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Imports and Exports at the Level of the Firm: Evidence from Belgium

Mirabelle Muûls and Mauro Pisu

THE LONDON SCHOOL
OF ECONOMICS AND
POLITICAL SCIENCE ■

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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 seem to have become more so over time. Focusing on manufacturing, we find that facts previously reported in the literature for exports only actually 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 regard to productivity differentials, firms that both import and export appear to be the most productive, followed, in descending order, by importers only, exporters only and non-traders. These results point to the presence of fixed costs; not only of exporting, but also of importing and to a process of self-selection in both export and import markets. Also, the productivity advantage of exporters reported in the literature may be overstated because imports were not considered.

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 per cent, surging to $9,216 billion. This outstripped the rise in world GDP (in nominal terms), which during the same period rose by 63 per cent (UNCTAD 2005). Recently, research efforts on the effects of the rising internationalisation of national economies on such outcomes 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 a detailed investigation of the choices of export market participation at the level of the firm. Greenaway and Kneller (2005) and Wagner (2007) provide 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 expenditure. 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 recent surge in imports of intermediates[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 have a positive impact on 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 on international trade by offering a complete view of the international trading activities of firms. For this purpose, we use a data set covering the whole population of Belgian companies matched with export and import 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 are traded by individual companies 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

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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 per cent in US and 17 per cent in France) export.

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

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 with the coexistence of firms with different productivity levels operating within a given industry[4]. 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 start shipping goods abroad.

Part of our results corroborate existing findings while others are novel and lay the ground for future research. Considering firms operating in all sectors of the economy and not in manufacturing only, 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 goods than firms in manufacturing or in the 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 declined over the sample period.

Among traders, we find 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 importing activities (including international outsourcing and offshoring) are becoming an increasingly 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[5].

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. As previously described in the literature focusing 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 do better than traders on these two scores. The concentration of international trade among the largest and most productive firms

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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. Tucci (2005), using a survey of Indian firms, finds that those engaged in both imports and exports have higher productivity levels than those that are not.

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

[5] Henceforth, we will refer to companies that both import and export as two-way traders to distinguish them from firms that just export or import, which we will simply call traders.

may be generated by fixed costs, since 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 corresponds to the behaviour of exporters Firms tend to 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[6]. The same type of relationship holds true at 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 as the number of products exported or imported rises. These positive relationships suggest that both fixed costs of imports and of exports are incurred for each new country or product with which firms start trading.

The rest of the paper proceeds as follows. The next section briefly overviews the existing literature concerning importing and exporting behaviour at the level of the firm. The data set is described in Section 3. The evidence we provide is discussed in Section 4, while Section 5 presents some conclusions.

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 the theory that exporters enjoy better performance characteristics than non-exporters. The theoretical models of Melitz (2003) and Bernard, Eaton, Jensen and Kortum (2003) build these stylised facts into an international trade general equilibrium model to show how the most productive firms self-select into export markets.

An alternative explanation has been also put forward to explain the productivity advantage of exporters over non-exporting firms (Clerides, Lach and Tybout 1998), namely the learning-by-exporting hypothesis. Testing the self-selection versus learning-by-exporting hypothesis has attracted a great deal of research effort. Initial evidence provided convincing support for 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,

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

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the rate of their productivity growth 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 that is 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 in companies after they started to export. On the other hand, Wagner (2002) for Germany find no evidence supporting the learning-by-exporting hypothesis.

Recently, Eaton, Kortum and Kramarz (2004) and Damijan, Polanec and Prasnikar (2004) have added a new dimension to the literature on exports at company level by investigating export-destination data. Eaton, Kortum and Kramarz (2004) look at a cross section of French firms in 1986. Their contribution runs along two main lines of thought. 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 evident 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 1 per cent increase in the French export market share of a foreign country market (i.e. gross production plus imports less exports) reflects a rise of around 0.88 per cent in the number of firms exporting there, whereas only 0.12 per cent is due to higher sales of firms already exporting to the same destination.

Damijan, Polanec and Prasnikar (2004) show that productivity is positively associated with 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 start exporting to the countries with low fixed costs.

The abundance of empirical evidence concerning the export behaviour of firms contrasts with the paucity of studies focusing on their importing activities[9]. It is a truism to say that the surge in

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[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 to be robust the methodology used to compute productivity.

[8] They analyse a Slovenian firm-level data 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.

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, anecdotal evidence of the rise in international outsourcing makes the study of imports at the level of the firm all the more interesting in itself. Surprisingly, there is little systematic and consistent evidence across countries on 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 per cent, reaching 21 per cent of the total exports of the countries considered[10].

Also, there are theoretical reasons to expect that imports of intermediates will impact upon firms, in particular on productivity levels. Building on Ethier (1982), Markusen (1989) argues that trade liberalisation of intermediates raises technical productivity at the final good production stage, if the final and intermediates sectors have non-constant returns 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 that 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 expenditure by 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, Tucci (2005) for India and MacGarvie (2006) for France have so far provided a comparative analysis of the exporting and importing behaviour of firms and its impact. 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 in the hands of 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 tend to be

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

[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 productivity improvements within individual firms and the exit of less productive firms due to import competition. Amiti and Konings (2005) make a comparative analysis in the spirit of Fernandes (2007). 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 reducing 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 1990s operates through productivity improvements and through the reallocation of capital and labour to importers.

larger[12]. They also argue that companies which both import and export tend to dominate US trade flows and employment among trading firms.

3. DESCRIPTION OF THE DATA AND SAMPLE COVERAGE

Firm-level accounts. The Central Balance Sheet Office at the National Bank of Belgium (NBB) collects the annual accounts of all companies registered in Belgium. Most limited liability enterprises, plus some other firms, have to file their annual accounts and/or consolidated accounts with the Central Balance Sheet Office every year. Large companies have to file the full-format balance sheet. Small companies may use the abbreviated format[13]. There are some exceptions. The data set does not cover firms in the financial sector. Also, some non-financial enterprises do not have to file any annual accounts[14]. Moreover, some of these companies have to submit a social balance sheet to the Central Balance Sheet Office. The social balance sheet contains specific information about the workforce, such as the number of people employed, personnel movements, training, etc.

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

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[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. Tucci (2005) finds a combined effect of imports and exports within trade networks when analysing a survey of Indian firms. She shows that the more a firm participates in international networks, defined by the combination of import and export shares, the higher its productivity advantage. Also, Indian firms that concentrate export and import activities on a specific geographical area are more productive.

[13] 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 euro.

[14] 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.

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

Foreign trade data. Trade data on individual transactions concerning exports or imports are collected separately at company 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 a change in ownership[16]. Companies report Intrastat transactions monthly. These are only liable for Intrastat declarations if their annual trade flows (receipts or shipments) exceed the threshold of 250,000 euro.

There are two kinds of declaration, the standard one 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 euro for their annual receipts or shipments must fill up 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 cover a larger share of the total trade transactions than Intrastat data, because all flows are recorded, unless their value is smaller than 1000 euro or their weight smaller than one tonne.

Merger of balance sheet and customs data. The Belgian Balance Sheet Transaction Trade Dataset (BBSTTD) results from the merging of the balance sheet data and the customs data at the level of the firm through the value added tax (VAT) number. This is a unique code identifying each firm. The merger was highly successful. As shown in Table 1, only 6.73 per cent of all firms that were present in the foreign trade data in 1996 and 2.91 per cent 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 accounts with the Central Balance Sheet Office[18]. Although these firms only make up a marginal fraction of the whole population, they accounted for 26.4 and 35.9 per cent of total imports in 1996 and 2004

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[16] Records of international trade transactions also have to register movements of goods across borders which do not involve any change of ownership. These concern movements of stock, or 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 details, see also Institut des comptes nationaux (2006). In order to give more information, 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 B. 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.

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

[18] These entities can well be firms that are part of larger group filing consolidated accounts. We do not use consolidated accounts. But even 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 concerning other firms in the group.

and 25.5 and 37.2 per cent of total exports. More information about these unmatched firms is given in Table 2. The bulk of trade conducted by unmatched firms in 2004 was attributed 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 employees at all or only one part-time equivalent employee. In the following analysis, we focus only on those firms with at least one full-time equivalent (FTE) employee[19]. Although selecting just these companies means losing more than half the total number of firms recorded in both 1996 and 2004 (see Table 1), this does not lead to any significant loss of information. The selected firms together account for most of the economic activity in Belgium. Table 1 shows that firms employing at least one worker accounted for 94.12 per cent of total reported value added[20] in 1996 and 93.01 per cent in 2004. Hence, our matched data set appears to adequately represent the Belgian economy.

Table 1 - Merged balance sheet data and foreign trade data

	Number of firms		Number of employees (thousands)		Value added (thousands of Euros)	
	1996	2004	1996	2004	1996	2004
Firms included in the balance sheet data set	216,137	301,674	1,590.89	1,817.1	99,790.8	147,668.7
of which, firms with at least 1 full-time employee	96,417 (44,61%)	107,180 (35,53%)	1,589.43 (99,91%)	1,804.1 (99,29%)	93,931.09 (94,12%)	137,351.2 (93,01%)
Firms included in the customs data set, but not in the balance sheet data set	15,601	9050				

Source: NBB-BBSTTD.

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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 sheet.

[20] Value added is measured differently for firms filing full-format or abbreviated balance sheets. The difference between sales and inventory in products, services and miscellaneous goods is computed for full-format 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).

Table 2 - Unmerged balance sheet data and foreign trade data (year 2004)

Type of firms	% 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 with establishment in Belgium	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-BBSTTD. Note: The judicial situation of firms with no Balance Sheet is obtained through the Crossroads Bank for Enterprises (BCE-KBO).

Table 2 provides more information about the non-merged observations for 2004. As can be seen, nearly 60 per cent of both export and import trade not merged with annual accounts data is conducted by foreign firms with no establishment in Belgium. These are trading firms with a VAT representative. They are most probably trading platforms of other European firms using Belgium as their port of entry or exit. Some might have been established for fiscal reasons by Belgian firms to conduct trade for them, but this cannot be checked in the data. About 20 per cent of the unmatched imports and exports can be attributed to foreign firms producing in Belgium. Their annual accounts are not available, but this is probably because they are part of a larger group of firms filing consolidated accounts.

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

Overall, the figures in Table 3 are broadly consistent with anecdotal evidence suggesting that most of the new small firms and start-ups are in the service sector, whereas manufacturing is shrinking and moving towards a process of consolidation favouring large firms.[21] The share of manufacturing declined markedly during the same period. Considering firms with at least five employees, their share plummeted from 24.3 per cent to less than 20 per cent. The decrease was a little milder when including smaller firms. Recycling, utilities and construction - another important sector - maintained a stable share in the total number of firms.

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[21] 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. This sector's share rose from 33.1 per cent to nearly 38 per cent (for firms with at least one employee) and from 27 to 32.7 per cent (for those with at least five employees) from 1996 to 2004. The contribution of the wholesale and retail sector to the total number of firms, although still prominent in 2004, declined during the sample period. The decrease was sharper when considering firms with at least one worker.

The last two columns of Table 3 show the shares of employees in each broad sector. Manufacturing and services are the two largest employers, each accounting for between 30 and 40 per cent of total jobs in our sample. Other large employers are, in descending order, wholesale and retail (around 20 per cent), and recycling, utilities and construction (between 10 and 11 per cent). Services and manufacturing appear to be on divergent paths. In 1996, manufacturing accounted for more than 36 per cent of jobs in the whole economy. The contribution of services was around 31.5 per cent. This ranking was reversed in 2004 as their respective shares were now 30 and 37 per cent. Also, during this period, the share of the wholesale and retail sector in terms of employment 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 and wholesale and retail sectors. This is likely to have an impact on the evolution of the number and percentage of companies trading goods.

Table 3 - Number of firms and employees per sector

Sector	NACE Code Bel	Number of firms				Number of employees (thousands)			
		At least 1 full-time employee		At least 5 full-time employees		At least 1 full-time employee		At least 5 full-time employees	
		1996	2004	1996	2004	1996	2004	1996	2004
Total		*96,416*	*107,180*	*37,518*	*42,730*	*1,589*	*1,804*	*1,477*	*1,660*
of which:									
Agriculture, Fishing, Mining	1-14	1.9%	2.1%	1.6%	1.9%	0.8%	0.9%	0.7%	0.7%
Manufacturing	15-36	15.8%	13.3%	24.3%	19.9%	36.5%	29.6%	38.4%	31.4%
Recycling, Utilities and Construction	37-49	14.3%	14.6%	15.9%	15.5%	11.0%	10.5%	10.7%	10.2%
Wholesale and Retail	50-54	34.2%	31.9%	30.4%	29.6%	19.4%	21.1%	18.2%	20.1%
Services	55-98	33.1%	37.9%	26.9%	32.7%	31.6%	37.3%	31.4%	37.1%
Coordination centres	*74152*	*0.3%*	*0.2%*	*0.7%*	*0.5%*	*0.5%*	*0.5%*	*0.5%*	*0.6%*
Unknown		*0.5%*		*0.1%*		*0.2%*		*0.1%*	

Source: NBB-BBSTTD.

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 for by non-traders and by traders, distinguishing between importers, exporters and two-way traders. We then break down these characteristics even further for the manufacturing sector. Next, we examine and compare the degree of concentration of both imports and exports. Then, focusing 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 following two subsections. Finally, we provide some evidence on the productivity differential between non-traders and the different types of traders.

4.1. Importers, Exporters and Two-way Traders

As discussed 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 provides new stylised facts on how intertwined these two activities are, and on their frequency both over time and across broad sectors.

Table 4 considers the number of firms in the sample distinguishing between the shares of non-trading firms, importers, exporters and those that both import and export (i.e. two-way traders)[22]. Again, we focus our attention on firms with at least one or five employees.

Overall, only a minority of firms export or import, which is consistent with previous empirical studies. Firms that export, meaning those that just export and those that both export and import, accounted for around 21 per cent of all firms in 1996 and 15 per cent in 2004[23]. Interestingly, our data suggest that importing goods is a slightly more common practice than exporting. The percentage of firms importing goods was 23.4 in 1996 and 17.7 in 2004[24]. Also, companies are more likely to engage in two-way trade (export and import at the same time) than doing just one or

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[22] We performed the same analysis considering trade with countries outside the EU only. Trade data relating to transactions with non-EU countries cover a larger share of actual shipments since Extrastat has a lower threshold than Intrastat above which they are recorded. Also, if the EU is considered 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.

[23] Bernard, Jensen and Schott (2005) report for the US that only 3.1 per cent of firms exported in 2000. They nevertheless consider all firms in the US with no limit on employment. Bernard and Jensen (1995) find that 14.6 per cent of manufacturers exported, excluding small plants. Eaton, Kortum and Kramatz (2004) obtain similar findings for France using cross-section data for all French firms for 1986. They find that 17.4 per cent 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 per cent. However, the data they use under-represents small firms.

[24] When considering all firms in the US economy in 2000 with no limit of size, Bernard, Jensen and Schott (2005) find that 2.2 per cent of firms import while 3.1 per cent export. With no size threshold, these figures in the BBSTTD would be respectively 8.5 per cent and 6.9 per cent.

the other. The share of firms doing both was 16.8 per cent in 1996, but dropped to 10.7 per cent in 2004. On the whole, larger firms are more likely to trade.

The last four 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 per cent of total employment. Comparing the first four columns of Table 4 with the last four, we have the stark contrast that non-traders make up the majority of firms in 1996 and 2004, but at the same time their share of total employment is much lower (being below 40 per cent).

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

	Number of firms				Number of employees (thousands)			
	Firms with at least one FT employee		Firms with at least 5 employees		Firms with at least one FT employee		Firms with at least 5 employees	
	1996	2004	1996	2004	1996	2004	1996	2004
Total	*96417*	*107180*	*37496*	*42730*	*1589.4*	*1804.1*	*1477.5*	*1660.3*
of which:								
Non-Traders	72.4%	77.0%	56.8%	62.4%	31.3%	38.4%	27.6%	34.4%
Importers	6.6%	8.0%	8.1%	10.9%	7.5%	10.8%	7.6%	11.1%
Exporters	4.2%	4.3%	5.0%	6.2%	5.8%	3.6%	6.0%	3.6%
Two-way Traders	16.8%	10.7%	30.1%	20.5%	55.3%	47.3%	58.7%	50.9%

Source: NBB-BBSTTD.

Table 5 - Sectoral distribution of traders and non-traders (all firms with at least one full-time equivalent employee)

	Manufacturing		Wholesale and Retail		Services		Agriculture, Fishing and Mining		Others		TOTAL	
	1996	2004	1996	2004	1996	2004	1996	2004	1996	2004	1996	2004
Total, of which:	*15,193*	*14,265*	*32,995*	*34,188*	*31,918*	*40,650*	*1,840*	*2,273*	*14,471*	*15,804*	*96,417*	*107,180*
Non-Traders	52.4%	55.0%	54.6%	60.6%	91.5%	92.1%	77.4%	81.2%	91.4%	92.7%	72.4%	77.0%
Importers only	6.4%	9.1%	11.4%	15.4%	3.3%	3.2%	3.0%	5.4%	3.4%	3.7%	6.60%	8.0%
Exporters only	4.4%	7.3%	7.4%	6.6%	2.2%	2.1%	3.2%	7.2%	1.4%	1.7%	4.20%	4.3%
Two-way Traders	36.8%	28.7%	26.6%	17.4%	3.0%	2.5%	16.3%	6.2%	3.8%	1.9%	16.8%	10.7%

Source: NBB-BBSTTD.

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

	Manufacturing		Wholesale and Retail		Services		Agriculture, Fishing and Mining		Others		TOTAL	
	1996	2004	1996	2004	1996	2004	1996	2004	1996	2004	1996	2004
Total, of which:	*579.8*	*534.8*	*309.0*	*381.5*	*502.7*	*673.3*	*13.5*	*15.5*	*184.5*	*198.9*	*1589.4*	*1804.1*
Non-Traders	10.0%	11.1%	25.0%	26.6%	49.3%	59.2%	44.4%	56.4%	59.4%	62.5%	31.3%	38.4%
Importers only	3.0%	5.5%	9.9%	14.1%	9.1%	11.6%	4.4%	9.4%	13.8%	16.0%	7.5%	10.8%
Exporters only	1.1%	2.5%	6.4%	6.0%	12.5%	3.0%	1.8%	7.9%	1.8%	3.3%	5.8%	3.6%
Two-way Traders	85.9%	80.9%	58.8%	53.2%	29.2%	26.2%	49.4%	26.3%	24.9%	18.3%	55.3%	47.3%

Source: NBB-BBSTTD.

As shown in Table 5, the growth in the total number of firms is mostly generated by both the service sector and non-trading firms. 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. The share of trading and non-trading firms is evolving differently in different industries. In manufacturing, the percentage of exporting- and importing-only firms increased. Surprisingly, however, the share of non-traders also rose over the sample period.

These changes are counterbalanced by the drop in the relative number of two-way traders[25]. In services, traders of any type account for the decreasing share of the total number of firms, whereas the share of non-traders is increasing. Wholesale and retail trade is instead characterised by the rise in the share of importing-only companies.

In Table 6, it can be seen that, not surprisingly, non-traders appear to generate fewer jobs than traders in the manufacturing sector. In both 1996 and 2004, only around 10 per cent of employees in manufacturing worked for firms that neither imported nor exported goods. Wholesale and retail firms' employment became increasingly concentrated in non-trading firms, rising from 25 per cent to 26.6 per cent, possibly because new firms tend not to trade immediately.

Another interesting pattern to emerge from Table 6 is that the share of employment generated by importing-only firms increased in all industries. On the other hand, the share of jobs of exporting-only firms increased in manufacturing (from 1.1 to 2.5 per cent), 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 declined in all sectors.

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

Our results concerning the dynamics of firms and jobs (as a share of the total economy) and their trading status are in stark contrast with what Bernard, Jensen and Schott (2005) report for the US.

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[25] The share of two-way traders decreased in all broad sectors considered. This is at first sight surprising, above all in manufacturing, given the increasing importance of international trade. However, it may be possible that this phenomenon reflects a concentration of firms on core competences. This leads firms to become less vertically integrated and therefore to focus on only a particular stage of the whole production process, with the result that they will become just importers or exporters.

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. A likely explanation for the different Belgian and US experience in this respect is the dissimilar evolution of the service and manufacturing industries in the two countries. Between 1990 and 2004, the contraction of 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 in Belgium, the contribution of manufacturing value added to total GDP decreased by 9.96 per cent, from 20.28 to 18.26 per cent. On the contrary, the relative weight of the US manufacturing sector was virtually unchanged. Manufacturing value added accounted for 18.07 per cent of GDP in 1990 and 18.24 per cent in 2004[26].

Different sectors contributed in very different ways 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 71.7 per cent of total exports, while wholesale and retail and services had respective shares of 25.8 and 1.2 per cent, as shown in Table 7[27]. Imports are less concentrated on one particular sector, with manufacturing and wholesale and retail both importing around 47.5 per cent 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 predominantly in the country where they operate.

There are two main conclusions to be drawn 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 just one or the other. This fact has not been properly considered thus far by the literature, which has mainly looked at exports only.

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[26] 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)

[27] 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 were blank.

Table 7 - Export and import share by broad sector

	Export Value (million euros)		Import Value (million euros)		Employment	
	1996	2004	1996	2004	1996	2004
Total	*86,794*	*127,187*	*79,076*	*120,006*	*1,589,388*	*1,804,072*
of which:						
Manufacturing	71.7%	69.6%	47.6%	47.1%	36.5%	29.6%
Wholesale and Retail	25.8%	26.3%	47.3%	46.1%	19.4%	21.1%
Services	1.2%	2.1%	2.2%	3.0%	29.4%	33.6%
Others	1.3%	2.0%	2.9%	3.8%	14.7%	15.6%

Source: NBB-BBSTTD.

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

Given the importance of manufacturing for trade in goods, in this subsection we break down 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 andTable 9[28].

Considering the number of firms in Table 8, we can see that, over the sample period, the number of manufacturing firms declined by 6 per cent. However, the trend in our data differs strongly across trading groups considered. Within our sample period, importers and exporters have greatly increased in number. On the other hand, 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 rare for firms engaged in international trade, and even more so for two-way traders. Furthermore, exit appears to be more likely than entry for all types of firms considered, except for exporters.

The rise in the number of importing- and exporting-only firms is also 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.

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

The surprising drop in the number of two-way traders is due to two elements. Firstly, exits of firms were not offset by the number of entries, both by new and old firms. Secondly, there was a relatively large 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, 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 as two-way traders (53 per cent) and the percentage of workers they employ (74 per cent). This is not true for non-traders.

Table 8 - Entry and exit of firms across trading status (manufacturing)

| | | | | | Continuing firms | | | |
| | | | | | Start trading | Stop trading | Switched trading status | |
Trading status	1996	Keep same status	Exits	Entry	Start trading	Stop trading	Switched trading status	2004
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				14,265

Share of firms relative to 1996 levels (in percentage)

| | | | | | Continuing firms | | | |
| | | | | | Start trading | Stop trading | Switched trading status | |
Trading status	1996	Keep same status	Exit	Entry	Start trading	Stop trading	Switched trading status	2004
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				94

Source: NBB-BBSTTD.
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.

The number of jobs lost through exits is lower in percentage terms for two-way traders (18 per cent of their workers were displaced for this reason) and higher for non-traders (38 per cent of jobs lost). Importers and exporters are in between, with around 35 per cent of their jobs destroyed as a result of exits. The net job creation due to entries and exits varies with the trading status of the firm.

Importing and exporting companies created more jobs than they destroyed, because of entries and exits, whereas the contrary is true for non-traders and two-way traders.

In the case of 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 employment changes due to starting and stopping trading, it is possible to see the net contribution is positive for importers and exporters and surprisingly negative for two-way traders.

Table 9 - Entry and exit of firms across trading status in terms of employment

Change in employment (thousands)									
					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					534.8

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-BBSTTD.
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.

Furthermore, considering those firms switching their trading status, but still remaining traders, the percentage change 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 stopped one of their trading activities and became just importers or exporters were on average smaller firms,

accounting for only a small percentage of two-way traders' total employment. Yet, this is still an important increase in the employment of importers and, even more so of exporters[29].

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

The main findings reported in this subsection highlight 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 drop in employment of two-way traders and their switch to single-trade activities.

4.3. Trade Concentration

Bernard, Jensen and Schott (2005) and Bernard, Jensen, Redding and Schott (2006) show for the US that trade is highly concentrated. This subsection looks at this issue in more detail for the Belgian data. Table 10 shows the Gini coefficients of exports, imports and total trade (in addition to value added and employment by way of comparison)[30]. We report this information for the whole economy and for manufacturing and wholesale and retail sectors separately.

However it is measured, overall economic activity appears to be unevenly distributed. All Gini coefficients in Table 10 are larger than 0.740. It is noteworthy that international trade is more concentrated than employment and value added. This is true whether we consider the whole economy or the manufacturing or wholesale and retail sectors separately. Also, exports and imports have become more concentrated over time. This is in line with the evolution in the degree of concentration of employment and value added[31].

The degrees of international trade concentration in Table 10 are similar to those that Bernard, Jensen, Redding and Schott (2006) report for the whole US economy in 2000. They find a Gini coefficient of 0.972 for exports, 0.965 for imports and 0.971 for total trade. These figures are marginally lower than those for the whole Belgian economy in 2004 and in 1996. So this suggests

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[29] Respectively 68 per cent and 88 per cent, summarised in the 49 per cent and 74 per cent figures of Table 9 which sum up all trading status switches.

[30] The Gini coefficient is a measure of how much a certain variable, say trade, is equally distributed across firms. It is bound between zero and one. A value of zero indicates that trade is uniformly distributed and that therefore all firms account for the same proportion of trade. A value of one points to the fact that just one firm is responsible for all trade.

[31] Employment in manufacturing is the exception since its Gini coefficients decreased from 1996 to 2004.

that international trade in Belgium appears to be even more concentrated than in the US. In both countries, exports appear to be more concentrated than imports.

In the appendix, Table A-1, we delve deeper into the data to investigate the degree of concentration of international trade, employment and value added for different parts of the size distribution. The largest firms, i.e. those with more than 500 employees, only make up 0.3 per cent of the total number of firms and 1.1 per cent of manufacturing firms. Yet, in 2004, they accounted for 33 per cent of total employment, and 37.2 per cent in manufacturing. Furthermore, they are responsible for over 40 per cent of exports and imports, and more than 55 per cent in manufacturing.

Table 10 - Gini coefficients

|	Whole Economy		Manufacturing		Wholesale Retail	
	1996	2004	1996	2004	1996	2004
Employment	0.826	0.833	0.824	0.815	0.746	0.747
Value Added	0.868	0.868	0.873	0.879	0.799	0.816
Exports	0.984	0.987	0.959	0.962	0.971	0.974
Imports	0.973	0.979	0.956	0.963	0.943	0.952
Total Trade	0.974	0.980	0.953	0.959	0.941	0.952

Source: NBB- BBSTTD.

The fact that exports are so highly concentrated among 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 mean that importing is only profitable for the largest firms. It could also be that importing a greater variety of intermediates, possibly of higher quality, allows firms to improve their productivity and thus grow more.

Over time, imports and exports have become even more concentrated. 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 break into export or import markets. Looking at the broad industry figures at the bottom of Table A-1, we can see that

wholesale and retail trade appears to be less concentrated than manufacturing, but the degree of concentration has been increasing during the sample period[32].

Illustrating this concentration within the manufacturing sector, depicts the Lorenz curve of total trade (i.e. imports plus exports) with respect to total value added. The top ten per cent of firms in terms of value added account for around 90 per cent of the value of international trade transactions, and this proportion increased from 1996 to 2004. Firms in the top 50 per cent of the distribution of value added are responsible for nearly 100 per cent of the value of imports plus exports. As shown in Figure 2, the concentration in terms of productivity (measured by value added per employee) is slightly lower, with the top 10 per cent of firms accounting for around 45 per cent trade in 2004.

Figure 1 - Concentration of trade value across total value added percentiles (manufacturing)
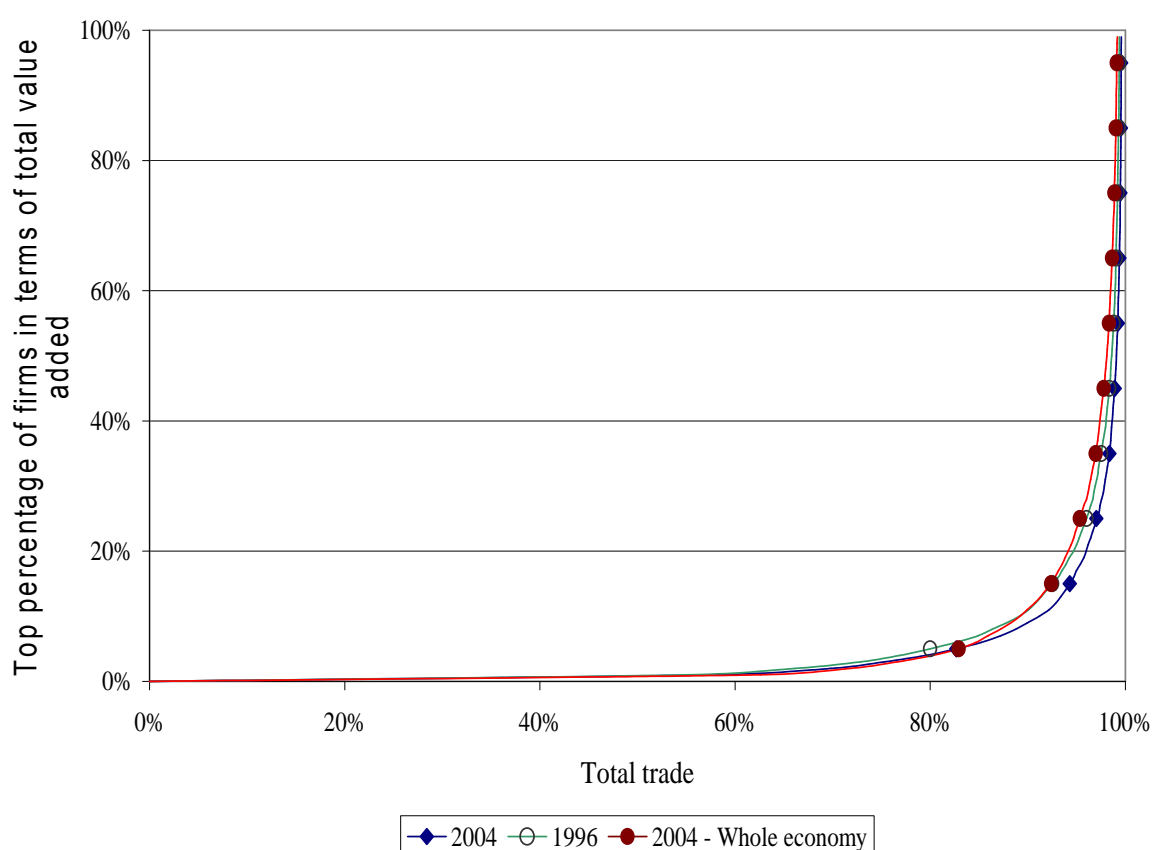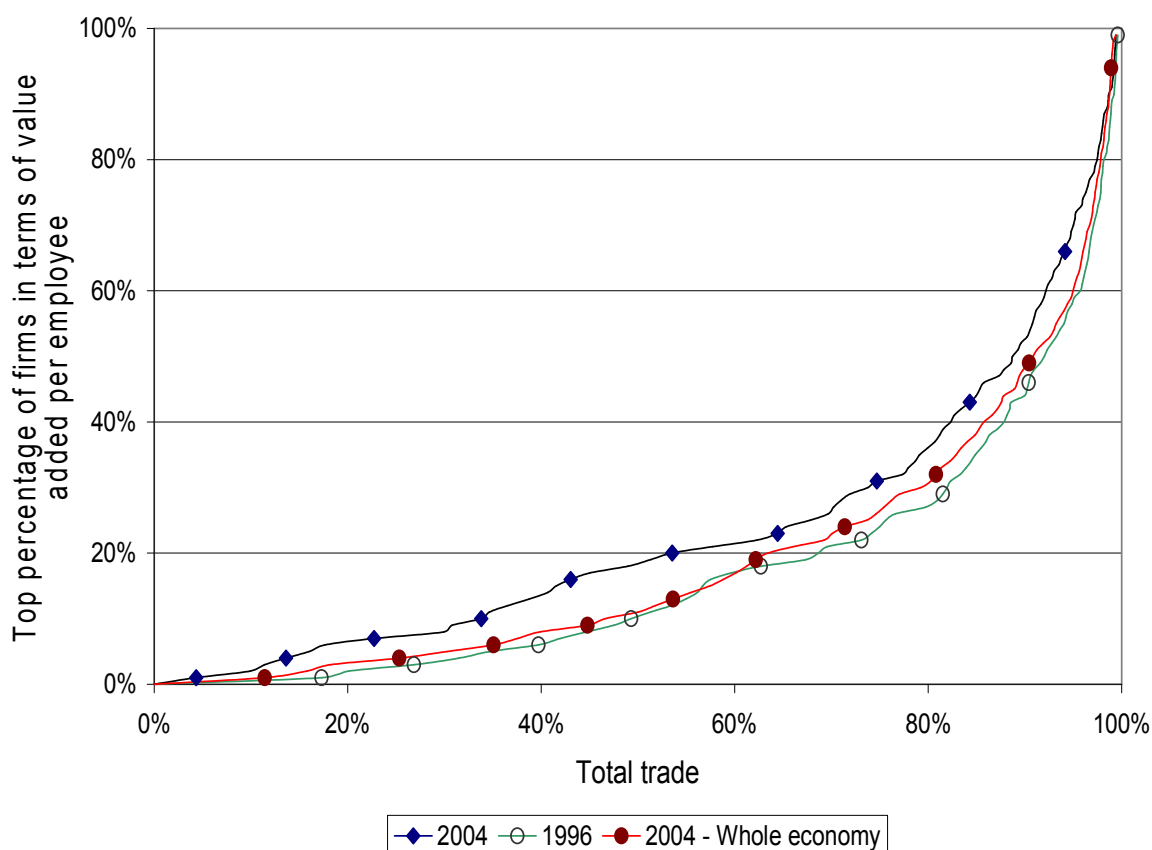

Source: NBB-BBSTTD.

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[32] The figures for wholesale and retail trade show a surprisingly large share of international trade conducted by firms with less than 20 employees. We conducted a robustness check, looking at the concentration figures of wholesale and retail sub-industries 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 a 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 per cent of international trade.

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. The higher concentration of both exports and imports among a relatively small number of firms may be generated by recurring sunk costs of exports and imports for different markets and products. This leads to the fact that only the most productive exporters and/or importers find it profitable to trade with more countries and more products. Therefore, more productive traders will trade more, and not only at the intensive margin, but also at the extensive margin. This will result in a higher degree of concentration than in the hypothetical case with just one foreign country and one product.

Figure 2 - Concentration of trade value across value added/employee percentiles (manufacturing)

Source: NBB-BBSTTD.

4.4. 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 so far been almost completely neglected[33].

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[33] Two exceptions are MacGarvie (2006) and Tucci (2005). The former 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. Tucci (2005), using a survey of Indian firms, finds that those engaged in both imports and exports have higher productivity levels to those that are not.

In this section, we explore the relationships between firm-level characteristics and international trading status. Summary statistics concerning the raw data of the most relevant firm-level variables are presented in the appendix from Table A-2 to 7. Table 11 instead exhibits regression results of firm-level variables, in log, regressed on trading-status dummies. These results, although showing simple correlation, have the advantage that estimated coefficients can be interpreted in percentage terms. Also, we are able to control for time and fixed effects, adding a full set of time and two-digit industry dummies[34]

Before commenting on the regression results in Table 11, we describe briefly the raw data as presented in Table A-2, A-3 and A-4 in the appendix. The main message arising from these tables is that two-way traders appear to be the most productive, in terms of value added per worker, and the largest, in terms of number of employees, in both years. At the other end of the spectrum, we find non-traders both in 1996 and 2004. With regard to capital intensity, i.e. stock of capital divided by the number of employees, and investment per employee, the results are much less clear. There does not seem to be any regular pattern between these variables and the trading status of firms[35].

Perusing the different tables, it is worth noting that, when considering the whole economy, importers outpaced exporters in terms of productivity and employment during the sample period. Between 1996 and 2004, all firms grew in size with the exception of exporters, whose average employment surprisingly decreased[36]. In wholesale and retail, Table A4 interestingly shows that there appears to be no difference in the average 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 Table A-5, A-6 and A-7, we analyse R&D spending[37]. What is at first striking is that this variable appears to be almost totally concentrated among two-way traders that also have the largest average R&D investment per firm in both years, across sectors. However, with some variation in time 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 A-5 suggests that, generally speaking, exporters are the most R&D-intensive firms followed by non-traders, two-way traders and

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[34] These regressions use firms in the whole economy from 1996 to 2004.

[35] We are unable to say if this is due to true heterogeneity across firms not related to their trading activities or measurement errors caused by the difficulties in having reliable capital stock and investment measures. Capital stock is in fact the net book value of tangible assets as appearing in the balance sheet, whereas we computed investment as the difference in capital stock at time t and time $t-1$.

[36] As noted above, this fact is caused by a single large firm operating in the service sector that switched export status from 1996 to 2004. The employment level of exporters in manufacturing and wholesale and retail trade did not fall.

[37] Only firms that file full-format balance sheets indicate their total R&D spending. Considering this reduced set of larger firms, the percentage of non-traders drops significantly to around 41 per cent in 2004 and 35 per cent in 1996 for the whole economy and traders are over-represented. The corresponding figures considering all firms with one or more full-time employees, are 77 and 72 per cent (see Table 4, for instance).

importers. Yet, the manufacturing two-way traders do seem to be more R&D intensive than other firms in both years[38]. The picture for wholesale and retail in Table 16 is less clear. 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 for accounting reasons[39].

Finally, Table 11 shows the percentage differences in the same variables described above among different types of firms. Overall, the parameter estimates presented in this table concerning productivity and employment confirm the descriptive analysis of the raw data above. Two-way traders appear to enjoy the largest premia followed in order by importers and exporters. Firms that both import and export are on average 35 per cent more productive than those doing neither. The productivity advantage of exporting- and importing-only firms is similar at around 17-18 per cent. Furthermore, Table 11 suggests that traders are more capital intensive and invest more per employee than non-traders. Again, two-way traders have the largest advantage followed by importers and exporters. These results contrast with those presented in the appendix since no relationship seemed to exist between these variables and trading status there. This difference is likely to be caused by between sectors' heterogeneity on capital and investment, which is controlled for in Table 11. Focusing on R&D per employee, we find the surprising results that importers and two-way traders are on average 39 per cent and 33 per cent less R&D intensive than non-traders, although both of them tend to have significantly larger total R&D spending than firms neither exporting nor importing[40].

In this subsection, we have provided evidence concerning possible relationships between international trading status and firm-level characteristics. Overall, two-way traders appear to be the largest and most productive companies whereas non-traders are the smallest and least productive. Also, importing-only firms enjoy larger premia when compared to non-traders than exporting-only enterprises. These patterns hold true for capital intensity and investment per employee, albeit to a lesser degree, but not for R&D intensity.

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[38] 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 dubious and is probably due to measurement errors.

[39] 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.

[40] These results are likely to be affected by few outliers since the data suggest that two-way traders account for more than 90 per cent of total R&D spending in Belgium.

Table 11 - Characteristics of firms per trading status - descriptive regressions (whole economy)

| Dependent variable	Log employment	Log value-added	Log VA per employee	Log Capital	Log capital per employee	Log investment	Log investment per employee	Log R&D	Log R&D per employee
Intercept	0.82	11.42	10.59	11.61	10.79	10.08	9.23	8.79	6.87
	(0.009)***	(0.011)***	(0.006)***	(0.015)***	(0.013)***	(0.016)***	(0.015)***	(0.41)***	(0.39)***
Exporter only	0.55	0.74	0.17	0.59	0.03	0.55	-0.01	0.22	-0.05
	(0.005)***	(0.006)***	(0.003)***	(0.009)***	(0.008)***	(0.009)***	(0.008)	(0.15)	(0.14)
Importer only	0.77	0.97	0.18	0.85	0.07	0.86	0.07	0.26	-0.39
	(0.004)***	(0.005)***	(0.002)***	(0.007)***	(0.006)***	(0.007)***	(0.007)***	(0.10)**	(0.10)***
Two-way trader	1.50	1.86	0.35	1.61	0.10	1.58	0.07	0.85	-0.33
	(0.004)***	(0.004)***	(0.002)***	(0.006)***	(0.005)***	(0.006)***	(0.006)***	(0.08)***	(0.08)***
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	913474	896386	896386	891224	891224	818339	818339	6488	6488
R^2	0.22	0.25	0.13	0.15	0.07	0.13	0.01	0.19	0.13

Source NBB- BBSTTD.

4.5.   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 our previous evidence, and in order to obtain results comparable to other countries, we will concentrate on the manufacturing sector in this section. 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 in.

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 3 and Figure 4. 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 origins of imports are respectively 157 and 62. The number of export destinations appears to decrease more quickly than the number of origins of imports, at least after four products are traded.

This is more apparent from Figure 5, 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 per cent of US exporters ship products to just one foreign country, while 7.7 per cent of them ship to ten or more overseas markets. The corresponding figures for French manufacturers are 34.5 per cent and 19.7 per cent.

Figure 3 - Number of export destinations (year 2000)
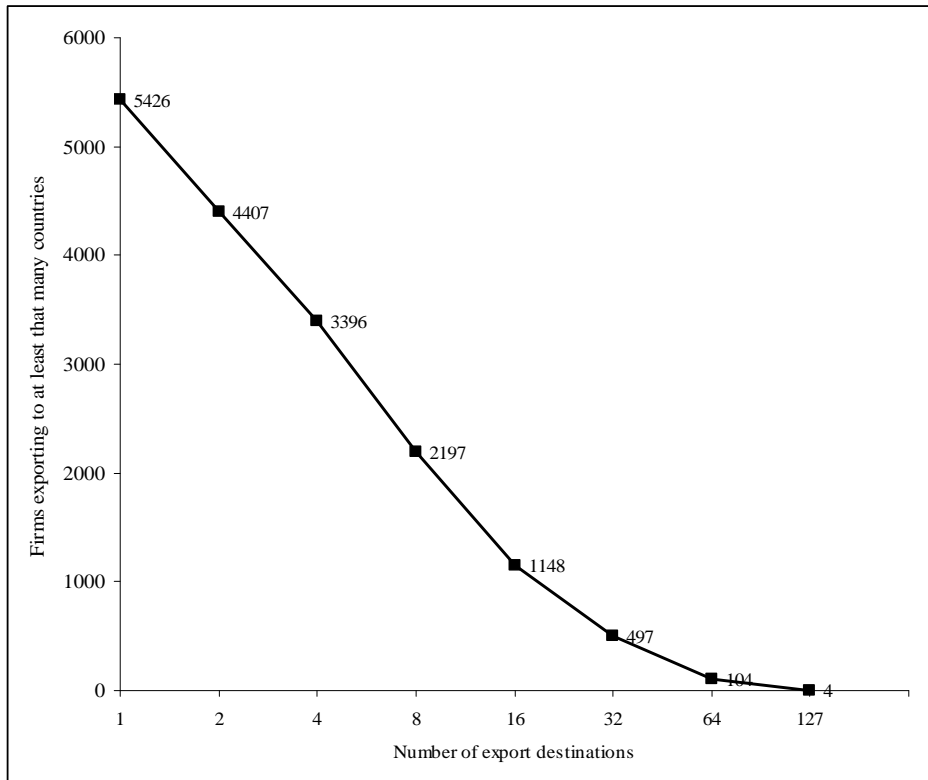
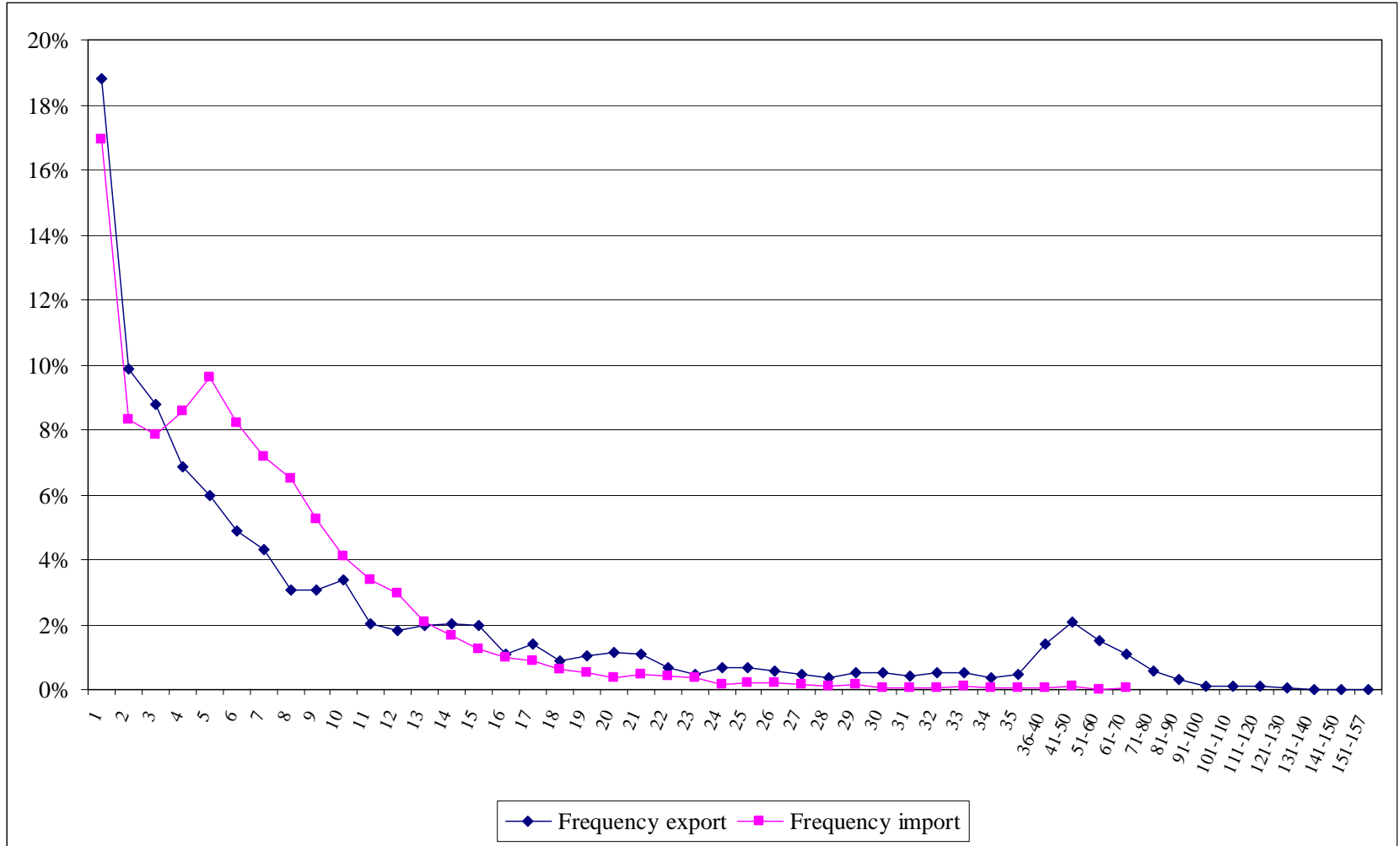

Source: NBB-BBSTTD.

Figure 4 - Number of sourcing countries (year 2000)
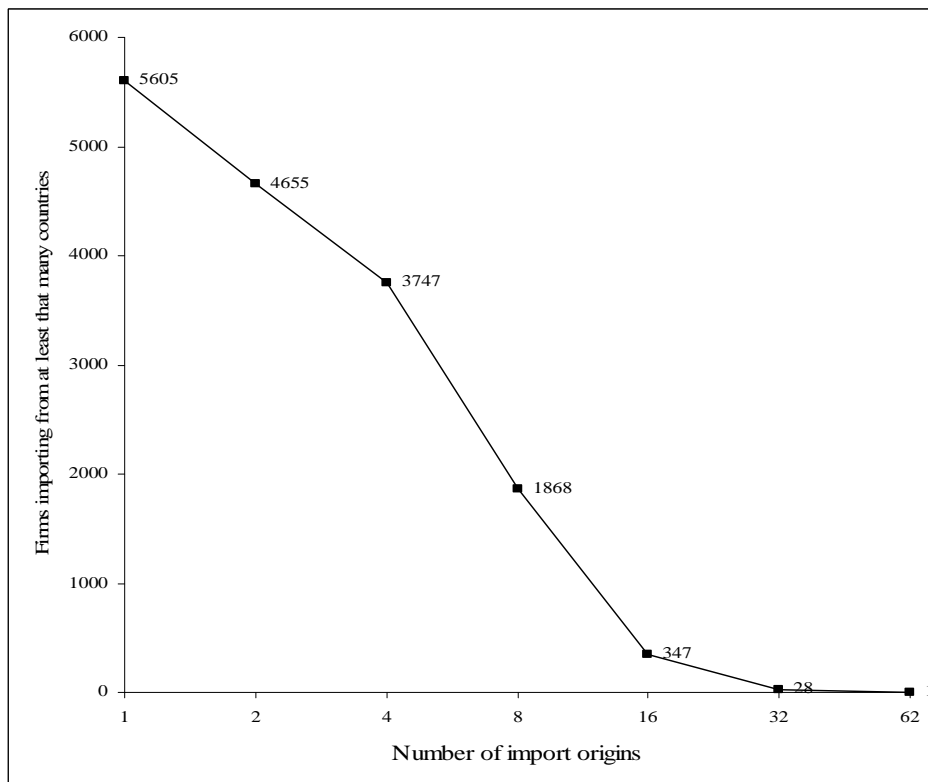
Source: NBB BBSTTD.

Figure 5 - Frequency of manufacturing firms exporting to and importing from a certain number of countries (year 2000)

Source: NBB-BBSTTD.

Our data suggest that 18.8 per cent of Belgian exporters serve just one market whereas 31 per cent of them ship to ten or more[41].

Thus, Belgian exporters appear to serve more markets than French and US exporting enterprises. French exporters fall somewhere in between Americans and Belgians. This could be attributed to the small Belgian domestic market: Belgian producers have to export to more destinations than French and US firms to take full advantage of increasing returns 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 distribution 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, it declines monotonically. Also of interest is that the distribution of export destinations dominates that of origins of imports in the one-to-three country range[42]. Thereafter, the distribution of imports dominates that of exports for up to 13 trading partners. 57 per cent of importers trade with 4 to 13 countries while only 37 per cent 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[43].

The distribution of export destinations and import origins is 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 just a 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 per cent 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 national 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 around 10 products from abroad. The BBSTTD suggests that Belgian manufacturing firms, in 2000, shipped to other countries on average around

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[41]   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 per cent of Belgian exporters ship products to just one destination, while 21.2 per cent of them ship to ten or more. Eaton, Kortum and Kramarz (2004) consider only manufacturing firms.

[42]   37 per cent of exporters export goods to one to three countries, whereas the corresponding figure for importers is 33 per cent.

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

12 products and sourced about 34 products from abroad[44]. Therefore, Belgian companies appear to be more geared towards trading internationally than US firms.

Looking in more detail at imported and exported products, Figure 6 and Figure 7 show that the number of trading firms declines systematically with the number of products they trade internationally. However, the number of exported products appears to decline more steadily than the number of imported goods. Figure 8 depicts the histogram of the number of products exported or imported. Both exporters and importers are more likely to trade a single product: around 20 and 11 per cent of exporters and importers, respectively, do so. Both distributions are skewed towards the right, as when considering destinations and sourcing countries.

Furthermore, from Figure 8 it is possible to note that Belgian traders are more likely to source ten or more products from abroad than to export them: only around 31 per cent of exporters sell more than ten products abroad compared with 62 per cent of importers sourcing more than ten goods[45].

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

[45] This is consistent with the findings of Bernard, Jensen and Schott (2005) for the US, where about 17 and 21 per cent of exporters and importers, respectively, trade more than ten products.

Figure 6 - Number of products exported (year 2000)
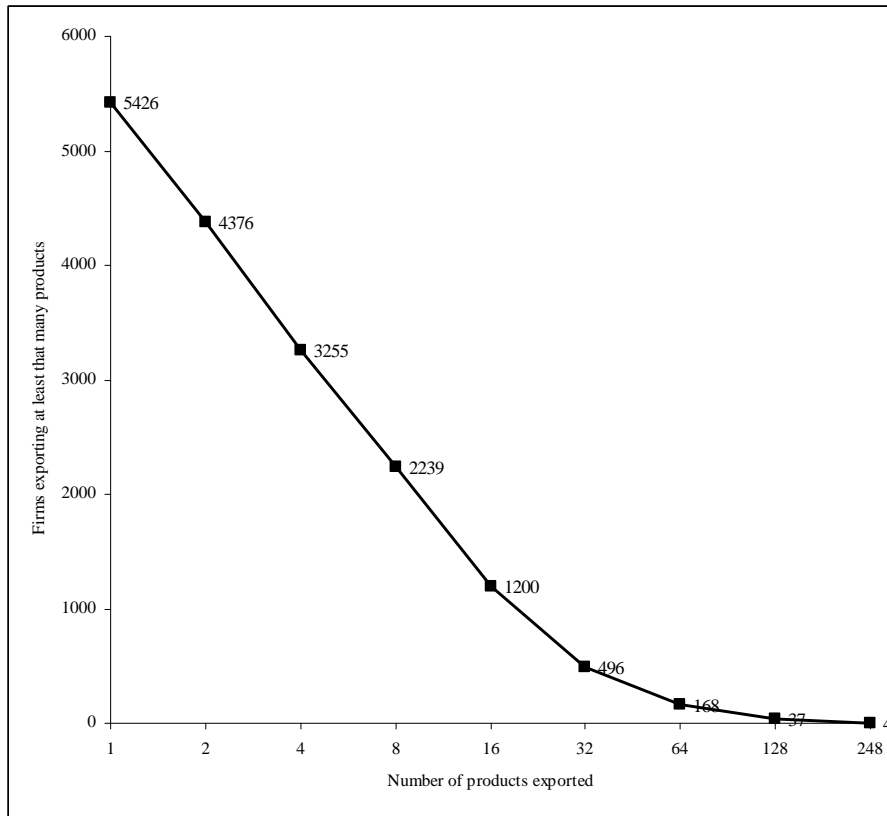
Source: NBB-BBSTTD.

Figure 7 - Number of products imported (year 2000)

Source: NBB-BBSTTD.

31

Figure 8 - Frequency of manufacturing firms importing and exporting a certain number of products (year 2000)

Source: NBB-BBSTTD.

4.6. Destinations, origins and gravity

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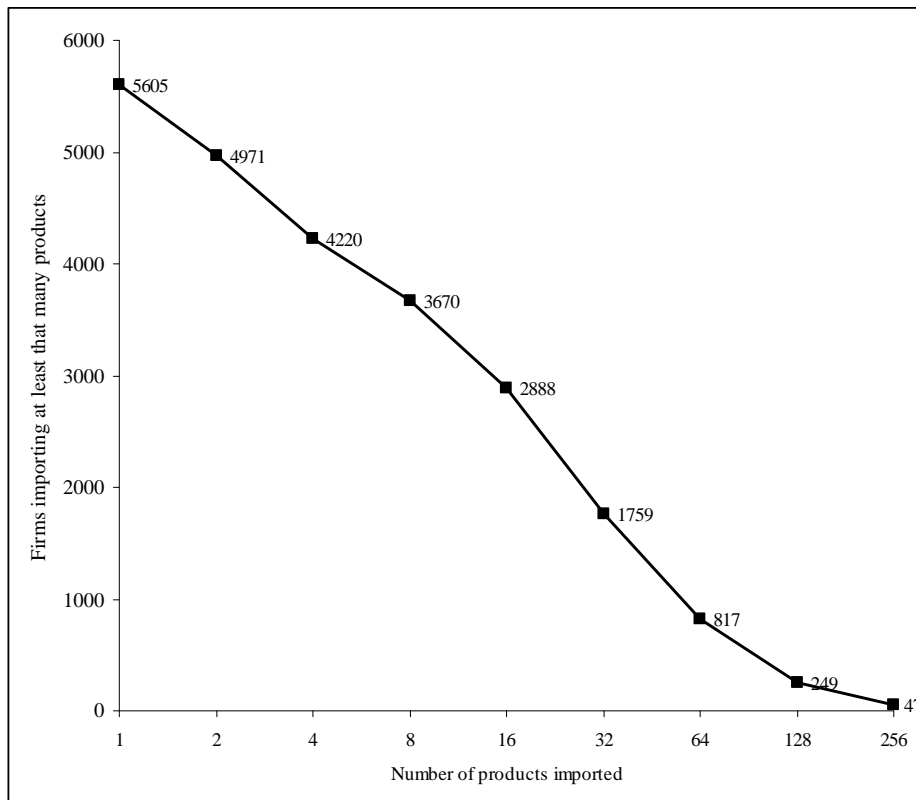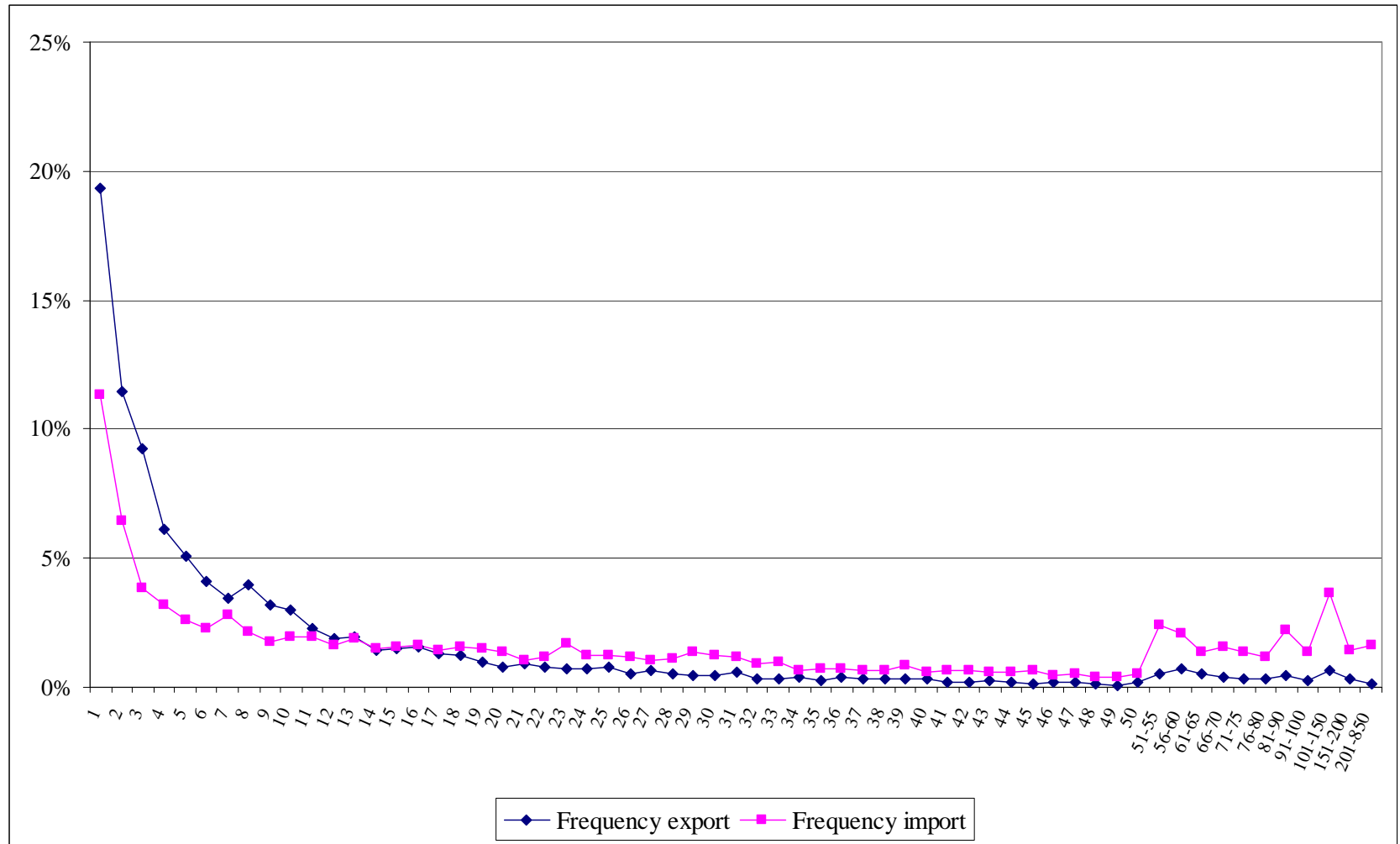edict that market size is also a determinant of how many firms will enter a specific market, given that only the most productive firms can incur the fixed cost of serving many markets. Besides, higher income and market size implies that less productive firms will find it profitable to bear the fixed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

By simply looking at the top destinations and origins of trade, we show that the BBSTTD is consistent with these findings. The top ten export destinations and sourcing countries are shown in Table 12.

Table 12 - 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	3,635	67.0%	3,028.5	Netherlands	4,095	73.1%	3,513.3
France	3,518	64.8%	4,329.6	Germany	3,958	70.6%	2,793.3
Germany	3,170	58.4%	4,802.1	France	3,779	67.4%	1,925.2
United Kingdom	2,429	44.8%	2,885.9	Italy	2,629	46.9%	672.4
Luxembourg	1,977	36.4%	496.2	United Kingdom	2,551	45.5%	1,263.0
Switzerland and Liechtenstein	1,896	34.9%	704.4	United States	1,730	30.9%	2,216.4
Italy	1,766	32.5%	2,734.1	Switzerland and Liechtenstein	1,681	30.0%	204.6
Spain	1,748	32.2%	1,862.1	Spain	1,656	29.5%	705.0
United States	1,661	30.6%	3,629.4	Austria	1,129	20.1%	334.4
Sweden	1,366	25.2%	1,149.0	Luxembourg	1,044	18.6%	245.5

Source: NBB-BBSTTD. 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. The 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 popular export destinations and the former being the ninth source of imports. The fact that direct neighbours are 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 EU15 are shown in Table 13. Consistently with the market size hypothesis, the US is the most popular country among importers whereas the country exporters trade most with is Switzerland. Other common export destinations are countries relatively near Belgium, such as Norway, Poland and the Czech Republic or countries that are rich and large but distant, such as Japan or fast-growing economies like Turkey.

Table 13 - 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 and Liechtenstein	1,885	34.7%	702.6	United States	1,730	30.9%	2,216.4
United States	1,642	30.3%	3,649.3	Switzerland and Liechtenstein	1,681	30.0%	204.6
Poland	1,198	22.1%	757.2	China	546	9.7%	962.0
Czech Republic	990	18.2%	501.0	Japan	533	9.5%	2,357.8
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%	1,412.2	Canada	411	7.3%	1,032.3
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-BBSTTD.

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 the 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 probably not 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.

4.7. 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 9 and Figure 10 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 imports. Yet, no causal link should be deduced from these graphs, as we cannot say whether this is due to self-selection into international markets or to post-entry productivity improvements.

Figure 9 - Value added per employee and total exports for manufacturing firms (year 2000)
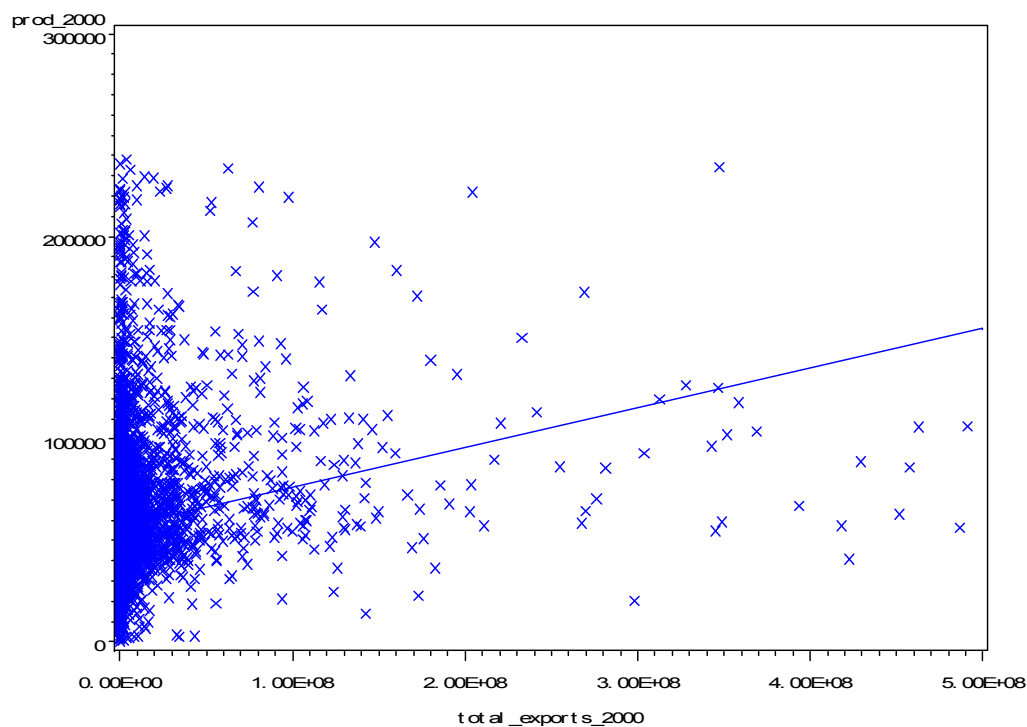
Source: NBB-BBSTTD. Notes: Firms in the top and bottom value added per worker percentile have been deleted, and so have firms that export more than 500 million Euros. The positive relation is statistically significant and robust to using a lower threshold and to using logarithms of the variables.

Figure 11 and Figure 12 show the relationships between labour productivity and the number of export destinations and the number of countries of origin of imports, respectively. There is a positive correlation in both cases.
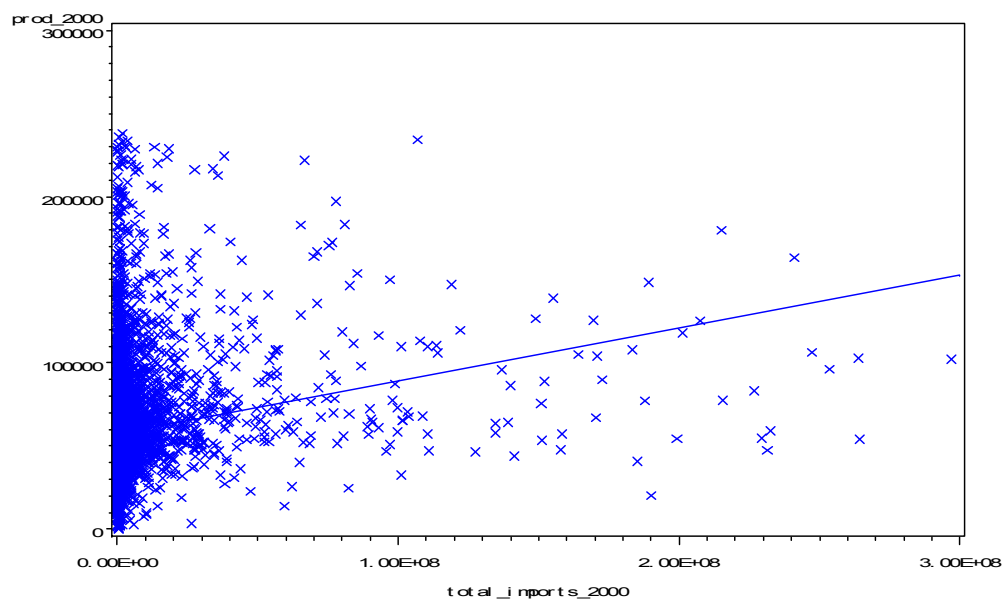
Figure 10 - Value added per employee and total imports for manufacturing firms (year 2000)

Source: NBB-BBSTTD. Notes: Firms in the top and bottom value added per worker percentile have been deleted, and so have firms that import more than 300 million Euros. The positive relation is statistically significant and robust to using a lower threshold and to using logarithms of the variables.

Figure 11 - Value added per employee and number of export destinations for manufacturing firms (year 2000)
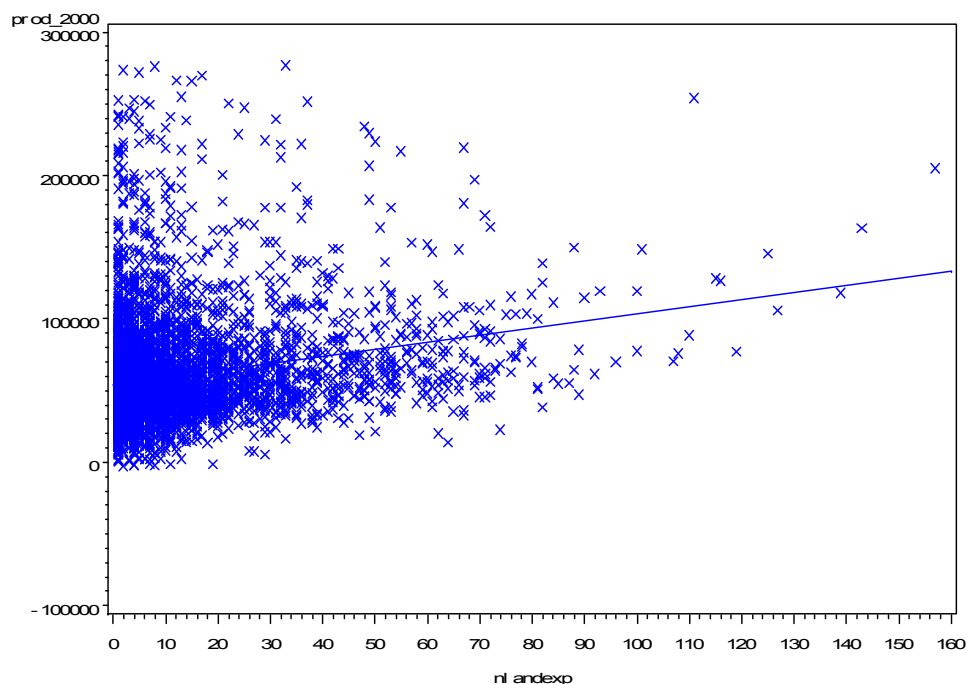
Source: NBB-BBSTTD. Notes: The sample is truncated by taking out firms that export to more than 170 destinations, and the top and bottom percentile in terms of value added per employee. The positive relation is statistically significant and robust to using a lower threshold and to using logarithms of the variables.

Figure 12 - Value added per employee and number of origins of imports for manufacturing firms (year 2000
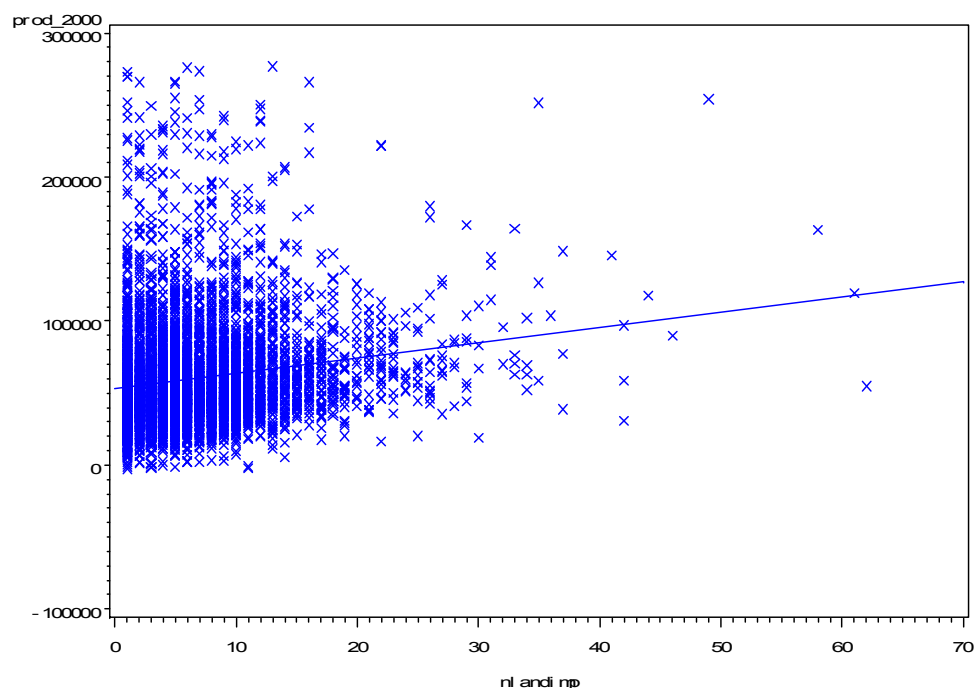
Source: NBB-BBSTTD. Notes: The sample is truncated by taking out firms that import from more than 70 destinations, and the top and bottom percentile in terms of value added per employee. The positive relation is statistically significant and robust to using a lower threshold and to using logarithms of 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 13 and Figure 14. 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 14. The reference category is that identifying non-traders.

**Figure 13 - Value added per employee and number of products exported for manufacturing firms
(year 2000)**

Source: NBB-BBSTTD. 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 statistically significant
and robust to using a lower threshold and to using logarithms of the variables.

**Figure 14 - Value added per employee and number of products imported for manufacturing firms
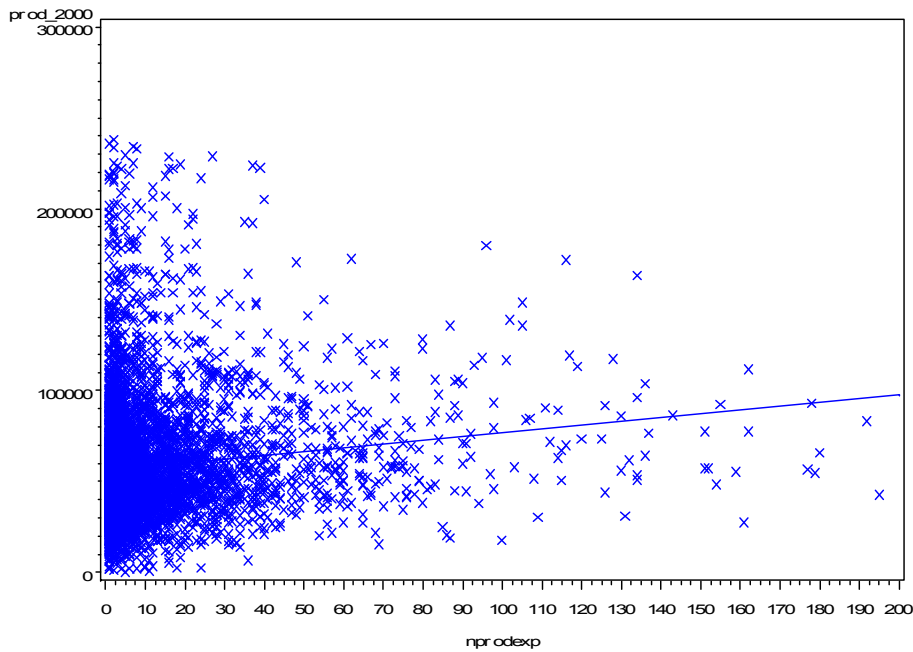(year 2000)**
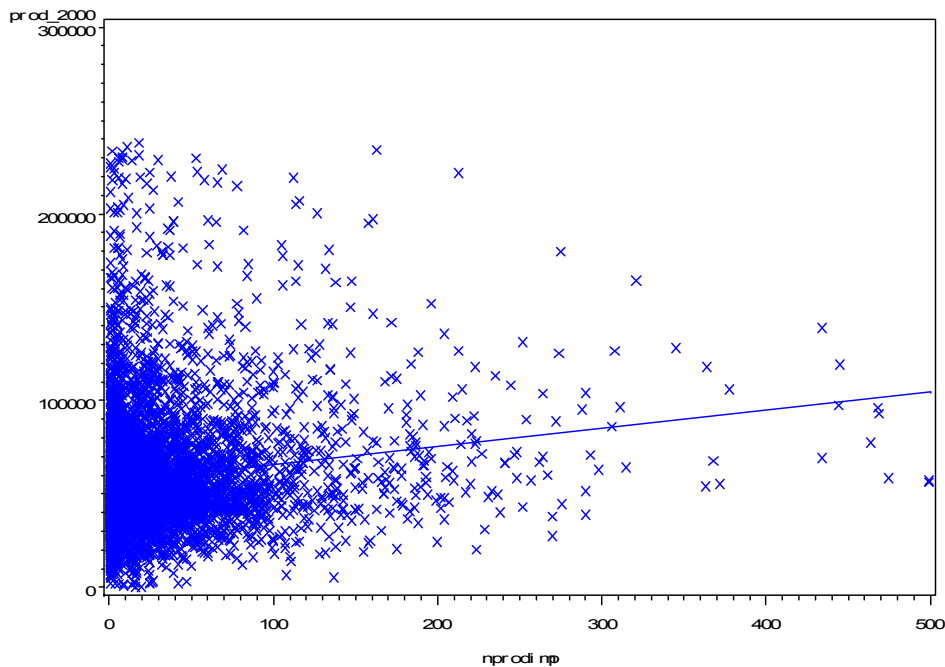
Source: NBB-BBSTTD. Notes: The sample is truncated by taking out firms that import more than 500 products, and the
top and bottom percentile in terms of value added per employee. The positive relation is statistically significant
and robust to using a lower threshold and to using logarithms of the variables.

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 import and export, whereas in the second, we consider two-way traders as different categories[46].

The results show that importers have a larger productivity advantage than exporters when compared to non-traders. Importing companies appear to be 17 per cent more productive than non-traders, whereas exporters are 9 per cent more efficient. In the third column, however, our results show that two-way traders have the largest productivity advantage. They are 27 per cent more productive than non-traders. Importing- and exporting-only companies are, respectively, 15 and 6 per cent 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 14 - Labour productivity regressions

Dependent Variable	(1)		(2)	(3)
		Log (Value added per employee)		
			Two-way traders	0.27
				[0.010]***
Importer	0.17		Importers only	0.15
	[0.010]***			[0.013]***
Exporter	0.09		Exporters only	0.06
	[0.010]***			[0.015]***
Log (Employment)	0.06		Log (Employment)	0.06
	[0.003]***			[0.003]***
Constant	10.24		Constant	10.24
	[0.017]***			[0.017]***
Year dummy	Yes		Year dummy	Yes
2 digit sector dummy	Yes		2 digit sector dummy	Yes
Observations	152,375		Observations	152,375
R-squared	0.03		R-squared	0.03

Source: NBB-BBSTTD. Notes: Table reports OLS regressions. Two-way traders are firms that both import and export.

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46   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 BBSTTD, this paper offers a broad 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 in which 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, whether importers, exporters or both, are larger in terms of value added and employment than non-trading firms. 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 Bernard, Jensen and Schott's (2005) findings for the US. We find conspicuous heterogeneity among different types of international traders. Importing-only firms' share of the total number of firms increased along with their contribution to the economy-wide value added and employment levels. Importing, whether through international outsourcing or offshoring, thus appears as an increasingly common practice, even among service-sector firms.

Our results also suggest the existence of fixed costs of importing in addition to those of exporting. More specifically, and in keeping with the existing literature focusing 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.

Using 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 corresponds to the pattern of exporting activities. In general, the number of trading firms decreases as the number of countries they trade with rises. 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 tend to 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 ways 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 imports were not taken into account as well as 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 this affects trade liberalisation, needs to be modelled properly both empirically and theoretically. By introducing a fixed cost to importing activities and an intermediates sector in a Melitz-type model, the productivity advantage of two-way traders will be shown and the magnification effect of trade liberalisation explored. Besides, we will be investigating in more depth the driving forces behind importing decisions and the effect of both imports and exports on productivity and job creation and destruction. Another avenue of future research will analyse the interactions between destination and product choices of exporters in order to understand their effects on the various trade margins. 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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Table A-1 - Concentration of exports and imports

Size of firms	1996						2004					
	Whole economy						Whole economy					
	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%	62,408	88.7%	24.8%	20.5%	11.4%	15.2%	67,335
21-50	7.4%	14.3%	13.3%	10.6%	13.1%	53,807	7.4%	14.1%	12.5%	9.7%	11.8%	66,307
51-100	1.9%	8.3%	7.8%	8.3%	7.7%	55,384	2.0%	8.4%	8.0%	8.0%	9.5%	71,992
101-200	1.0%	8.4%	8.5%	9.6%	10.4%	59,669	1.0%	8.4%	9.0%	10.1%	9.6%	81,311
201-500	0.6%	11.5%	11.9%	14.2%	15.7%	60,430	0.6%	11.3%	12.7%	15.1%	13.9%	86,413
>500	0.3%	34.2%	37.6%	41.1%	34.8%	67,864	0.3%	33.0%	37.2%	45.7%	40.0%	96,632

Size of firms	Manufacturing						Manufacturing					
	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%	49,970	75.1%	12.5%	8.7%	3.3%	4.1%	62,554
21-50	14.7%	12.7%	10.2%	7.4%	7.4%	50,792	13.6%	12.2%	8.6%	6.0%	6.2%	59,185
51-100	5.3%	10.1%	8.3%	8.6%	7.6%	50,499	5.1%	9.9%	7.9%	7.4%	5.8%	67,355
101-200	2.8%	10.5%	9.1%	10.0%	9.7%	54,111	3.0%	11.0%	9.7%	9.8%	8.4%	74,856
201-500	1.9%	15.3%	14.8%	14.2%	13.5%	60,006	2.1%	17.3%	16.5%	16.4%	14.9%	81,063
>500	1.1%	40.0%	49.3%	55.9%	57.2%	73,399	1.1%	37.2%	48.6%	57.0%	60.7%	101,677

Size of firms	Wholesale and retail						Wholesale and retail					
	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%	56,419	91.6%	38.1%	30.8%	29.9%	26.3%	65,129
21-50	5.5%	18.6%	16.8%	18.5%	18.9%	52,491	6.1%	17.3%	15.6%	17.6%	17.0%	68,332
51-100	1.0%	7.3%	7.6%	7.4%	7.5%	60,649	1.2%	7.3%	7.6%	7.2%	9.3%	79,675
101-200	0.5%	6.9%	10.3%	8.3%	11.8%	88,372	0.5%	6.9%	8.7%	10.8%	11.0%	94,807
201-500	0.3%	10.3%	11.8%	14.4%	18.8%	65,879	0.4%	9.4%	13.0%	12.6%	13.9%	108,847
>500	0.1%	16.3%	17.4%	3.6%	11.6%	81,068	0.2%	21.0%	24.3%	21.9%	22.7%	130,942

Source: NBB-BBSTTD. Notes: This table divides firms by size according to the number of employees (FTE) 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.

Table A-2 - 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-BBSTTD. 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 A-3 - Characteristics of firms per trading 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			63,521		62,801		14,266

Source: NBB-BBSTTD.

Table A-4 - Characteristics of firms per trading status – Wholesale and retail 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	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- BBSTTD.

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Table A-5 - For firms with full-format balance sheet, investment in R&D

	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-BBSTTD. Notes: R&D is measured as the annual spending on R&D as an intangible asset (item 802-1 in full-format balance sheets).

Table A-6 - R&D by broad industry (full-format balance sheet only) manufacturing sector

	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-BBSTTD. Notes: R&D is measured as the annual spending on R&D as an intangible asset (item 802-1 in full-format balance sheets).

Table A-7 - R&D by broad industry (full-format balance sheet only) wholesale and retail sector

	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-BBSTTD. Notes: R&D is measured as the annual spending on R&D as an intangible asset (item 802-1 in full-format balance sheets).

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