	14	0.12	7,024	70	101
NSE = 10	25	0.14	70,210	103	484
NCI = 1	12	0.12	5,328	57	91
NCI= 30	24	0.14	69,096	98	1,053
NSI = 1	11	0.13	3,609	54	69
NSI = 10	34	0.16	92,091	132	735

Source: Own calculations.

Appendix H: Toughest markets for exports (Difficult countries – DC)

Congo, Equator, Syria, Vietnam, Serbia, Iran, Gabon, Pakistan, Qatar, Sri Lanka, Ghana, Guatemala, Guinea, Bermudas, Benin, Uruguay, Mali, Libya, Kenya, El Salvador, Burkina Faso, Mauritania, Togo, Madagascar, Bangladesh, Nicaragua, Barbados, Oman, Bosnia, Sudan, Chad, Macedonia, Moldavia, Barbados, Liberia, Central African Republic, Kyrgyzstan, Haiti, Ethiopia, Honduras, Albania, Paraguay, Yemen, Azerbaijan, Uganda, Swaziland, Belarus, Kazakhstan, Niger, Botswana, Cambodia, Turkmenistan, Armenia, North Korea, Djibouti, Somalia, Uzbekistan, Rwanda, Samoa, Guam, Tonga, Malawi, Bhutan, Laos, Nepal, Iraq, Myanmar, Mongolia.

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