Imports and Exports at the Level of the Firm:

Evidence from Belgium*

Mirabelle Muûls[1]
Mauro Pisu[2]

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Abstract:
This paper explores a newly available panel data set merging balance sheet and international trade transaction data for Belgium. Both imports and exports appear to be highly concentrated among few firms and to have become more so over time. Focussing on manufacturing, we find that facts previously reported in the literature for exports only apply to imports too. We note that the number of trading firms diminishes as the number of export destinations or import origins increases. The same is true if we consider the number of products traded. With regards productivity differentials, firms that both import and export appear to be the most productive followed, in order, by just importers, just exporters and non-traders. These results point to the presence of fixed costs not only of exports, but also of imports and to a process of self-selection in both export and import markets. Also, the productivity advantage of exporters widely reported in the literature may have be overstated because of not considering imports.

JEL codes: F10, F16, J21

1.   Introduction

It is a well known fact that the world is becoming economically more integrated. Between 1990 and 2004 world exports of goods and non-factor services increased by 116 percent surging to $9216 billion. This outstripped the rise in world GDP (in nominal terms), which during the same period rose by 63 percent (UNCTD 2005). Recently, research efforts on the effects of international trade on different aspects of national economies, such as growth, employment and wage levels, have increasingly relied on the availability of firm-level data sets. This has shifted the focus of research from the level of countries and industries to the underlying micro-economic determinants of trade flows and their effects on firms and workers.

This burgeoning micro-econometric literature on international trade has mostly focused on exports. This branch of the literature, starting from Bernard and Jensen (1995) and Aw and Hwang (1995), has allowed to investigate in detail the choices of export market participation at the level of the firm (see Greenaway and Kneller (2005) and Wagner (2007) for two recent surveys of the literature). One of the main findings of this research is that exporters are superior to non-exporting firms along several firm-level characteristics, such as productivity, employment and R&D spending. The existing evidence suggests that trade is mostly conducted by a relatively small number of companies.[1]

Thus far imports have been relatively neglected by the empirical literature. This is unwarranted given the rise of intermediates imports.[2] There are also strong theoretical reasons, to expect that access to a larger variety or better quality of inputs, and technological spillovers across international borders might affect positively firm-level productivity (Ethier 1982; Markusen 1989; Grossman and Helpman 1991; Feenstra Markusen and Zeile 1992).

In this paper we extend the evidence of the micro-econometric literature of international trade by offering a complete view of the international trading activities of Belgian companies. For this purpose we use a data set of Belgian firms matched with exports and

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[1] Bernard and Jensen (1995) for the US and Eaton, Kortum and Kramarz (2004) for France, using comparable data sets in terms of coverage, find that only a minority of manufacturing firms (15 percent in US and 17 percent in France) export.

[2] Hummels, Ishii, and Yi (2001) find that for OECD countries around 20% of total exports are due to imported intermediate inputs being used for further processing. Besides, one shouldn't neglect the fact that imported final goods reach final consumers through firms operating as intermediaries .

imports data covering the period 1996-2004. This allows us to identify importers and exporters along with the country of destination of exports and origin of imports. In addition, we observe which and how many products they trade as well as a number of other firm level characteristics. The dataset also allows us to consider the broad Belgian economy rather than manufacturing firms only, and to compare both importing and exporting activities. With the exception of Bernard, Jensen and Schott (2005) for the US this is a clear improvement on the literature.[3]

Studies have overwhelmingly found that exporters are larger and more productive than non-exporters. This is mostly explained by the presence of fixed costs of exporting combined to the coexistence of firms with different productivity levels operating within a given industry. Theoretical models (Melitz 2003; Bernard, Eaton, Jensen and Kortum 2003) formally show that the most productive firms self-select into export markets. Firms whose productivity is above a certain cut-off point will find it profitable to pay the fixed costs of exporting and will start shipping goods abroad.

Part of our results corroborate existing findings while others are novel and lay the path for future research. Considering firms operating in all sectors of the economy and not just in manufacturing, we find that the number of firms engaged in international trade has been increasing, along with their employment levels. However, their share in the total number of firms and employees in the economy has decreased during the sample period, due to new firms and jobs being generated mostly in the service sector. By definition, service firms are less likely to trade in goods than firms in manufacturing or in wholesale and retail sectors. Similarly, companies trading internationally are larger in terms of value added and employment than non-trading ones, although their contribution to value added and employment of the whole economy decreased over the sample period.

Among traders, we find that firms that solely import are the only category of traders accounting for a rising share of total value added and employment. This is also because importers are the only kind of trading firms whose share in the total number of firms increased. This suggests that international outsourcing is becoming an increasingly

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[3] MacGarvie (2006) also considers the importing and exporting activities of French firms, but she focuses on their effects on patent citations.

common practice even among service firms. Importers grew faster in terms of value added than exporters, but slower than companies that both import and export.[4]

Our findings also point to the existence of fixed costs of importing besides fixed costs of exporting. Both imports and exports appear to be strongly concentrated among the largest, in terms of both employment and value added, and most productive firms. Exports show an even larger degree of concentration than imports. As previously described in the literature focussing on exporters only, we show that traders outperform non-traders. They are more productive and spend on average more on R&D . Furthermore, two way traders are superior in those dimensions to traders. The concentration of international trade among the largest and most productive firms may be generated by fixed costs, whereby only the best firms can afford to meet them and then start trading internationally.

Only a minority of firms import and when they do so, most firms source intermediate goods from a small number of countries. This mimics the behaviour of exporting activities. Firms export only a small share of their output and serve only few foreign markets. There is a negative relationship between the number of exporting firms and the number of export destinations they serve.[5] The same type of relationship holds at the product level. Traders export or import a relatively small number of goods and the number of trading firms decreases as the number of products traded increases.

Our results also suggest that the number of export markets served and the number of import origins increases with productivity. Furthermore, productivity is also increasing in the number of products exported or imported. These positive relationships suggest that both fixed costs of imports and of exports are incurred for each new country or product firms start trading.

The rest of the paper proceeds as follows. The next section briefly overviews the exiting literature concerning importing and exporting behaviour at the level of the firm. The data set is described in Section 3. The evidence we provide are commented in Section 4. Section 5 concludes.

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[4] Henceforth, we will refer to companies that both import and export as two-way traders to distinguish them from firms that solely export or import, which we will label as traders.

[5] Eaton, Kortum and Kramarz (2004) and Damijan, Polanec and Prasnikar (2004) present similar findings concerning the exporting activities of French and Slovenian firms.

2.   Exports, Imports and Firm Level Characteristics

The micro-economic literature in international trade was pioneered by the work of Bernard and Jensen (1995) and Aw and Hwang (1995) on export market participation. These and many successive studies spanning different countries and time periods have overwhelmingly confirmed exporters enjoy better performance characteristics than non-exporters. Theoretical models of Melitz (2003) and Bernard, Eaton, Jensen and Kortum (2003) build these stylised facts into international trade general equilibrium model to show how the most productive firms self-select into export markets.[6]

An alternative hypothesis has been also put forward to explain the productivity advantage of exporters compared to non-exporting firms (Clerides, Lach and Tybout 1998): this is the learning-by-exporting hypothesis. Testing the self-selection versus learning-by-exporting hypothesis has attracted a great deal of research effort. The debate was won convincingly by those supporting self-selection. The arguments were perhaps most powerfully put by Bernard and Jensen (1999, 2004). In their study of US plants they found that even though exporters had a higher level of productivity, the rate of productivity growth of exporters was not significantly different from that of non-exporters. They also provided evidence that new exporters were already among the best and differed significantly from the average non-exporter.[7]

More recently the hypothesis under test has evolved and started to consider whether or not there is any productivity improvement conditional on self-selection: does the performance of newly exporting firms improve relative to similar firms that did not start exporting? This involves controlling for the selection effect in the export decision. Here the results are less clear-cut. On the one hand, Baldwin and Gu (2004) for Canada, Castellani (2002) for Italy, Damijan, Polanec and Prasnikar (2004) and De Loecker (2004) for Slovenia and Van Biesebroeck (2005) for a set of African countries find evidence of productivity improvements following the start of exports. On the other hand, Wagner (2002) for Germany find no evidence supporting the learning by exporting hypothesis.

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[6] Bartelsman and Doms (2000) report that there is great dispersion in productivity levels across firms even in narrowly defined industry.

[7] In this literature different measures of productivity have been used. Some studies have used labour productivity (i.e. value added per worker). Others have employed total factor productivity measures, which take into account the contribution of all inputs. Results overall appear robust to the methodology used to compute productivity.

Recently, Eaton, Kortum and Kramarz (2004) and Damijan, Polanec and Prasnikar (2004) have added a new dimension to the export firm-level literature by investigating export destination data. Eaton, Kortum and Kramarz (2004) look at the cross section of French firms in 1986. Their contribution goes along two main lines. Firstly, they show that there is a negative relationship between the number of firms selling to multiple markets and the number of foreign markets they serve. Secondly, the variation of French exports across destinations is mostly at the extensive margin (i.e. number of firms selling there) rather than the intensive margin (i.e. output firms already exporting sell there). They show that one percent increase in the French export market share of a foreign country market size (i.e. gross production plus imports less exports), reflects around 0.88 percent rise in the number of firms exporting there, whereas only 0.12 percent is due to increase in sales of firms already exporting to the same destination.

Damijan, Polanec and Prasnikar (2004) show that productivity is positively associated to the number of export markets firms serve.[8] This suggests that fixed costs of exporting re-occur at the entrance of each new export market. Also they show how firms penetrate new export markets gradually, on average one every two years and they start exporting to the countries with low fixed costs.

The abundance of empirical evidence concerning the exporting behaviour of firms contrasts with the paucity of studies focussing on their importing activities.[9] It is a truism to say that the surge in international trade is due not only to the rise in exports, but also in imports and that therefore both sides of the coin deserve to be investigated. However, anecdotic evidence concerning the rise in international outsourcing make the study of imports at the level of the firm all the more interesting in its own. Surprisingly there is little systematic and consistent evidence across countries concerning the increase in trade in intermediates. Hummels, Ishii and Yi (2001) calculate the degree of vertical specialisation for a number of OECD countries using input-output tables. They find that between 1970 and 1990 the share of imported inputs used to produce goods that are exported rose by around 30 percent to 21 percent of the total exports of the countries considered.[10]

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[8] They analyse a Slovenian firm-level date set from 1994 to 2002.

[9] There are a number of empirical works that have investigated the effect of import competition. For instance Pavcnik (2002) shows that firms in import-competing industries experienced productivity gains after trade liberalisation.

[10] See Campa and Goldberg (1997) for the US, UK and Canada and Strauss-Kahn (2003) for France.

Also, there are theoretical reasons to expect that imports of intermediates will impact upon firms, in particular on productivity: Markusen (1989), building on Ethier (1982), argues that trade liberalization of intermediates raises technical productivity in the final good production if final and intermediates sectors have non-constant return to scale. This is because of the complementarities of domestic and foreign specialised inputs. With free trade in inputs "each country essentially confers a positive technological externality on its trading partner" (Markusen 1989). Feenstra Markusen and Zeile (1992) show how the introduction of new inputs, that is an increase in input variety, is positively correlated with total factor productivity (TFP). In endogenous growth models with international trade, the productivity level of a country can increase because of externalities not only from its own R&D spending, but also from R&D spending of trading partners. (Grossman and Helpman 1991).

To date, there is only scant empirical evidence on the effects of imports on firm-level characteristics. The available studies suggest the existence of a positive relationship between imports and productivity.[11] Only Bernard, Jensen and Schott (2005) for the US and MacGarvie (2006) for France have provided so far a comparative analysis of the exporting and importing behaviour of firms and their effects. The analysis that follows is more in the spirit of the study of Bernard, Jensen and Schott (2005). They show how US imports and exports are both heavily concentrated on a relatively small number of firms. Furthermore they show how traders account for a disproportionate share of total employment, when compared with their numbers, and how firms that trade with more countries and/or more products are larger.[12] They also argue that firms that both import and export dominates US trade flows and employment at trading firms.

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[11] Schor (2004) compares the effect of output and input tariff cuts on Brazilian manufacturing productivity and finds that they are similar in magnitude. Muendler (2004) extends her analysis to consider explicitly the role of imported inputs in a production function. He finds that imported equipment and intermediates have a larger effect on output than domestically produced analogous inputs. However, their contribution to aggregate productivity changes is minor when compared to within firm productivity improvement and the exit of less productive firms due to import competition. Amiti and Konings (2005) make a comparative analysis in the spirit of Fernandes (2003). They study the different effects of output and input tariff cuts on firm-level productivity in Indonesia. They find that both tariff cuts boost productivity, but that the effect of decreasing input tariffs is three times larger than that of cutting output tariffs. Furthermore, the effect is even stronger for importing firms. Halpern *et al*. (2005) show that the significant effect of imports on total factor productivity in Hungary in the 1990's operates through productivity improvement and through the reallocation of capital and labour to importers.

[12] MacGarvie (2006) studies the effect of imports and exports of French firms on foreign patent citations. Importing activities cause the number of foreign patents cited by importers to increase, whereas this is not true for exporters. This is taken as evidence that imports, contrary to exports, facilitate access to foreign technology.

3. Description of the data and sample coverage

Firm-level accounts. Central Balance Sheet Office at the National Bank of Belgium (NBB) gathers the annual accounts of almost all companies which are active in Belgium. Most limited liability enterprises, plus some other enterprises, have to file their annual accounts and/or consolidated accounts with the Central Balance Sheet Office at the National Bank every year. There are some exceptions. Some enterprises do not have to file any annual accounts.[13] In certain cases these companies have to submit a social balance sheet to the Central Balance Sheet Office. The social balance sheet holds specific information about the workforce: number of people employed, personnel movements, training. Large companies have to file the full balance sheet. The abbreviated presentation may be used by small companies.[14]

For this study we selected those companies who filed between 1996 and 2004 a full or abbreviated balance sheet and dropped those that only file social balance sheets.[15] Also we did not select firms filing consolidated balance sheets to avoid double counting. Those balance sheets that cover more than one year or report data from to different calendar years were annualised to match the customs data.

Customs data. Trade data on individual transactions concerning exports or imports are collected separately at the firm level for intra-EU (Intrastat) and extra-EU (Extrastat) trade. Different types of international trade transactions are reported. To classify firms as exporters and/or importers we consider only those involving change in ownerships.[16] Companies report Intrastat transactions monthly. Companies are only liable for Intrastat

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[13] These include: sole traders; small companies whose members have unlimited liability: general partnerships, ordinary limited partnerships, cooperative limited liability companies; large companies whose members have unlimited liability, if none of the members is a legal entity; public utilities; agricultural partnerships; hospitals, unless they have taken the form of a trading company with limited liability; health insurance funds, professional associations, schools and higher education institutions.

[14] Under the Belgian Code of Companies, a company is regarded as large if: the annual average of its workforce exceeds 100 persons or more than one of the following criteria are exceeded: 1) annual average of workforce: 50; 2) annual turnover (excluding VAT): €7 300 000 euro; 3) balance sheet total: €3 650 000.

[15] This is because social balance sheets contain only limited information.

[16] Records of international trade transactions have to register also movements of goods across borders which do not involve any change of ownership. These concern movements of stock, of goods sent or received for further processing, or for repair (after the repair has been executed). Furthermore, international trade transactions have to register the return of merchandise and other special movements of goods. For more information see also Institute de comptes nationaux (2006). The recorded international trade transactions regard only goods that have actually transited the country. This therefore excludes the so called triangular trade, whereby two firms in two different countries (for instance A and C) exchange goods through an intermediary operating in a third country (B). The intermediary buys the goods from the seller in country A and sells them to the buyer in country C. However, the goods are shipped by the original seller (in country A) to the final buyer (in country C), without transit through country C. Official figures suggest that this kind of trade is a non-negligible phenomenon in Belgium, but it will be recorded among imports or exports of services and not of goods.

declarations if their annual trade flows (receipts or shipments) exceeded the threshold of €250 000.

There are two kinds of declarations, the standard and the extended declaration. Both declarations must include for each transaction the product code, the type of transaction, and the destination or origin of the goods, the value, the net mass and units. Companies which exceed the threshold of €25 000 000 for theirannual receipts or shipments must fill the Extended declaration.[17] In addition to the same common variables of the standard declaration, the means of transport and the conditions of delivery must be included in the extended declaration.

Extrastat contains exactly the same information as Intrastat for transaction flows with countries outside the European Union. The data is collected by customs agents and centralised at the National Bank of Belgium. The Extrastat data covers a larger share of the total trade transactions than Intrastat data, because all flows are recorded, unless their value is smaller than €800 and their weight smallerthan one ton.

The Belgian Balance Sheet Transaction Trade Dataset (BBSTD) results from the merging of the balance sheet data and the custom data at the level of the firm through the value added tax (VAT) number. This is a unique code identifying each firm. The merge was highly successful. As shown in Table 1, only 7.22 percent of the firms in the custom data in 1996 and 4.67 percent of them in 2004 were not merged with the balance sheet data set. These legal entities have a VAT number but do not file any account to the Central Balance Sheet Office.[18] Although these firms are only a marginal fraction of the whole population, they did account for 26.4 and 35.9 percent of total imports in 1996 and 2004 and 25.5 and 37.2 of total exports. More information about these unmatched firms is shown in Table 2. The majority of trade conducted by unmatched firms in 2004 was due to foreign firms with no actual production site in Belgium. Therefore, our results are unlikely to be biased by this matching issue.

In the data there are a large number of firms reporting no employee at all or only one part-time equivalent employee. In the following analysis we focus only on those firms with at

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[17] They must file an extended declaration for the flow of goods which exceeds this threshold. The extended declarations was introduced in 2002.

[18] These entities can well be some firms being part of larger group filing consolidated accounts. We do not use consolidated accounts. However, also with consolidated accounts, it would be extremely difficult to disentangle the data related to those firms trading internationally but not filing accounts, from the information on the other firms in the group.

least one full-time equivalent (FTE) employee.[19]   Although selecting these companies results in losing more than half of the total number of firms in both 1996 and 2004 (see Table 1), this does not lead to a significant loss of information. The selected firms account for most of the economic activity in Belgium. Table 1 shows that firms employing at least one worker accounted for 94.12 percent of total reported value added[20] in 1996 and 93.01 percent in 2004. Hence, our matched data set appears to adequately represent the Belgian economy.

Table 1: Merged balance sheet data and custom data

	Number of firms		Number of employee (thousands)		Value added (thousands Euros)	
	1996	2004	1996	2004	1996	2004
Balance sheet data	216137	301674	1590.89	1817.1	99790.8	147668.7
Firms not merged with custom data	15601 (7.22%)	94223 (4.67%)				
Firms merged: with at least 1 FT employee	96417 (44.61%)	107180 (35.53%)	1589.43 (99.91%)	1804.1 (99.29%)	93931.09 (94.12%)	137351.2 (93.01%)

Source: NBB-BBSTD.

Table 2: Unmerged balance sheet data and custom data type of firms (year 2004)

	% of unmatched exporting firms	% of unmatched exports	% of unmatched importing firms	% of unmatched imports
Foreign firms with no establishment in Belgium	14.4%	59.7%	13.7%	58.6%
Foreign firms	8.5%	21.4%	10.8%	21.1%
Non profit organisations	2.5%	13.5%	3.6%	14.3%
Others	74.6%	5.4%	71.8%	6.0%

Source: NBB-BBSTD. Notes: The judicial situation of firms with no Balance Sheet is obtained through the Firms' Crossroads Bank (BCE-KBO). Trading "foreign firms with no establishment in Belgium but with a VAT representative", are most probably trading platforms of other European firms using Belgium as their port of entry. Some might have been established for fiscal reasons by Belgian producing firms to conduct trade for them, but this cannot be controlled for in the data.

To investigate the sample coverage at the industrial level, Table 3 shows the number of firms and employment levels for different sectors of the economy considering firms with at

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[19] Henceforth, if we refer to an employee or worker, one should understand Full Time Equivalent Employee. This corresponds to item 9087 in the Balance Sheets.

[20] Value added is measured differently for firms filing in complete or abbreviated balance sheets. The difference between sales and inventory in products, services and miscellaneous goods is computed for complete balance sheets as items (70/74 – 740 – 60 – 61). In the case of abbreviated accounts, it is approximated by the gross operating margin (70/61 or 61/70).

least one employee and those with at least five employees. To provide an overview of the dynamics of broad sectoral divisions of the Belgian economy we consider the following industries: agriculture, fishing and mining, manufacturing, recycling, utilities and construction, wholesale and retail, services, coordination centres and firms with no industry classification.

Table 3: Number of firms and Employees per sector

Sector	Code Nace Bel	Number of Firms 1996				Number of Employees (thousands)			
		At least one FT empl.	%	At least 5 empl.	%	At least one FT empl.	%	At least 5 empl.	%
Agriculture, Fishing, Mining	1 to 14	1840	1.9%	591	1.6%	13.5	0.8%	11.0	0.7%
Manufacturing	15 to 36	15193	15.8%	9129	24.3%	579.8	36.5%	566.8	38.4%
Recycling, Utilities and Construction	37 to 49	13745	14.3%	5961	15.9%	174.3	11.0%	157.8	10.7%
Wholesale and Retail	50 to 54	32995	34.2%	11422	30.4%	309.0	19.4%	268.4	18.2%
Services	55 to 98	31918	33.1%	10105	26.9%	502.7	31.6%	463.9	31.4%
Coordination centres	74152	261	0.3%	261	0.7%	7.8	0.5%	7.8	0.5%
Unknown		464	0.5%	49	0.1%	2.4	0.2%	1.8	0.1%
Total		96416	100%	37518	100%	1589.4	100%	1477.5	100%
2004									
Agriculture, Fishing, Mining	1 to 14	2273	2.1%	794	1.9%	15.5	0.9%	12.1	0.7%
Manufacturing	15 to 36	14265	13.3%	8520	19.9%	534.8	29.6%	520.8	31.4%
Recycling, Utilities and Construction	37 to 49	15601	14.6%	6608	15.5%	189.8	10.5%	168.8	10.2%
Wholesale and Retail	50 to 54	34188	31.9%	12638	29.6%	381.5	21.1%	333.2	20.1%
Services	55 to 98	40650	37.9%	13974	32.7%	673.3	37.3%	616.1	37.1%
Coordination centres	74152	203	0.2%	196	0.5%	9.2	0.5%	9.2	0.6%
Total		107180	100%	42730	100%	1804.1	100%	1660.3	100%

Source: NBB-BBSTD.

Overall, the figures in Table 3 are broadly consistent with anecdotic evidence suggesting that most of the new small firms and start-ups are in the service sector whereas

manufacturing is shrinking and going towards a process of consolidation favouring large firms. In both 1996 and 2004 the service and wholesale and retail sectors accounted for the majority of all firms in the economy. The number of firms in the service sector increased in both employment classes we consider. Its share rose from 33.1 percent to nearly 38 percent (for firms with at least one employee) and from 27 to 32.7 percent (for those with at least five employees) from 1996 to 2004. The contribution of wholesale and retail to the total number of firms, although still prominent in 2004, decreased during the sample period. The decrease was sharper considering firms with at least one worker.

The share of manufacturing decreased markedly during the same period. Considering firms with at least five employees, their share plummeted from 24.3 percent to less than 20 percent. The decrease was a little milder when including smaller firms. Recycling, utilities and construction, another important sector maintained a stable share in total number of firms.

The last two columns of Table 3 shows the number of employees in each broad sector. manufacturing and services are the two largest employers, each accounting for between 30 and 40 percent of total jobs in our sample. Other large employers are, in decreasing order, wholesale and retail (around 20 percent), and recycling, utilities and construction (between 10 and 11 percent). Services and manufacturing appear to be on divergent paths. In 1996, manufacturing accounted for more than 36 percent of jobs in the whole economy. The contribution of services was around 31.5 percent. This ranking was reversed in 2004 as their respective shares were now 30 and 37 percent. Also, during this period, the share in terms of employment of wholesale and retail increased while that of recycling, utilities and construction remained stable.

Overall Table 3 suggests that, as expected, firms and jobs are deserting manufacturing and growing in the service sector and wholesale and retail sectors. This is likely to impact the evolution in the number and percentage of companies trading in goods .

4.   Evidence

Having described the dataset and considered its coverage, this section aims at exploring its content and highlighting several key elements related to exports and imports. In the following subsection we investigate the number and percentage of firms and jobs accounted by non-traders, and traders, distinguishing between importers, exporters and two-way traders. We then decompose these dynamics further for the manufacturing sector.

Next we examine and compare the level of concentration of both imports and exports. Then, focussing on the manufacturing sector, we analyse the firm-level characteristics of traders and non-traders. The information on export destinations, origins of imports and products traded are explored in the subsequent two subsection. Finally, we provide some evidence on the productivity differential between non-traders and the different types of traders.

A. *Importers, Exporters and Two-way Traders*

As developed in Section 2, the literature on firm-level trade has so far concentrated mainly on the exporting behaviour of firms. Few papers have considered their importing activities. This subsection establishes new stylized facts on how intertwined these two activities are, and on their frequency across both time and the broad sectors.

Table 4 considers the number of firms in the sample distinguishing between non-trading firms, importers, exporters and those that both import and export (i.e. two-way traders).[21] Again we focus our attention on firms with at least one or five employees.

Overall, only a minority of firms export or import, consistently with previous empirical studies. Exporters, defined as firms that just export or both export and import, accounted for around 21 percent of the totality of firms in 1996 and 15 percent in 2004.[22] Interestingly, our data suggests that international outsourcing of goods is a slightly more common practice than exporting.[23] Also companies are more likely to engage in two-way trade (export and import at the same time) than doing one or the other. The share of firms doing both was 16.8 percent in 1996, but decreased to 10.7 percent in 2004. On the whole, larger firms are more likely to trade.

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[21] We performed the same analysis considering trade with countries outside the EU only. Trade data relating to transactions with non-EU countries are more reliable than data relating to EU counterparts. This is because the recording of trade transactions with EU countries is undertaken by the firm. On the contrary, transactions with partners outside EU are recorded by the customs at the borders. Also, if one considers the EU as one single economy, only extra-EU trade would be considered as trade. The results for non-EU trade are similar to those found in Table 4. They are available upon request.

[22] Bernard, Jensen and Schott (2005) report for the US that only 4.2% percent of firms exported in 2000. They consider however all firms in the US with no limit on employment. Bernard and Jensen (1995) find that 14.6% of manufacturers exported, excluding small plants. Eaton, Kortum and Kramatz (2004) find similar findings for France using a cross-section data of all French firms for 1986. They find that 17.4 % of all manufacturers export. The different coverage of the data sets used. in other studies made direct comparisons with other countries difficult For instance, Kneller and Pisu (2004) find for the UK that export participation stands at around 65 percent. however, the data they use under-represents small firms.

[23] When considering all firms in the US economy in 2000 with no limit of size, Bernard, Jensen and Schott (2005) find that 3.3% of firms import while 4.2% export. With no size threshold, these figures in the BBSTD would be respectively 8.5% and 6.9% while they are reported in Table 4 as being 23.4 percent in 1996 and 18.7 in 2004 for firms with more than 1 employee.

Table 4: Number and employees of traders and non-traders

	Number of firms				Number of employees (thousands)			
	1996		2004		1996		2004	
Firms with at least one FT employee								
Non Traders	69825	72.4%	82502	77.0%	498.2	31.3%	692.7	38.4%
Importers	6321	6.6%	8576	8.0%	119.6	7.5%	194.1	10.8%
Exporters	4076	4.2%	4604	4.3%	92.6	5.8%	64.4	3.6%
Two-way traders	16195	16.8%	11498	10.7%	879.0	55.3%	852.9	47.3%
Total	**96417**		**107180**		**1589.4**		**1804.1**	
Firms with at least 5 FT employees								
Non Traders	21285	56.8%	26673	62.4%	408.5	27.6%	570.5	34.4%
Importers	3035	8.1%	4656	10.9%	112.9	7.6%	184.4	11.1%
Exporters	1889	5.0%	2649	6.2%	88.2	6.0%	59.6	3.6%
Two-way traders	11287	30.1%	8752	20.5%	867.9	58.7%	845.8	50.9%
Total	**37496**		**42730**		**1477.5**		**1660.3**	

Source: NBB-BBSTD.

The last two columns of Table 4 show that most jobs in Belgium are generated by firms that have some type of involvement in trading goods internationally. Besides, two-way traders are the largest employers. They account for around 50 percent of total employment. Comparing the first two columns of Table 4 with the last two, we have the stark contrast that non-traders are the majority of firms in 1996 and 2004, but at the same time their share of total employment is much lower (being below 40 percent). As shown in Table 5 and the corresponding Figure 1, the growth in the total number of firms is mostly generated by both the service sector and non-trading firms. These firms are less likely to be involved in trading goods. Thus, although the manufacturing sector has become more open and trade in goods has increased in value, a lower proportion of firms in the economy is involved in importing and/or exporting goods because new firms are mostly concentrated in the, relatively closed, service sector.

Hence, the shares of manufacturing and wholesale and retail in non-traders decreased while that of agriculture increased, both in terms of firms and employees. Due to the growth of services which are increasingly over time unlikely to trade in goods across borders, the share of total jobs in the Belgian economy of non -traders rose between 1996 and 2004 from 31.3 percent to 38.4 percent. Unsurprisingly, non-traders appear to generate fewer jobs than traders in the manufacturing sector. Only around 10 percent of employees of manufacturing worked for firms that neither imported nor exported goods in 1996 and 2004. Wholesale and retail firms' employment became increasingly located in

non-trading firms with increase from 25 percent to 26.6 percent, possibly because new firms tend not to trade immediately.

Our results concerning the dynamics of firms and jobs (as share of the total economy) and their trading status is in contrast with what Bernard, Jensen and Schott (2005) report for the US. They find that over the 1993-2000 period the contribution of traders (whether exporters, importers or both) to the total number of firms and workers in the US economy increased. The different Belgian and US experience in this respect is likely to be explained by the dissimilar evolution of the service and manufacturing industries in the two countries. Between 1990 and 2004 the contraction the manufacturing sector, and the corresponding growth of the service sector, was in fact more pronounced in Belgium than in the US. In this period, the contribution of manufacturing value added to total economic activity in Belgium decreased by 9.96 percent, from 20.28 to 18.26 percent of GDP. On the contrary, the relative weight of the US manufacturing sector was virtually unchanged. Manufacturing value added accounted for 18.07 percent of GDP in 1990 and 18.24 percent in 2004.[24]

Another interesting pattern emerging from Table 6 is that the share of employment generated by importing only firms increased in all industries. On the contrary, the share of jobs of exporting only firms increased in manufacturing (from 1.1 to 2.5 percent), but decreased in wholesale\retail (slightly) and service (markedly). In services, this was mainly due to the switch in the trading status of one very large firm. Two-way traders' employment decreased in all sectors.

Alternative explanations of this these trends can be suggested. It could be that firms increasingly use trade intermediates or platforms for one leg of the trading activity, thus switching status from two-way trader to importer or exporter only. Or, outsourcing might not necessarily be having detrimental effects on net employment levels, although it is possible that some the type of workers are more likely to be displaced than others.. Alternatively, outsourcing or a concentration on core competencies might be affecting these numbers in different possible ways. These are questions that should be addressed by further research.

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[24] We computed these percentages considering national aggregates in constant 1990 prices in US$. These values come from the UN National Accounts Main Aggregates Database as downloaded in January 2007. For a comparative analysis of the evolution of the manufacturing sector in Belgium with that of other EU countries and the US in the last 20 years see Robert and Dresse (2005)
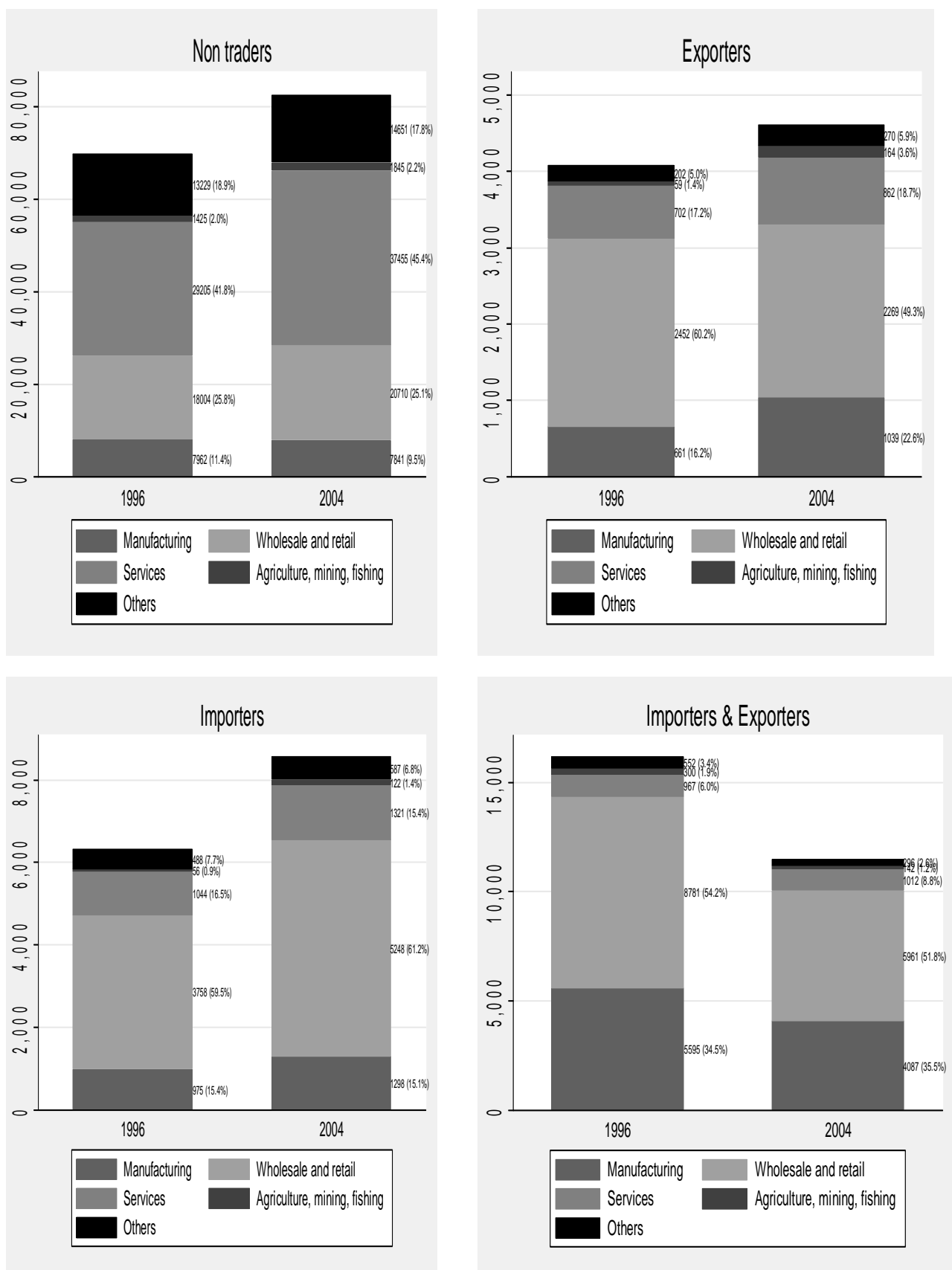
Table 5: Sectoral distribution of traders and non-traders (all firms with at least one full time equivalent employee)

	1996											
	Manufacturing		Wholesale and Retail		Services		Agriculture, Fishing and Mining		Others		TOTAL	
	# Firms	%	# Firms	%	# Firms	%	# Firms	%	# Firms	%	# Firms	%
Exporters only	661	4.4%	2452	7.4%	702	2.2%	59	3.2%	202	1.4%	4076	4.2%
Importers only	975	6.4%	3758	11.4%	1044	3.3%	56	3.0%	488	3.4%	6321	6.6%
Two-way traders	5595	36.8%	8781	26.6%	967	3.0%	300	16.3%	552	3.8%	16195	16.8%
Non Traders	7962	52.4%	18004	54.6%	29205	91.5%	1425	77.4%	13229	91.4%	69825	72.4%
Total	15193.0	100%	32995.0	100%	31918.0	100%	1840.0	100%	14471.0	100%	96417.0	100%
	2004											
	# Firms	%	# Firms	%	# Firms	%	# Firms	%	# Firms	%	# Firms	%
Exporters only	1039	7.3%	2269	6.6%	862	2.1%	164	7.2%	270	1.7%	4604	4.3%
Importers only	1298	9.1%	5248	15.4%	1321	3.2%	122	5.4%	587	3.7%	8576	8.0%
Two-way traders	4087	28.7%	5961	17.4%	1012	2.5%	142	6.2%	296	1.9%	11498	10.7%
Non Traders	7841	55.0%	20710	60.6%	37455	92.1%	1845	81.2%	14651	92.7%	82502	77.0%
Total	14265.0	100%	34188.0	100%	40650.0	100%	2273.0	100%	15804.0	100%	107180.0	100%

Source: NBB-BBSTD.

Figure 1: Number and percentage of firms in each sector by trading status

Non traders

1996:
- 7962 (11.4%)
- 18004 (25.8%)
- 29205 (41.8%)
- 1425 (2.0%)
- 13229 (18.9%)

2004:
- 7841 (9.5%)
- 20710 (25.1%)
- 37455 (45.4%)
- 1845 (2.2%)
- 14651 (17.8%)

Legend: Manufacturing, Wholesale and retail, Services, Agriculture, mining, fishing, Others

Exporters

1996:
- 661 (16.2%)
- 2452 (60.2%)
- 702 (17.2%)
- 59 (1.4%)
- 202 (5.0%)

2004:
- 1039 (22.6%)
- 2269 (49.3%)
- 862 (18.7%)
- 164 (3.6%)
- 270 (5.9%)

Legend: Manufacturing, Wholesale and retail, Services, Agriculture, mining, fishing, Others

Importers

1996:
- 975 (15.4%)
- 3758 (59.5%)
- 1044 (16.5%)
- 56 (0.9%)
- 488 (7.7%)

2004:
- 1298 (15.1%)
- 5248 (61.2%)
- 1321 (15.4%)
- 122 (1.4%)
- 587 (6.8%)

Legend: Manufacturing, Wholesale and retail, Services, Agriculture, mining, fishing, Others

Importers & Exporters

1996:
- 5595 (34.5%)
- 8781 (54.2%)
- 967 (6.0%)
- 300 (1.9%)
- 552 (3.4%)

2004:
- 4087 (35.5%)
- 5961 (51.8%)
- 1012 (8.8%)
- 142 (1.2%)
- 296 (2.6%)

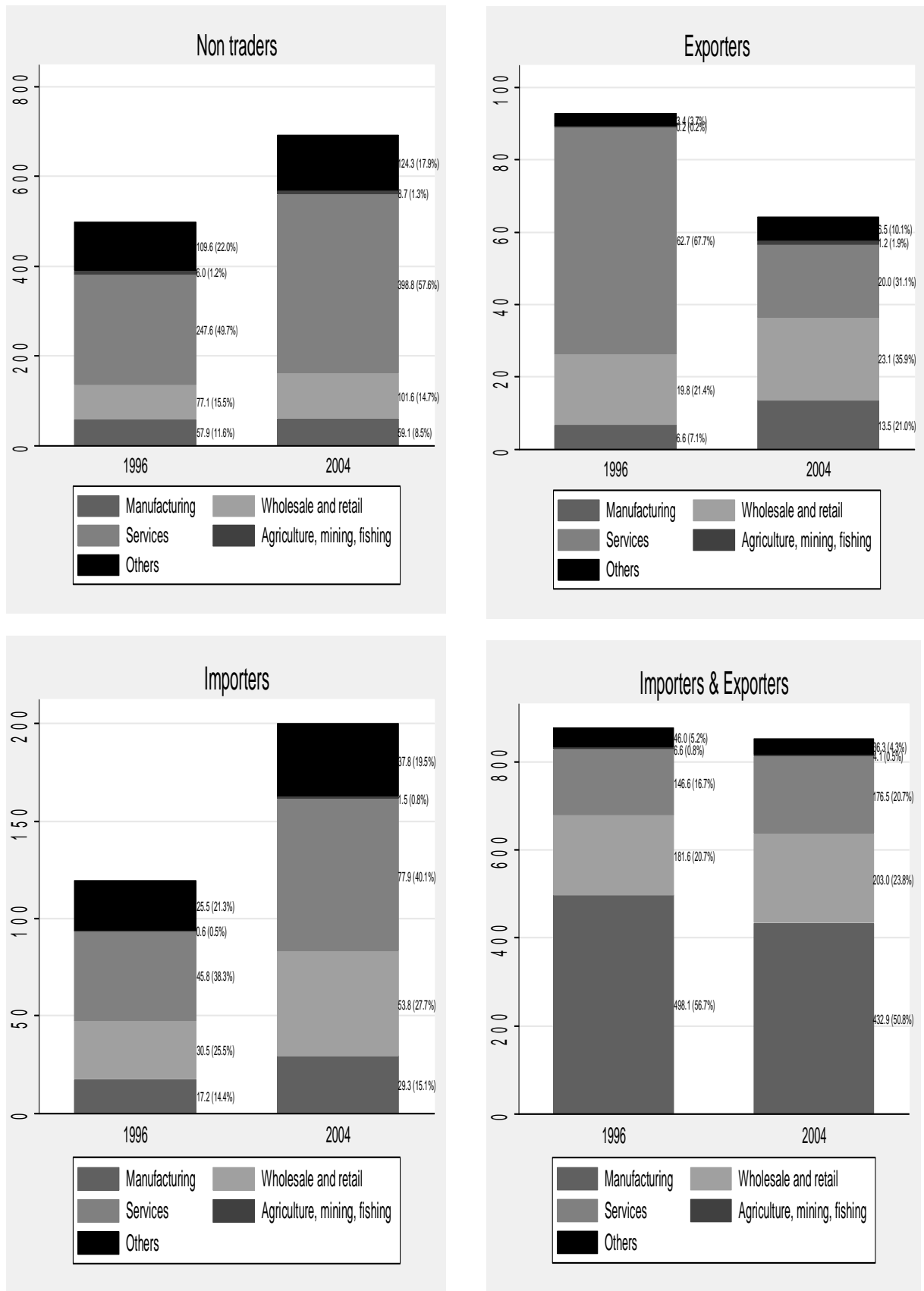Legend: Manufacturing, Wholesale and retail, Services, Agriculture, mining, fishing, Others

Source: NBB-BBSTD. Notes: These figures report the number of firms per trading status in 1996 and 2004 on the y-axis. The composition of each trading status group in terms of the broad sectors of the economy are reported to the right of each bloc.

Table 6: Sectoral distribution of employees of traders and non-traders (all firms with at least one full time equivalent employee) (thousands)

	1996											
	Manufacturing		Wholesale and Retail		Services		Agriculture, Fishing and Mining		Others		TOTAL	
	# Empl	% Emp	# Empl	% Emp	# Empl	% Emp	# Empl	% Emp	# Empl	% Emp	# Empl	% Emp
Exporters only	6.6	1.1%	19.8	6.4%	62.7	12.5%	0.2	1.8%	3.4	1.8%	92.6	5.8%
Importers only	17.2	3.0%	30.5	9.9%	45.8	9.1%	0.6	4.4%	25.5	13.8%	119.6	7.5%
Two-way traders	498.1	85.9%	181.6	58.8%	146.6	29.2%	6.6	49.4%	46.0	24.9%	879.0	55.3%
Non traders	57.9	10.0%	77.1	25.0%	247.6	49.3%	6.0	44.4%	109.6	59.4%	498.2	31.3%
Total	579.8	100%	309.0	100%	502.7	100%	13.5	100%	184.5	100%	1589.4	100%

	2004											
	# Empl	% Emp	# Empl	% Emp	# Empl	% Emp	# Empl	% Emp	# Empl	% Emp	# Empl	% Emp
Exporters only	13.5	2.5%	23.1	6.0%	20.0	3.0%	1.2	7.9%	6.5	3.3%	64.4	3.6%
Importers only	29.3	5.5%	53.8	14.1%	77.9	11.6%	1.5	9.4%	31.8	16.0%	194.1	10.8%
Two-way traders	432.9	80.9%	203.0	53.2%	176.5	26.2%	4.1	26.3%	36.3	18.3%	852.9	47.3%
Non traders	59.1	11.1%	101.6	26.6%	398.8	59.2%	8.7	56.4%	124.3	62.5%	692.7	38.4%
Total	534.8	100%	381.5	100%	673.3	100%	15.5	100%	198.9	100%	1804.1	100%

Source: NBB-BBSTD.

Figure 2: Number and percentage of workers in each sector by employer's trading status

Source: NBB-BBSTD. Notes: These figures report the number of employees per trading status of the firm they work in, in 1996 and 2004 on the y-axis. The employment of each trading status group is decomposed in terms of the broad sectors of the economy and reported to the right of each bloc.

Different sectors contributed very differently to the total value of exports and imports in goods, as they do in terms of other variables such as employment. In 1996, manufacturing unsurprisingly accounted for 72 percent of total exports, while wholesale and retail and services had respective shares of 25.8 and 1.5 percent as shown in Table 7.[25] Imports are less concentrated in one particular sector with manufacturing and wholesale and retail both importing around 47.5% of the total in 1996, possibly due to the presence of large retailer chains. These companies are likely to source their imports from the cheapest locations and serve prevalently in the country where they operate.

Table 7: Export and import share by broad sector

	Manufacturing	Wholesale	Services	Others
1996				
Export Value	71.7%	25.8%	1.2%	1.3%
Import Value	47.6%	47.3%	2.2%	2.9%
Employment	36.5%	19.4%	29.4%	14.7%
Employees/Firm	38.16	9.36	17.04	9.58
2004				
Export Value	69.6%	26.3%	2.1%	2.0%
Import Value	47.1%	46.1%	3.0%	3.8%
Employment	29.6%	21.1%	33.6%	15.6%
Employees/Firm	37.50	11.16	17.39	10.56

Source: NBB-BBSTD.

There are two main conclusions from this subsection. First, although the Belgian economy is becoming more open most of the new jobs and firms are being created in the service sector where trade in goods is marginal. Second, if firms trade internationally they are more likely to engage in both exports and imports instead of doing just one. This fact has not been properly considered thus far by the literature, which has mainly looked at exports only.

B. *Entry, exit and job creation or destruction in the manufacturing sector*

Given the importance of manufacturing for trade in goods, we decompose in this subsection the described changes in the number of firms and employment across the different trading categories over our sample period. These dynamics are reported in Table 8 and Table 9.[26]

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[25] The very slight decrease in the share of manufacturing is possibly due to either a question of classification or to certain services being increasingly attached to manufacturing goods. For example, when a software company exports its product, the trade will be recorded as the shipment of a CD-Rom, valued as if it was blank.

[26] Similar tables are reported for the whole US economy by Bernard, Jensen and Schott (2005).

Table 8: Entry and Exit of Firms across Trading Status (Manufacturing)

Number of Firms

Trading status	1996	Keep same status	Exits	Entry	Continuing Firms			2004
					Start trading	Stop trading	Switched trading status	
Non-traders	7 962	3 782	-3 428	+3 203	-752	+856		7 841
Importers	975	233	-352	+322	+278	-263	+338	1 298
Exporters	661	100	-251	+303	+264	-213	+275	1 039
Two-way traders	5 595	2 944	-1 478	+753	+210	-380	-613	4 087
Total	15 193	7 059	-5 509	+4 581	752	856	1 017	14 265

Share of Firms relative to 1996 levels (in percentage)

Trading status	1996	Keep same status	Exit	Entry	Continuing Firms			2004
					Start trading	Stop trading	Switched trading status	
Non-traders	100	48	-43	+40	-9	+11		98
Importers	100	24	-36	+33	+29	-27	+35	133
Exporters	100	15	-38	+46	+40	-32	+42	157
Two-way traders	100	53	-26	+13	+4	-7	-11	73
Total	100	46	-36	+30	5	6	7	94

Source: NBB-BBSTD. Notes: The first sub-table gives firm counts, while the second gives values relative to 1996 values. The first column reports the number of firms existing in each category in 1996, while the second gives those that had not changed status in 2004. Columns 2 and 3 show death and birth of firms in and out of each status. The next three columns report the switches of continuing firms between the various trading categories. The movements between non-traders and the three types of traders are reported in columns 5 and 6, while in column 7 we report those traders that switch trading type. The last column gives the 2004 figure.

Considering the number of firms in Table 8, we can see that over the ten years the decline in the number of manufacturing firms is due to the greater number of firms closing down than the number of new firms. The trend in our data differs strongly across trading groups considered. Despite the fact that they represent a small number of firms, importers and exporters have, within our sample period, greatly increased in number. On the contrary, the number of both non-traders and two-way traders decreased.

Table 8 also shows how common entry and exit of firms is in all four categories. It constitutes the most important source of dynamics compared to continuing firms switching trading status. There are however major differences in these movements. Firms are more likely to keep the same status when they are non-traders or two-way traders. Firm death is much more seldom for firms engaged in international trade, and even more so for two-way traders.

Table 9: Entry and Exit of Firms across Trading Status in terms of Employment

					Continuing Firms				
							Firms keep trading		
Trading status	1996	Keep same status	Exit	Entry	Start trading	Stop trading	Switched trading status	Same trading status	2004
Non-traders	57.9	26.4	-22.2	+17.9	-9.3	+10.0		+4.9	59.1
Importers	17.2	5.4	-6.1	+6.8	+5.1	-3.2	+8.5	+1.0	29.3
Exporters	6.6	1.3	-2.2	+2.8	+3.3	-1.9	+4.9	+0.1	13.5
Two-way traders	498.1	367.7	-87.6	+52.1	+6.4	-7.9	-14.0	-14.1	432.9
Total	579.8	400.8	-118.2	+79.5				-8.0	534.8

Change in Employment (Thousands)

Change in Employment Relative to 1996 Levels (in Percentage)

					Continuing Firms				
							Firms keep trading		
Trading status	1996	Keep same status	Exit	Entry	Start trading	Stop trading	Switched trading status	Same trading status	2004
Non-traders	100	46	-38	+31	-16	+17		+8	102
Importers	100	31	-36	+40	+30	-19	+49	+6	170
Exporters	100	20	-34	+43	+50	-29	+74	+2	205
Two-way traders	100	74	-18	+10	+1	-2	-3	-3	87
Total	100	69	-20	+14				-1	92

Source: NBB-BBSTD. Notes: See Table 8 notes. This describes the same dynamics but in terms of employment. For continuing firms, negative flows are 1996 employment figures, while positive flows are 2004 employment figures. Column 8 reports the change in employment of firms that did not change status over the sample period.

The rise in the number of importing and exporting only firms is due to two-way traders discontinuing one of their trading activities and to non-traders starting to trade Looking at the status of entrants and new traders, it seems that becoming a two-way trader is a gradual process. Once this status is acquired, a firm is also less likely to stop trading altogether.

The surprising drop in the number of two-way traders is due to two elements. Firstly, exits of firms were uncompensated by the number of entries, both by new and old firms. Secondly, there was a relatively important number of two-way traders that stopped both importing or exporting to concentrate on only one of these two activities.

Most of these comments can be carried over to Table 9 which reports dynamics of job flows. Additionally, one notices that large firms that trade are even more likely to keep their status by comparing for example the percentage of firms that stay two-way traders (53%) and the percentage of workers they employ (74%). This is not true for non traders.

The number of jobs lost because of exits is lower in percentage terms for two-way traders (18% of their workers were displaced for this reason) and higher for non-traders (38 percent of jobs lost). Importers and exporters are in between, with around 35 percent of their jobs destroyed because of exits. The net employment creation due to entries and exits varies with the trading status of the firm. Importing and exporting companies created more jobs than what they destroyed, because of entries and exits, whereas the contrary is true for non-traders and two-way traders.

With regards continuing firms it is possible to see that the reallocation of employment among different types of firms was also caused by switching trading status. Comparing the jobs changes due to start trading and stop trading, it is possible to see the net contribution is positive for importers and exporters and surprisingly negative for two-way traders.

Furthermore, considering those firms switching their trading status, but remaining traders, the percentage changes in employment is negative for two-way traders and positive for both importers and exporters. However, perusing the figures about the number of employees in Table 9 and number of firms in Table 8, it is possible to infer that those two-way traders that that stopped one of their trading activities and became just importers or exporters were on average smaller firms, representing only a small percentage of two-way traders total employment. Yet, this represents a important increase in the employment of importers and, even more so, of exporters.[27]

Finally, firms with the same trading status in 1996 and 2004 have also different trajectories of employment creation. The surprising overall decrease in the employment levels of two-way traders is aggravated by the fact that continuing firms in this category saw on average a decrease in their employment levels. Given that the decrease in both employment and firm numbers of the manufacturing industry is concentrated in this category of companies, these are particularly interesting results that should analysed further in future research as mentioned above.

The main results reported in this subsection are the role of firms' death and birth and the strength of larger and trading firms. One should also note the gradual process of entering trade and the decrease in employment of two-way traders and their switch to single trade activities.

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[27] Respectively 68% and 88%, summarized in the 49% and 74% figures of Table 9 which sum all switches.

C. Trade Concentration

Bernard *et al*. (2005) and Bernard *et al*. (2006) show for the US that trade is very concentrated. This subsection looks at this issue in more detail. Table 10 shows the degree of concentration of imports and exports (in addition to value added and employment by way of comparison) for different parts of the size distribution. We report this information for the whole economy and for manufacturing and wholesale and retail sectors separately.

For the whole economy and manufacturing firms, all these variables appear to be highly concentrated. The largest firms, i.e. those with more than 500 employees, are only 0.3 percent of the total number of firm and 1.1 percent of manufacturing firms. Yet, in 2004, they accounted 33 percent of total employment, 37.2% in manufacturing. Furthermore, they are responsible for over 40 percent of exports and imports, and more than 55% for manufacturing.

The fact that exports appear to be the domain of the largest firms is consistent with recent theoretical models (Melitz 2003; Bernard, Eaton, Jensen and Kortum 2003) and empirical evidence showing that only the largest and most productive firms will be able to meet the fixed costs of exports and start selling abroad. A similar phenomenon seems to be at work for imports. Fixed costs of imports could make international outsourcing profitable only for firms with largest value added.

Over time imports and exports have become even more concentrated. The same it is not true for employment and value added. International transactions seem to be increasingly conducted by the largest firms. This could be due to a strengthening of the selection process to start trading internationally. As trade is liberalised further, foreign markets become more competitive. This makes it less likely for small firms to find exports or imports profitable.

Looking at the broad industry figures at the bottom of Table 10, we can see that in manufacturing, trade is highly concentrated. Also, imports appear to be more concentrated than exports and the degree of concentration has been increasing over time. Overall, wholesale and retail appears to be less concentrated than manufacturing, but the degree of

Table 10: Concentration of Exports and Imports

	1996						2004					
	Whole Economy						**Whole Economy**					
Size of firms	Share of Firms	Share of Empl.	Share of Total VA	Share of Total Exports	Share of Total Imports	Average VA/Emp	Share of Firms	Share of Empl.	Share of Total VA	Share of Total Exports	Share of Total Imports	Average VA/Emp
1-20	88.8%	23.3%	20.9%	16.2%	18.2%	62408	88.7%	24.8%	20.5%	11.4%	15.2%	67335
21-50	7.4%	14.3%	13.3%	10.6%	13.1%	53807	7.4%	14.1%	12.5%	9.7%	11.8%	66307
51-100	1.9%	8.3%	7.8%	8.3%	7.7%	55384	2.0%	8.4%	8.0%	8.0%	9.5%	71992
101-200	1.0%	8.4%	8.5%	9.6%	10.4%	59669	1.0%	8.4%	9.0%	10.1%	9.6%	81311
201-500	0.6%	11.5%	11.9%	14.2%	15.7%	60430	0.6%	11.3%	12.7%	15.1%	13.9%	86413
>500	0.3%	34.2%	37.6%	41.1%	34.8%	67864	0.3%	33.0%	37.2%	45.7%	40.0%	96632
	Manufacturing						**Manufacturing**					
Size of firms	Share of Firms	Share of Empl.	Share of Total VA	Share of Total Exports	Share of Total Imports	Average VA/Emp	Share of Firms	Share of Empl.	Share of Total VA	Share of Total Exports	Share of Total Imports	Average VA/Emp
1-20	74.1%	11.5%	8.4%	3.8%	4.7%	49970	75.1%	12.5%	8.7%	3.3%	4.1%	62554
21-50	14.7%	12.7%	10.2%	7.4%	7.4%	50792	13.6%	12.2%	8.6%	6.0%	6.2%	59185
51-100	5.3%	10.1%	8.3%	8.6%	7.6%	50499	5.1%	9.9%	7.9%	7.4%	5.8%	67355
101-200	2.8%	10.5%	9.1%	10.0%	9.7%	54111	3.0%	11.0%	9.7%	9.8%	8.4%	74856
201-500	1.9%	15.3%	14.8%	14.2%	13.5%	60006	2.1%	17.3%	16.5%	16.4%	14.9%	81063
>500	1.1%	40.0%	49.3%	55.9%	57.2%	73399	1.1%	37.2%	48.6%	57.0%	60.7%	101677
	Wholesale Retail						**Wholesale Retail**					
Size of firms	Share of Firms	Share of Empl.	Share of Total VA	Share of Total Exports	Share of Total Imports	Average VA/Emp	Share of Firms	Share of Empl.	Share of Total VA	Share of Total Exports	Share of Total Imports	Average VA/Emp
1-20	92.6%	40.6%	36.0%	47.8%	31.5%	56419	91.6%	38.1%	30.8%	29.9%	26.3%	65129
21-50	5.5%	18.6%	16.8%	18.5%	18.9%	52491	6.1%	17.3%	15.6%	17.6%	17.0%	68332
51-100	1.0%	7.3%	7.6%	7.4%	7.5%	60649	1.2%	7.3%	7.6%	7.2%	9.3%	79675
101-200	0.5%	6.9%	10.3%	8.3%	11.8%	88372	0.5%	6.9%	8.7%	10.8%	11.0%	94807
201-500	0.3%	10.3%	11.8%	14.4%	18.8%	65879	0.4%	9.4%	13.0%	12.6%	13.9%	108847
>500	0.1%	16.3%	17.4%	3.6%	11.6%	81068	0.2%	21.0%	24.3%	21.9%	22.7%	130942

Source: National Bank of Belgium; BBSTD. Notes: This Table divides firms by size according to the number of employees in each firm, as reported in the first column. The share of firm population, employment, total exports and imports is then reported for each size class. Average value-added per employee is also given. This is done for both 1996 and 2004. It considers the whole economy and the manufacturing and wholesale and retail sectors separately. *** decomposition of WSR?

concentration has been increasing during the sample period. Like in manufacturing imports is more concentrated than exports.[28]

Illustrating this concentration within the manufacturing sector, Figure 3 depicts the Lorenz curve of total trade (i.e. imports plus exports) with respect to total value added. The top ten percent firms in terms of value added account for around 90 percent of the value of international trade transactions, and this proportion increased from 1996 to 2004. Firms in the top 50 percent of the distribution of value added are responsible for nearly 100 percent of the value of imports plus exports. As shown in Figure 4, the concentration in terms of productivity (measured by value added per employee) is slightly lower, with the top 10 percent firms accounting for around 45 percent trade in 2004.

Figure 3: Concentration of Trade value across Total Value added percentiles (Manufacturing)
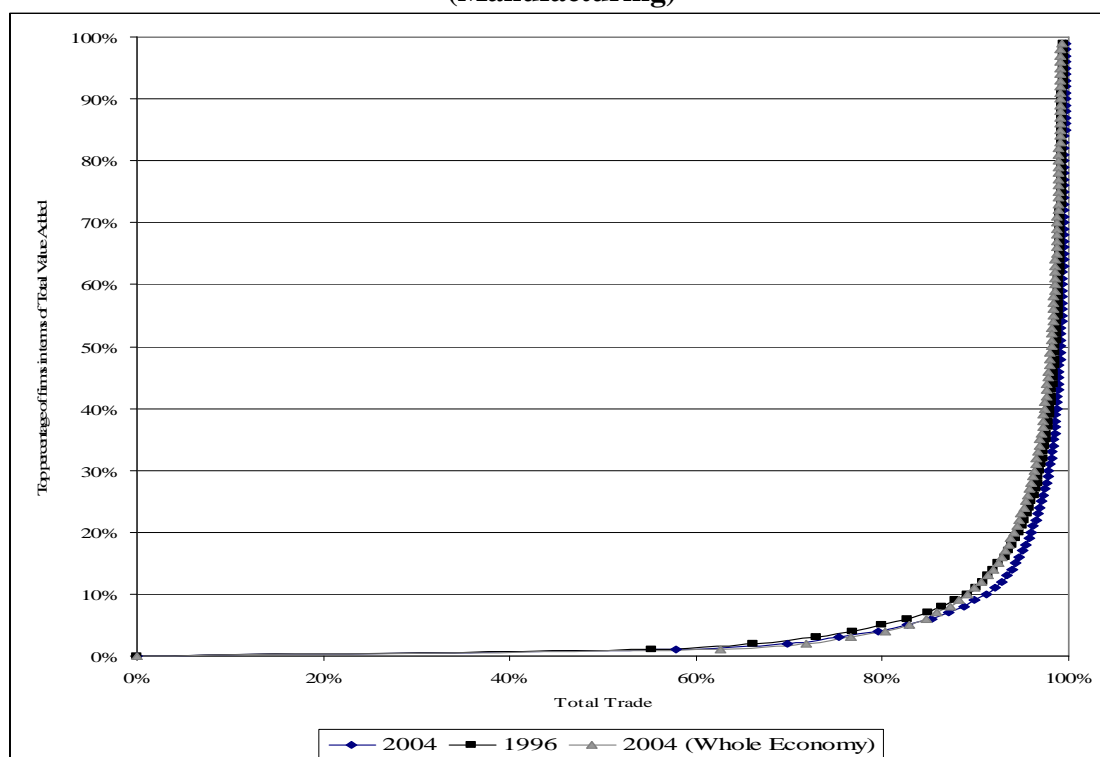
Source: NBB-BBSTD.

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[28] The figures of wholesale and retail appear suspicious at a certain extent because of the large share of international trade conducted by firms with less than 20 employees. We conducted a robustness check, looking at the concentration figures of sub-industries of wholesale and retail. at 2-digit NACE level. These are: sector 50 "sale, maintenance and repair of motor vehicles; fuel sale", 51 "wholesale trade & commission trade exc. motor veh." and 52 "retail trade exc. motor vehicles; repair of pers. goods". Industry 51 and 52 show similar degree of concentration to the entire wholesale and retail sector. Sector 50 appears to be more concentrated, with a handful of firms with more than 500 employees accounting for around 50 percent of international trade.

Figure 4: Concentration of Trade value across Value added/Employee percentiles (Manufacturing)
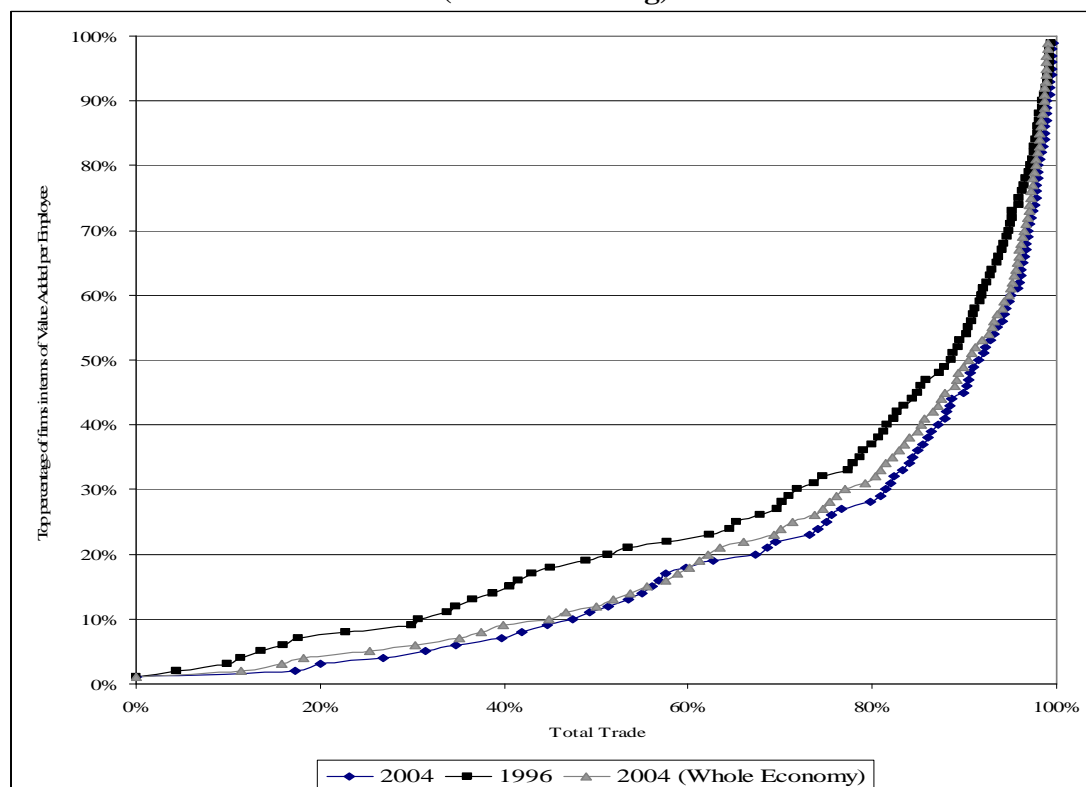
Source: NBB-BBSTD

This subsection has depicted how extremely concentrated trade is. Both imports and exports are primarily conducted by the largest firms in terms of employment and value added, which are also those with higher levels of productivity.

D. *Firm-Level Characteristics of Traders vs. Non-Traders*

The micro-econometric based international trade literature to date has overwhelmingly shown that exporters are more productive than non-exporters (e.g. Bernard and Jensen (1999) for the US; Girma, Kneller and Pisu (2005) for the UK; Wagner (2002) for Germany; Castellani (2002) for Italy). Yet, due to a lack of data, importers have been nearly completely neglected thus far. One exception is MacGarvie (2006) who shows, for a panel of large French firms, that importers have similar value added per worker to exporters and that they are more productive than both non-importers and non-exporters. However, she does not consider separately firms that both import and export at the same time.

Table 11 shows the average size in terms of number of employees, total value added, labour productivity, capital intensity and investment per employee of traders and non-traders for the whole Belgian economy. In general, traders, either importers, exporters or two-way traders are larger than non-traders both in terms of employment and value added.

Among trading companies, the largest are those that both import and export. Over the sample period all firms increased in size with the exception of exporters, whose average employment decreased. Also, exporters and two-way traders saw their share in total value added decrease from 1996 to 2004. On the contrary that of importers and non-traders increased. As we have noted before, the rising share of value added of non-traders is probably due to the growth of the service sector, whose firms are much less likely to engage in trade in goods.

Firms with no involvement in international trade were the least productive, in terms of value added per worker, in both years. Two-way traders were the most productive, along with exporters in 1996. Importers outpaced exporters in terms of value added per worker during the sample period.

Table 12 shows that the same pattern of results holds for manufacturing. Non-traders were the smallest companies in terms of number of employees in both years Between 1996 and 2004, they also posted the lowest increases in employment. In both years, two-way traders

Table 11: Characteristics of Firms per Trading status – Whole Economy

	% Firms	% Employment	Average # employees	Total Value-Added (million Euros)	% Value-Added	Average VA/Employee	Share of Capital	Capital Intensity	Share of Investment	Average Investment per Employee
1996										
Exporters only	4.2%	5.8%	22.7	3 893	4.1%	67 067	3.1%	74 169	4.2%	22 919
Importers only	6.6%	7.5%	18.9	6 739	7.2%	60 586	8.9%	83 251	9.4%	21 820
Two-way traders	16.8%	55.3%	54.3	59 799	63.7%	67 986	55.2%	54 144	56.4%	16 983
Non-Traders	72.4%	31.3%	7.1	23 500	25.0%	59 805	32.9%	108 128	30.1%	23 544
Average			16.5			61 616		95 995		22 302
2004										
Exporters only	4.3%	3.6%	14.0	4 409	3.2%	72 271	3.1%	75 435	5.3%	25 475
Importers only	8.0%	10.8%	22.7	13 840	10.1%	75 023	12.9%	74 603	11.0%	21 520
Two-way traders	10.7%	47.2%	74.2	80 268	58.4%	92 075	47.1%	69 131	50.4%	22 820
Non-Traders	77.0%	38.4%	8.4	38 835	28.3%	63 219	36.9%	124 200	33.3%	28 356
Average			16.8			67 704		112 247		27 092

Source: NBB-BBSTD. Notes: Capital is measured as tangible assets (item 22/27), while capital intensity is the ratio of capital to FTE employees. Investment is defined as the acquisition of tangible assets (item 8169).

Table 12: Characteristics of Firms per Trade status – Manufacturing Sector

	% Firms	% Employment	Average # employees	Total Value-Added (million Euros)	% Value-Added	Average VA/Employee	Share of Capital	Capital Intensity	Share of Investment	Average Investment per Employee
1996										
Exporters only	4.4%	1.1%	10.0	300	0.8%	50 753	0.9%	51 354	1.1%	15 438
Importers only	6.4%	3.0%	17.6	1 011	2.8%	56 987	4.2%	79 564	4.5%	29 230
Two-way traders	36.8%	85.9%	89.0	32 719	90.0%	56 359	86.7%	47 596	83.8%	14 539
Non-Traders	52.4%	10.0%	7.3	2 327	6.4%	45 910	8.2%	55 349	10.6%	19 907
Average			38.2			50 679		53 874		18 334
2004										
Exporters only	7.3%	2.5%	13.0	732	1.6%	67 656	1.8%	64 731	1.7%	19 161
Importers only	9.1%	5.5%	22.6	2 154	4.7%	76 786	5.9%	69 824	5.1%	18 697
Two-way traders	28.7%	81.0%	105.9	39 644	87.1%	77 543	83.6%	63 443	84.5%	15 931
Non-Traders	55.0%	11.1%	7.5	2 967	6.5%	53 492	8.7%	61 049	8.8%	16 363
Average			37.5			63521		62 801		14 266

Source: NBB-BBSTD.

Table 13: Characteristics of Firms per Trade status – Wholesale and Retail

	% Firms	% Employment	Average # employees	Total Value-Added (million Euros)	% Value-Added	Average VA/Employee	Share of Capital	Capital Intensity	Share of Investment	Average Investment per Employee
1996										
Exporters only	7.4%	6.4%	8.1	957	5.3%	63 461	5.8%	58 359	5.0%	12 379
Importers only	11.4%	9.9%	8.1	1 450	8.0%	53 773	9.8%	47 589	9.2%	13 236
Two-way traders	26.6%	58.8%	20.7	12 476	69.1%	72 965	57.7%	46 425	58.4%	14 350
Non-Traders	54.6%	25.0%	4.3	3 170	17.6%	47 992	26.7%	55 634	27.4%	15 579
Average			9.4			56 446		52 469		14 747
2004										
Exporters only	6.6%	6.0%	10.2	1 420	4.8%	66 128	6.3%	59 053	6.5%	15 511
Importers only	15.4%	14.2%	10.2	3 263	11.1%	70 199	12.9%	57 860	13.3%	15 917
Two-way traders	17.4%	53.2%	34.1	19 658	66.9%	95 786	50.6%	54 731	49.9%	15 687
Non-Traders	60.6%	26.7%	4.9	5 050	17.2%	56 221	30.2%	66 313	30.3%	17 156
Average			11.2			65 912		62 514		16 600

Source: NBB- BBSTD.

were the largest kind of company followed by importers and exporters, the former employing more workers on average than the latter. This same ranking holds when we focus on productivity: Two-way traders have the highest value added per employee followed by importers, exporters and non-traders.

With regard to firms in wholesale and retail, Table 13 shows again that non-traders are the smallest companies in terms of employment, whereas firms that both export and import are the largest. Interestingly, in this industry there is no difference in the number of employees between importers and exporters. In terms of value added, importers are larger than exporters, as in manufacturing, but their advantage is smaller in percentage terms than that observed in the manufacturing sector. In addition, as seen in Table 13, in 2004 two-way traders have the highest labour productivity measures, ahead of importers and exporters. Non-traders appear to be least productive firms.

Shares of capital and investment follow the same pattern as employment shares. The capital intensities we report are however a little surprising, as one would have expected exporters to clearly be more capital intensive, especially in the manufacturing sector. This might however be due to accounting issues as we derive our capital measure from tangible assets.

Another firm-level characteristics worth examining in relation to firms' involvement in international trade is R&D spending. Related to this topic, MacGarvie (2006) has been the first to examined the relationship between technology (proxied by patent citations) and different forms of international trade involvement. She compares French non-traders, importers and exporters. She shows that both importers and exporters cite more foreign patents and are cited more by foreign patents than non-traders than non-traders.[29] Firms that file complete balance sheets indicate their total R&D spending, which we summarise in Table 14, 15 and 16. Considering this reduced set of larger firms, the percentage of non-traders drops significantly to around 41 percent in 2004 and 35 percent in 1996 for the whole economy and traders are overrepresented.[30] R&D activities appear to be nearly totally concentrated among two-way traders who also have the largest average R&D investment per firm in both years, across sectors. However, with some variation in time

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[29] In the related FDI literature, Griffith, Redding and Simpson (2004) have shown for the UK that foreign firms spend more in R&D than domestic companies.

[30] The corresponding figures considering all firms with one or more full time employees, are 77 and 72 percent (see Table 3 for instance).

Table 14: For firms with complete balance sheet, investment in R&D (Number of firms: 12855 in 1996 and 13615 in 2004)

	1996				
	% Total R&D	Average R&D by Firm	Average R&D per Employee	% Firms	% Employment
Exporters only	0.37%	5,903	977	5.37%	6.30%
Importers only	0.56%	4,790	162	10.14%	7.70%
Two-way traders	92.71%	163,301	360	49.11%	69.41%
Non Traders	6.36%	15,554	462	35.38%	16.59%
	2004				
Exporters only	0.37%	10,754	2,347	5.85%	2.61%
Importers only	0.99%	12,605	192	13.26%	11.38%
Two-way traders	95.52%	407,274	630	39.71%	62.97%
Non Traders	3.12%	12,823	960	41.18%	23.04%

Source: NBB-BBSTD. Notes: R&D is measured as the annual spending on R&D as an intangible asset (item 802-1 in complete balance sheets)

Table 15: R&D by broad industry (complete balance sheet only)
Manufacturing

	1996				
	% Total R&D	Average R&D by Firm	Average R&D per Employee	% Firms	% Employment
Exporters only	0.09%	10,290	436	2.44%	0.38%
Importers only	0.11%	5,184	116	6.21%	2.01%
Two-way traders	98.27%	363,632	438	79.44%	94.90%
Non Traders	1.53%	37,777	281	11.91%	2.72%
	2004				
Exporters only	0.00%	9	0	3.36%	0.75%
Importers only	0.05%	3,513	74	9.73%	4.06%
Two-way traders	99.84%	866,150	789	73.70%	92.24%
Non Traders	0.11%	5,360	109	13.21%	2.95%

Source: NBB-BBSTD. Notes: R&D is measured as the annual spending on R&D as an intangible asset (item 802-1 in complete balance sheets)

Table 16: R&D by broad industry (complete balance sheet only)
Wholesale and Retail

	1996				
	% Total R&D	Average R&D by Firm	Average R&D per Employee	% Firms	% Employment
Exporters only	7.93%	6,708	1,646	8.37%	5.14%
Importers only	0.88%	537	17	11.62%	8.42%
Two-way traders	82.16%	9,233	153	62.97%	77.91%
Non Traders	9.03%	3,749	305	17.04%	8.53%
	2004				
Exporters only	0.68%	2,421	97	8.48%	4.82%
Importers only	0.47%	836	31	16.95%	11.34%
Two-way traders	97.39%	57,838	270	50.62%	75.03%
Non Traders	1.45%	1,826	69	23.95%	8.80%

Source: NBB-BBSTD. Notes: R&D is measured as the annual spending on R&D as an intangible asset (item 802-1 in complete balance sheets)

and sectors, firms that just export or import do not seem to invest more in R&D than non-traders. Considering R&D spending per employee, Table 14 suggests that overall exporters are the most R&D intensive firms followed by non-traders, two-way traders and importers. Yet, the manufacturing two-way traders do seem to be more R&D intensive than other firms in both years.. Exporters were the second most R&D intensive firms in 1996, but their R&D expenditure per employee drops to nearly zero in 2004. This is suspicions and probably reflect measurement errors. The picture for wholesale and retail in Table 16 is less clear, but again there is a large decrease in the R&D intensity of exporters. These large and apparently unjustified variations in R&D intensity could be due to the fact that R&D values do not reflect the actual R&D expenditure of firms because of accounting reasons.[31]

E. Export destinations, import origins and products traded

Products and destinations have been the focus of recent literature on manufacturing firms' export behaviour, as described in Section 2. Given the previous evidence we provided, and

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[31] Community Innovation Surveys run in different European countries are probably a better and more reliable source of information about R&D than balance sheet data.

in order to have results comparable to other countries, we will concentrate in this section on the manufacturing sector. Trade flows are determined by several dimensions. The literature defines the intensive margin, quantities traded by a firm, and the extensive margin, the number of trading firms. This can be further separated between the "country extensive margin" of trade, how many countries a firm trades with, and the "product extensive margin", how many products a firm trades.

We first consider destinations of exports and origins of imports. The number of firms exporting to at least a certain number of export destinations and the number of firms importing from at least a certain number of foreign countries are represented in Figure 5 and Figure 6. There is a clear negative relationship between the number of trading firms and the number of countries traders trade with. The maximum number of export destinations and countries of imports values are respectively 157 and 62. The number of export destinations appear to decrease more quickly than the number of origins of imports.

This is more clearly visible from Figure 7, which plots the histogram of the number of countries importers and exporters trade with. The mean of trading partners is 11.3 for exporters and 6.6 for importers, whereas the median is at about 5 for both types of firms. Both distributions are skewed towards the right and have a mode at one. It is worth comparing in more detail our findings with those of Eaton, Kortum and Kramarz (2004) and Bernard, Jensen and Schott (2005) for French and US firms. Our result that the frequency of firms trading with a certain number of countries decreases as the number of partner countries increases is consistent with both. In 2000, US exporters traded with on average 3.5 countries and importers sourced from 2.8 countries. Around 56.6 percent of US exporters ship products to exactly one foreign country, whereas the 7.7 percent of them to ten or more overseas markets. The corresponding figures for French manufacturers, are 34.5 percent and 19.7 percent. Our data suggest that 18.8 percent of Belgian exporters serve just one market whereas 31 percent of them ten or more.[32]

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[32] The French figures refer to the year 1986, the US and ours to 2000. Bernard, Jensen and Schott (2005) include manufacturing and other sectors of the economy, whose firms are less likely to trade in goods. By doing so, we find that 30.3 percent of Belgian exporters ship products to exactly one destination, whereas the 21.2 percent of them to ten or more. Eaton, Kortum and Kramarz (2004) consider only manufacturing firms.

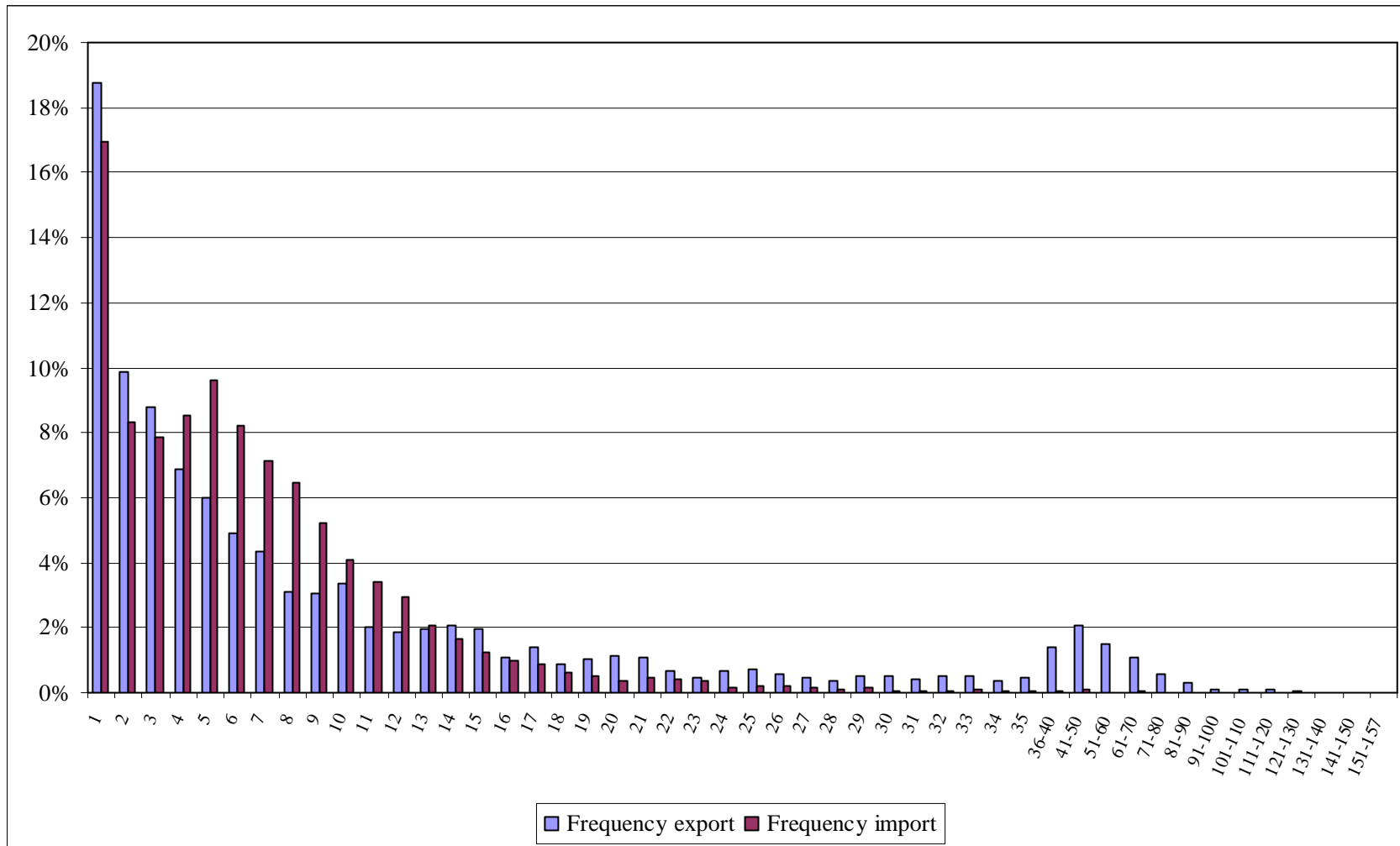**Figure 5: Number of export destinations (Year=2000)**
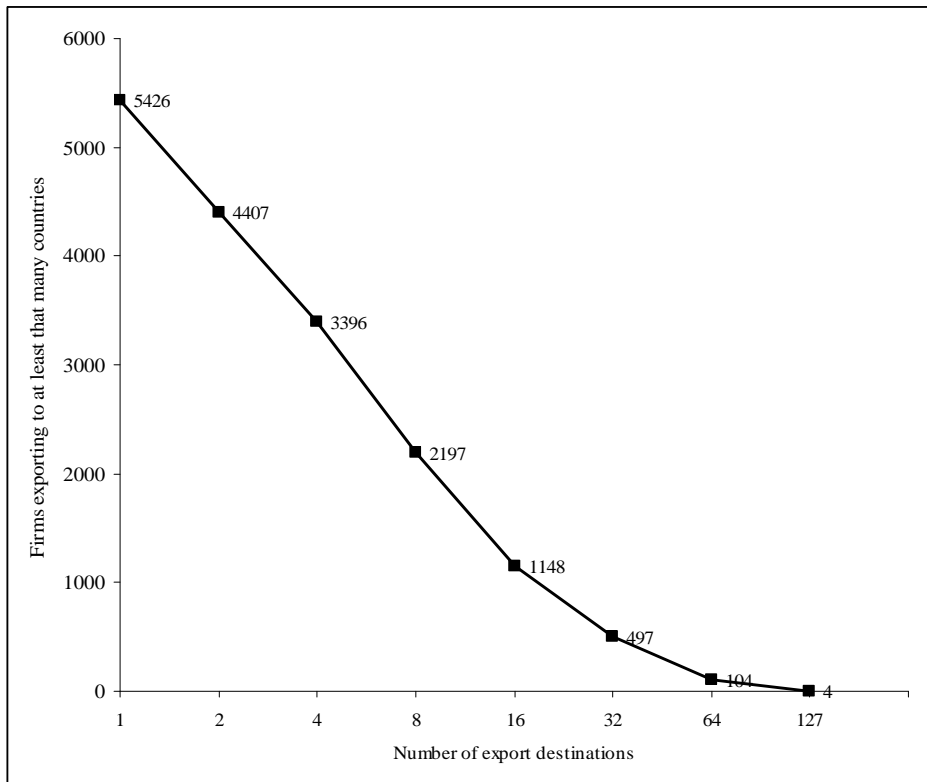
Source: NBB-BBSTD.

Figure 6: Number of sourcing countries (Year=2000)
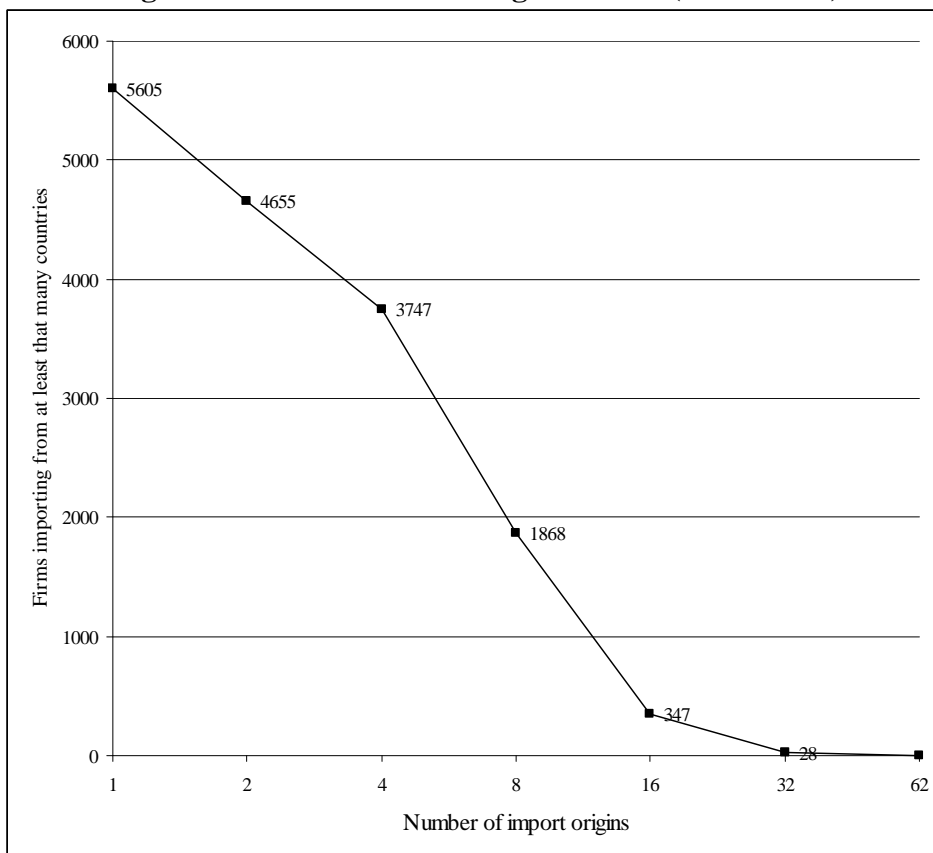
Source: NBB BBSTD.

Figure 7: Frequency of manufacturing firms exporting to and importing from a certain number of countries

Source: National Bank of Belgium; BBSTD. Notes:

Thus, Belgian exporters appear to serve more markets than French and US exporting enterprises. French exporters are in between US and Belgians This could be determined by the small Belgian domestic markets: Belgian producers are required to export to more destinations than French and US firms to take full advantage of increasing return to scale which is one of the reasons for Belgium being a more open economy than the US. The same is true when France is compared to the US.

Despite the similarities in the distributions of trading partners for exporters and importers, there are also interesting differences. The frequency of import origins seems to be bimodal. Declining from one to three countries, it then rises and peaks at five. Thereafter declines monotonically. Also of interest is that the distributions of export destinations dominates that of origins of imports in the one-three country range.[33] Thereafter the distribution of imports dominates that of exports up to 13 trading partners. 57 percent of importers trade with 4 to 13 countries whereas only 37 percent of exporters do the same. Beyond 14 trading partners export destinations dominate import origins again. Such a pattern is also reported by Bernard, Jensen and Schott (2005) for the US.[34]

The distributions of export destinations and import origins are likely to be determined by fixed costs of exports and imports respectively. The degree of concentration of imports shown in the previous tables suggest that fixed costs of imports may be as relevant as fixed costs of exports. There is some evidence that fixed costs of exports re-occur at each new foreign market entry (Damijan, Polanec and Prasnikar 2004). This could constrain the majority of exporters to sell to few foreign markets. The same appears to be true for imports. If fixed costs relating to importing goods re-occur for each new sourcing country, the majority of firms will import goods from a relatively small number of countries. In our data 90 percent of importers import from less than 14 countries.

We now turn to the product extensive margin, given that our data set allows us to investigate the number of products firms trade across borders. Bernard, Jensen and Schott (2005) investigate the same issue using data for the US. They report that on average exporters traded 8.9 products in 2000, whereas importers purchased from abroad around 10 products. The BBSTD suggests that Belgian manufacturing firms, in 2000, shipped to other countries on average around 12 products and sourced from abroad about 34

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[33] 37 percent of exporters export goods to one to three countries, whereas the corresponding figure for importers is 33 percent

[34] The figures they report suggest that exporters are more likely than importers to trade with exactly one or ten or more countries. However, in the two to nine countries range the frequency of imports is higher than that of exports.

products.[35] Therefore, Belgian companies appear to be more oriented to trade internationally than US firms and to be more involved in outsourcing some stage of the production process.

Looking in more detail at imported and exported products, Figure 8 and Figure 9 show that the number of trading firms declines systematically with the number of products they trade internationally. As in the case of trading partners, however, the number of exported products appears to decline more steadily than the number of imported goods. Figure 10 depicts the histogram of the number of products exported or imported.[36] Both exporters and importers are more likely to trade a single product: around 20 and 11 percent of exporters and importers, respectively, do so. Both distributions are skewed toward the right, as when considering destinations and sourcing countries.

Furthermore, from Figure 10 it is possible to note that Belgian traders are more likely to source from abroad ten or more products than to export them: only around 31 percent of exporters sell abroad more than ten products compared with 62 percent of importers sourcing more than ten goods.[37]

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[35] The median of the two distributions is around 5 for exports and 17 for imports. If considering all sectors of the Belgian economy to compare to the US data, the average number of products exported by firms is 12 and 29 for imports.

[36] Table A2 in the appendix shows the frequency and cumulative values of these two distributions.
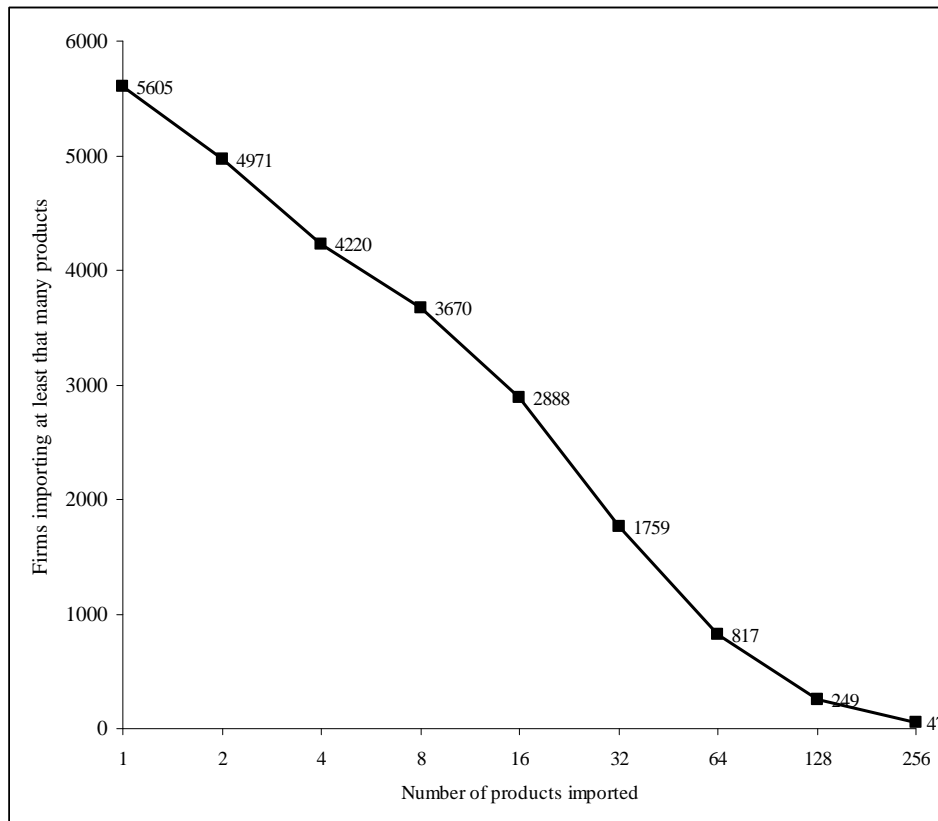
[37] This is consistent with the findings of Bernard, Jensen and Schott (2005) for the US, where about 17 and 21 percent of exporters and importers, respectively, trade more than ten products.

Figure 8: Number of exported products (Year=2000)
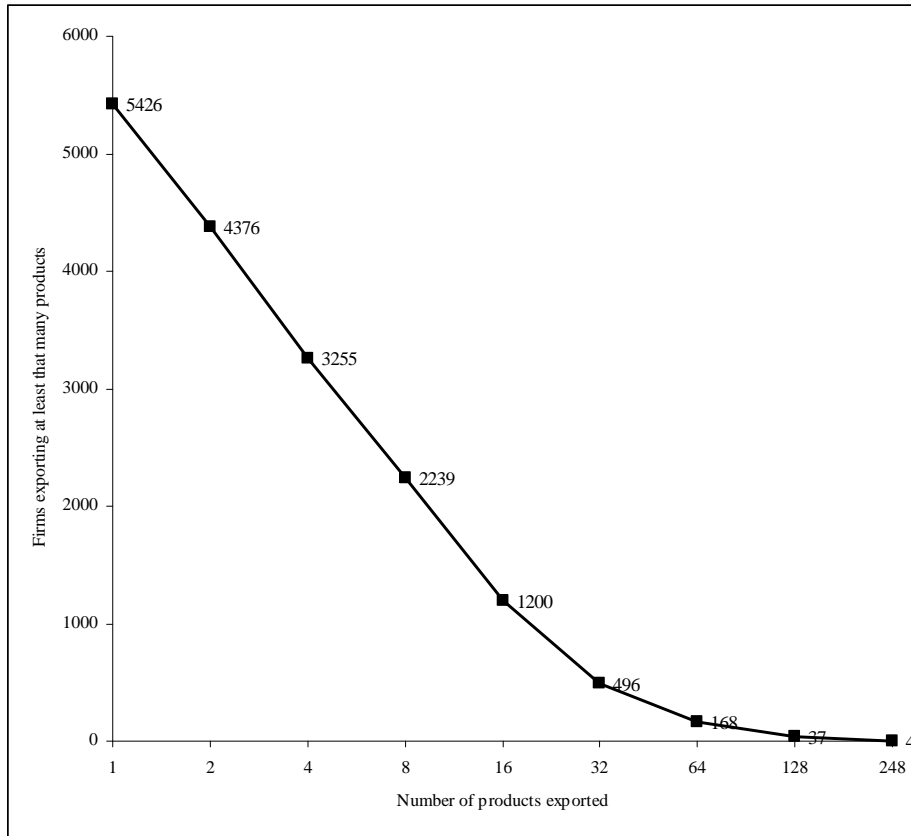
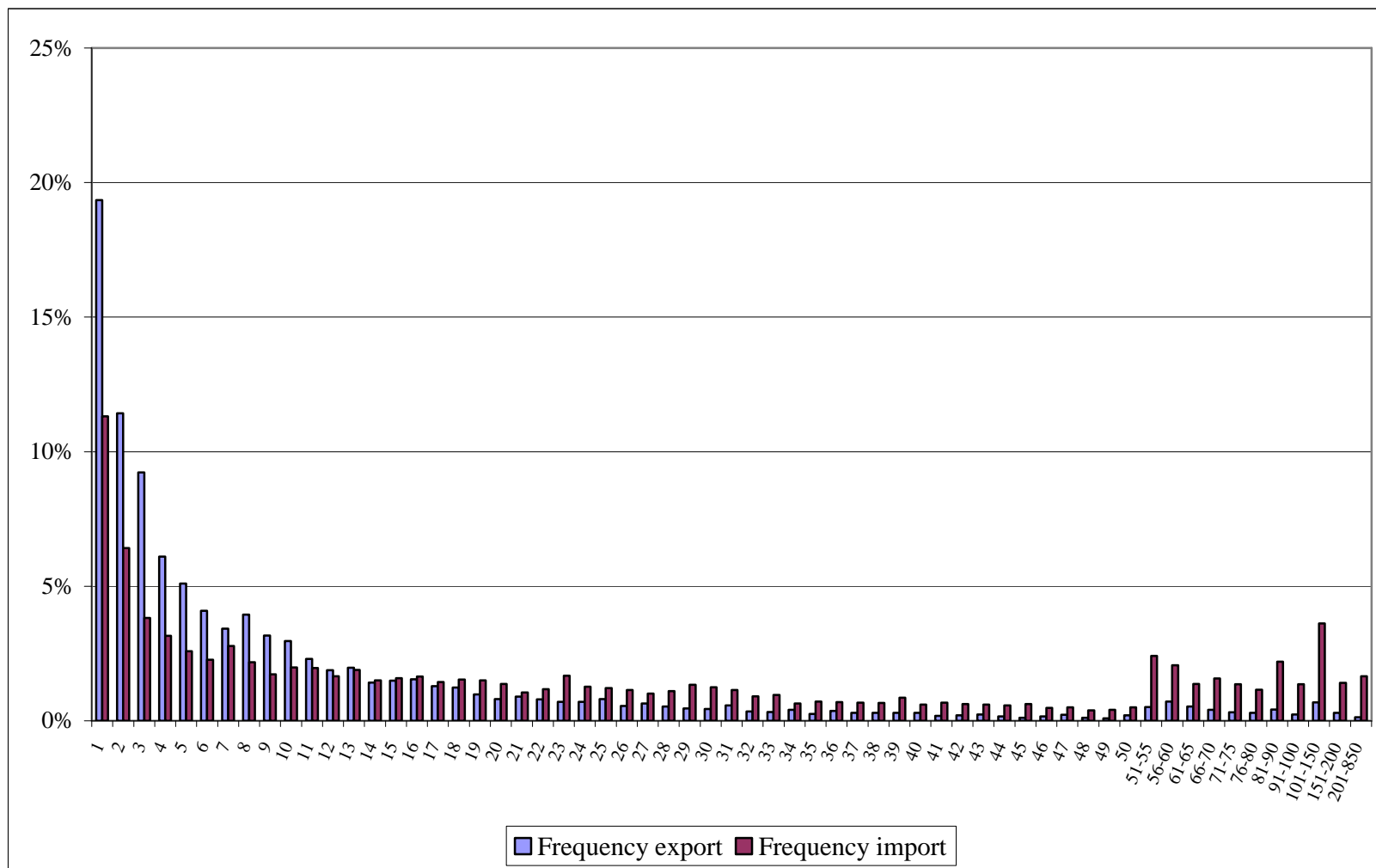Source: National Bank of Belgium; BBSTD.

Figure 9: Number of products imported (year 2000)

Source: National Bank of Belgium; BBSTD.

Figure 10: Frequency of manufacturing firms importing and exporting a certain number of products

Source: National Bank of Belgium; BBSTD.

F. Destinations, origins and gravity

A very large strand of the literature in international economics has developed a strong evidence that distance reduces trade flows. Heterogeneous firm models also predict that market size is also a determinant of how many firms will enter a specific market, given that only the most productive firms can incur the fixed cost of serving many markets. Besides, higher income and market size implies less productive firms will find it profitable to bear the fixed cost of exporting to a given market.

By simply looking at the top destinations and origins of trade, we show that the BBSTD is consistent with these findings. The top ten export destinations and sourcing countries are shown in Table 17.

Table 17: Top ten export destinations and source countries for manufacturing firms (year 2000)

Top 10 export destinations	Number of firms	% of Exporting Firms	Average Value of Exports	Top 10 sourcing countries	Number of firms	% of Importing Firms	Average Value of Imports
Netherlands	3635	67.0%	3028.5	Netherlands	4095	73.1%	3513.3
France	3518	64.8%	4329.6	Germany	3958	70.6%	2793.3
Germany	3170	58.4%	4802.1	France	3779	67.4%	1925.2
United Kingdom	2429	44.8%	2885.9	Italy	2629	46.9%	672.4
Luxemburg	1977	36.4%	496.2	United Kingdom	2551	45.5%	1263.0
Switzerland et Liechtenstein	1896	34.9%	704.4	United States	1730	30.9%	2216.4
Italy	1766	32.5%	2734.1	Switzerland et Liechtenstein	1681	30.0%	204.6
Spain	1748	32.2%	1862.1	Spain	1656	29.5%	705.0
United States	1661	30.6%	3629.4	Austria	1129	20.1%	334.4
Sweden	1366	25.2%	1149.0	Luxemburg	1044	18.6%	245.5

Source: NBB-BBSTD. Notes: Destinations and origins are classified according to the number of firms that trade with them, rather than the total trade value.

There is a high degree of overlap between the most frequent export and import trading partners. Netherlands, France and Germany share the top three places in both rankings. Other countries Belgian firms frequently trade with are the UK, Italy and the US. Austria and Sweden are the only two countries not appearing in both tables, the latter being the tenth most chosen export destinations and the former being the ninth source of imports. Direct neighbours being the most frequent destination for Belgian exporters confirms the

importance of distance, whereas the variation in average shipments to each country illustrates the importance of market size.

The top ten export destinations and import origins outside the EU are shown in Table 18. Consistently with the market size hypothesis, the US is the most popular countries among importers whereas the country exporters trade most is Switzerland. Other common export destinations are countries relatively near Belgium, such as Norway, Poland and Czech Republic or countries rich and large, but distant such as Japan or fast-growing economy such as Turkey.

Table 18: Top ten export destinations and sourcing countries outside the EU for manufacturing firms (year 2000)

| Top 10 export destinations	Number of firms	% of Exporting Firms	Average Value of Exports	Top 10 sourcing countries	Number of firms	% of Importing Firms	Average Value of Imports
Switzerland et Liechtenstein	1885	34.7%	702.6	United States	1730	30.9%	2216.4
United States	1642	30.3%	3649.3	Switzerland et Liechtenstein	1681	30.0%	204.6
Poland	1198	22.1%	757.2	China	546	9.7%	962.0
Czech Republic	990	18.2%	501.0	Japan	533	9.5%	2357.8
Norway	970	17.9%	393.5	Poland	526	9.4%	885.7
Israel	831	15.3%	904.8	Czech Republic	524	9.3%	587.4
Japan	824	15.2%	1412.2	Canada	411	7.3%	1032.3
Hungary	802	14.8%	683.4	India	400	7.1%	563.8
Turkey	797	14.7%	895.7	Taiwan	396	7.1%	451.2
Canada	763	14.1%	650.8	Turkey	360	6.4%	660.1

Source: NBB-BBSTD.

Among the top countries of origin of imports, we can see three Asian countries, namely China, Taiwan and India and two European transition economies, Poland and Czech Republic. These are usually associated with cheap imports and the displacement of production in developed countries. Belgian firms appear to be exploiting the opportunity offered by international trade to reduce costs by means of importing goods from these countries. However, crude cost considerations are not probably the only causes of imports since among the top sources of imports there are also other developed countries besides the US, such as Canada and Japan.

G. Exporting, Importing and Productivity

In this section we explore the relationship between productivity, measured as value added per worker, and exporting and importing activities of firms. We also investigate the role of the number of products traded and the number of countries firms trade with. For comparability with existing studies we focus on manufacturing.

Figure 11 and Figure 12 plot the relationship between value added per worker and total exports and imports. Labour productivity appears to be increasing as firms become more involved in international markets through exports or import. Yet, no causal link should be deducted from these graphs, as we cannot say whether this is due to self-selection into international markets or to post-entry productivity improvements.

Figure 11: Value added per employee and total exports for manufacturing firms (year: 2000)
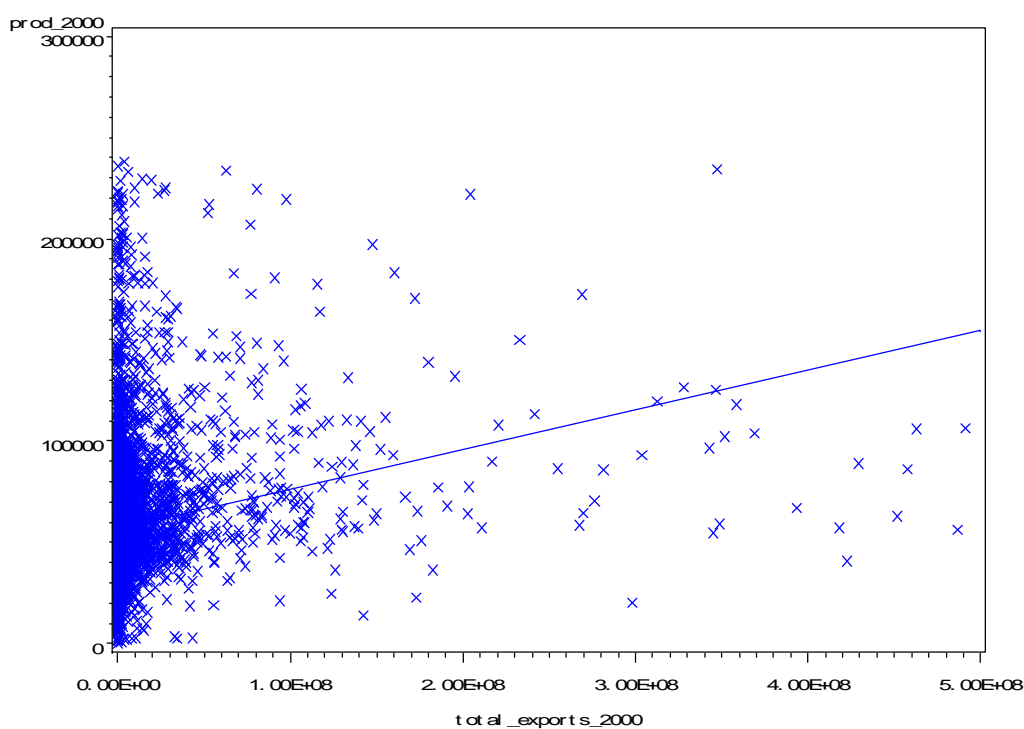
Source: NBB-BBSTD. Notes: Firms in the top and bottom value added per worker percentile have been deleted, and so have firms who export more than 500 million Euros. The positive relation is robust to using a lower threshold and to using logarithms of the variables.

Figure 12: Value added per employee and total imports for manufacturing firms (year: 2000)
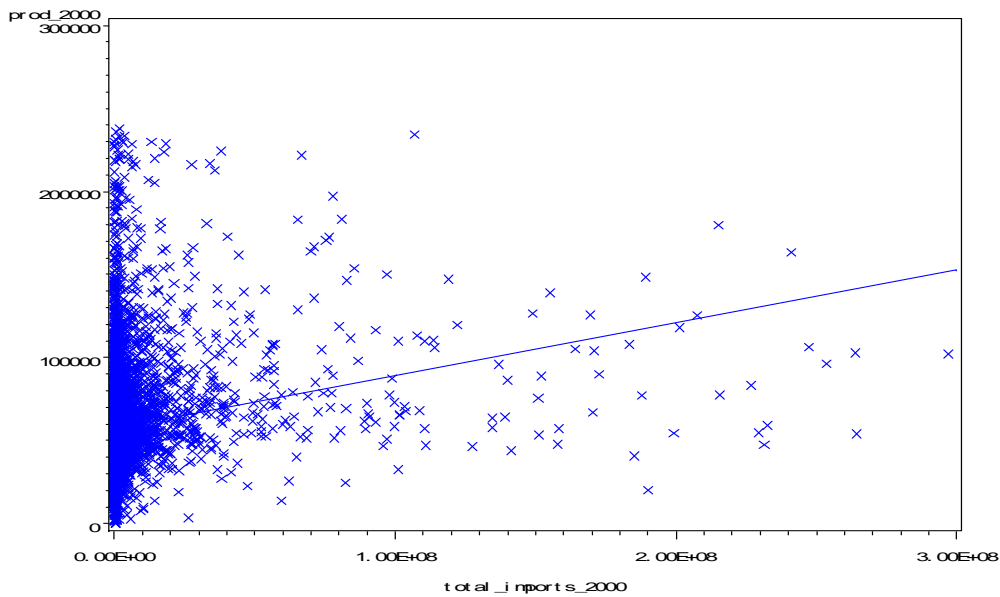
Source: NBB-BBSTD. Notes: Firms in the top and bottom value added per worker percentile have been deleted, and so have firms who import more than 300 million Euros. The positive relation is robust to using a lower threshold and to using logarithms of the variables.

Figure 13 and Figure 14 show the relationships between labour productivity and the number of export destinations and the number of country of origins of imports, respectively. There is a positive correlation in both cases.

Figure 13: Value added per employee and number of export destinations (year 2000) for manufacturing firms
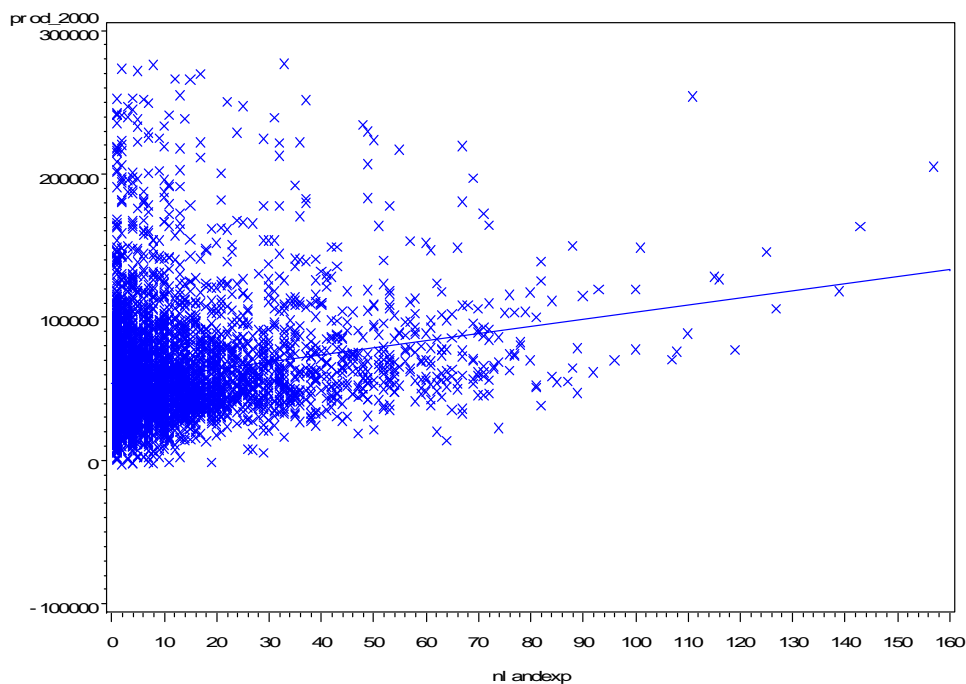
Source: NBB-BBSTD. Notes: The sample is truncated by taking out firms that export to more than 170 destinations, and the top and bottom percentile in terms of value added per employee. The positive relation is robust to using a lower threshold and to using logarithms of the variables.

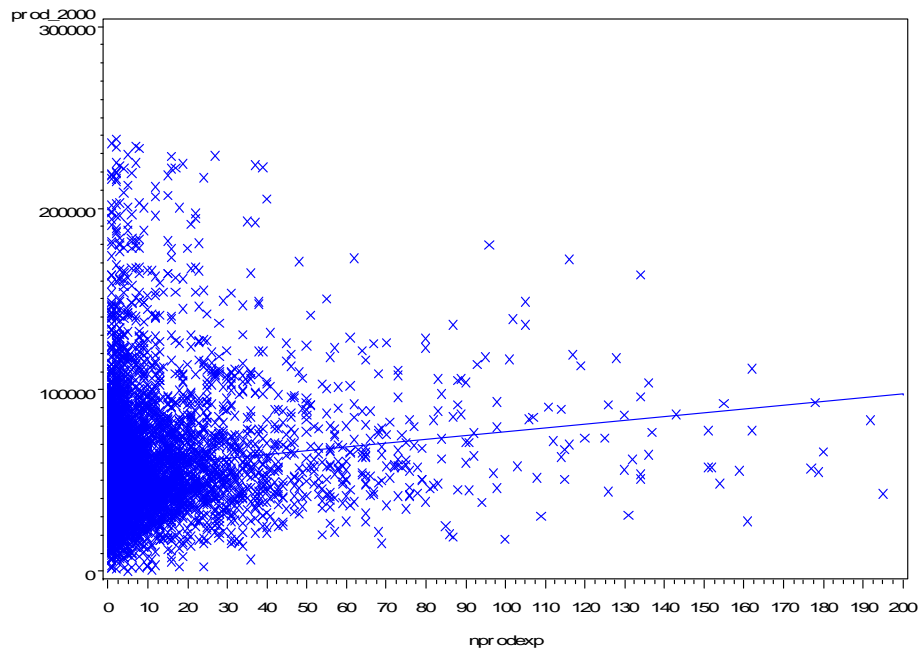**Figure 14: Value added per employee and number of origins of imports (year 2000) for manufacturing firms**
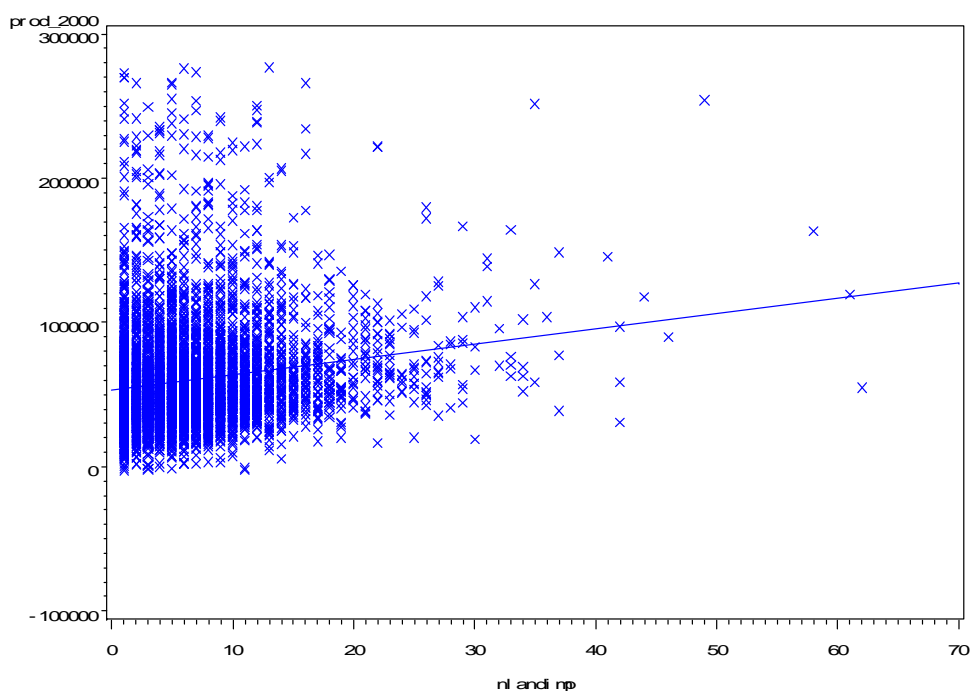
Source: NBB-BBSTD. Notes: The sample is truncated by taking out firms that import from more than 70 destinations, and the top and bottom percentile in terms of value added per employee. The positive relation is robust to using a lower threshold and to using logarithms of the variables.

Again, as explained in previous sections, this suggests that fixed costs of imports may be as relevant as fixed costs of exports: only the most productive firms are able to import inputs from a large number of countries.

The possible presence of fixed costs of importing and exporting each single product is illustrated in Figure 15 and Figure 16. They depict the relationship between labour productivity and number of products imported and exported. In both cases there is a clear positive relationship between value added per worker and number of goods shipped to or sourced from abroad. These positive correlations suggest that fixed costs of imports and exports might be related to specific products in addition to countries.

To investigate further the relationship between types of involvement in international trade and productivity we run simple value added per worker regressions on dummies identifying the trading status of firms. We control for year and industry effects by including time and industry dummies. The results are shown in Table 19. The reference category is that identifying non-traders.

Figure 15: Value added per employee and number of products exported for manufacturing firms (year 2000)

Source: NBB-BBSTD. Notes: :The sample is truncated by taking out firms that export more than 200 products, and the top and bottom percentile in terms of value added per employee. The positive relation is robust to using a lower threshold and to using logarithms of the variables.

Figure 16: Value added per employee and number of products imported for manufacturing firms (year 2000)
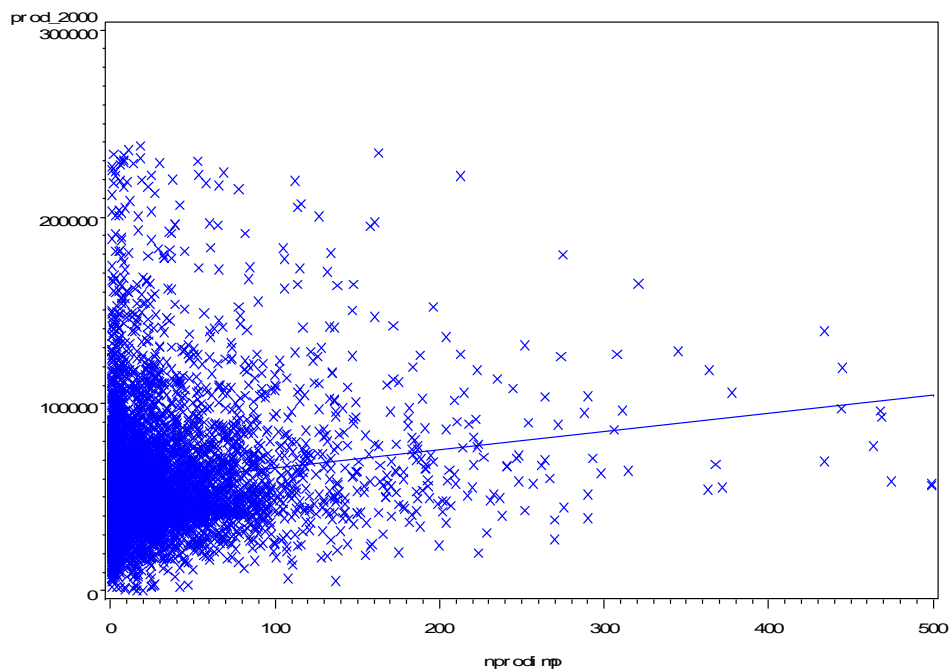
Source: NBB-BBSTD. Notes :The sample is truncated by taking out firms that import more than 500 products, and the top and bottom percentile in terms of value added per employee. The positive relation is robust to using a lower threshold and to using logarithms of the variables.

We also add as regressor the log of employment to control for any size effect and capture genuine productivity differentials. In the first column we consider firms that imports and export, whereas n the second we consider two-way traders as different categories.[38]

The results show that importers have a larger productivity advantage than exporters when compared to non-traders. Importing companies appear to be 17 percent more productive than non-traders, whereas exporters are 9 percent more efficient. In the second column, however, our results show that two-way traders are the firms with the largest productivity advantage. They are 27 percent more productive than non-traders. Importing and exporting only companies are, respectively, 15 and 6 percent more productive than enterprises with no involvement in international trade. Overall these results suggest that the current literature may have overstated the productivity advantage of exporters by not taking into account the role of imports.

Table 19: Labour productivity regressions

	(1)	(2)
Dependent Variable	Log (Value added per employee)	
Importer-Exporter		0.27
		[0.010]***
Importer only	0.17	0.15
	[0.010]***	[0.013]***
Exporter only	0.09	0.06
	[0.010]***	[0.015]***
Log (Employment)	0.06	0.06
	[0.003]***	[0.003]***
Constant	10.24	10.24
	[0.017]***	[0.017]***
Year dummy	Yes	Yes
2 digit sector dummy	Yes	Yes
Observations	152375	152375
R-squared	0.03	0.03

Source: NBB-BBSTD. Notes: Table reports OLS regressions. Two-way traders are firms that both import and exports. Imports import only and exporters export only.

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[38] In the first columns exporters may also import and importers may also export.

5. Conclusion

Using a newly available data set merging balance sheets and international trade transactions data, covering both imports and exports of Belgian firms, the BBSTD, this paper offers a complete view of international trade in goods at the level of the firm. More specifically, we provide a comparative analysis concerning importers and exporters considering the destinations of exports, origins of imports and the number of products firms trade.

Some of the findings we report confirm previous results, whereas others are novel and deserve further investigation. Considering the whole economy, we find that the number of firms importing and/or exporting has been increasing, along with their employment levels. Also, companies trading internationally, being importers, exporters or both are larger in terms of value added and employment than non-trading ones. However, their contribution to the total number of firms, employees and value added has decreased during the sample period. This is mainly due to the fact that new jobs and firms are being generated mostly in the service sector, which are less likely to trade in goods than companies in manufacturing. This result is in contrast to what Bernard, Jensen and Schott (2005) find for the US. We find conspicuous heterogeneity among different types of international traders. Importing only firms's share of the total number of firms increased along with their contribution to the economy-wide value added and employment levels. International outsourcing thus appears as an increasingly common practice, even among service firms.

Our results also suggest the existence of fixed costs of importing in addition to those of exporting. More specifically, consistently with the existing literature focussing on exports, we show that traders in general, whether importing, exporting or doing both, are more productive than non-traders. Furthermore, both imports and exports appear to be strongly concentrated among the largest and most productive firms. These facts suggest that a process of self-selection might characterise not only the entry into export markets, as suggested by the literature, but also the entry into import markets.

Exploiting information about destinations of exports and origins of imports, we find that most manufacturing firms source intermediate goods from a small number of countries. This mimics the behaviour of exporting activities. In general, the number of trading firms decreases as the number of countries they trade with. The same type of relationship holds at the product level. Traders export or import a relatively small number of goods and the number of trading firms diminishes as the number of products traded rises. These trading

patterns are consistent with those reported by Bernard, Jensen and Schott (2005) for the US. In addition, labour productivity is increasing in the number of countries firms trade with and the number of products exported or imported. These positive relationships would suggest that fixed costs of imports and exports are incurred for each new country a firm starts trading with and for each additional new product shipped to or sourced from abroad.

Finally, simple OLS regressions exploring productivity differentials among firms involved in international trade in different fashions suggest that firms that both import and export enjoy the largest productivity advantage when compared to non-traders. They are followed, in order, by importing and exporting only firms. Although we can not infer any causal link, this does suggest that the productivity advantage of exporters towards non-exporters may be overstated in the current literature, because of not taking into account imports besides exports.

In future research we plan to investigate further the issues explored in this paper. In particular we believe that, given the non-negligible share of importing firms and their potential effects on jobs and productivity reallocation, the role of imports, and how it affects trade liberalisation, need to be modelled properly both empirically and theoretically. Other issues deserving more attention, among many others, are the dynamics of entry and exit into foreign markets (of exports and imports) along with the dynamics of products traded.

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