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

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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 US$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 datasets. This has shifted the focus of research from the level of countries and industries to the underlying microeconomic determinants of trade flows and their effects on firms and workers.

In this paper, we extend the evidence of the microeconometric literature on international trade by offering a complete view of the international trading activities of firms. For this purpose, we use a dataset 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

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observe trade at product level by firms as well as a number of other firm-level characteristics. The dataset also allows us to consider the broad Belgian economy rather than manufacturing firms only, and to compare both importing and exporting activities. With the exception of Bernard et al. (2007, 2009) for the US, this is a clear improvement on the literature.[1]

The burgeoning microeconometric literature on international trade has focused mostly 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), Bernard et al. (2007) and Wagner (2007) provide recent surveys. 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.[2]

Thus far, imports have been relatively neglected by the empirical literature. This is unwarranted given the recent surge in imports of intermediates.[3] 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 et al., 1992).

Empirical 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 (Bernard et al., 2003; Melitz, 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 corroborates existing findings while others are novel and lay the ground for future research. Considering firms operating in all sectors of

[1] MacGarvie (2006) also considers the importing and exporting activities of French firms, but she focuses on their effects on patent citations. Using a survey of Indian firms, Tucci (2005) finds that those engaged in both imports and exports have higher productivity levels than those that are not. Our paper is contemporaneous to Andersson et al. (2007) who use similar data to ours for Sweden and consider both importing and exporting.

[2] Bernard and Jensen (1995) for the US and Eaton et al. (2004) for France, using comparable datasets in terms of coverage, find that only a minority of manufacturing firms (15 per cent in the US and 17 per cent in France) export.

[3] Hummels et al. (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.

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

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 potential 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 larger and more productive. Furthermore, two-way traders do better than traders on these two scores.

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 increase with productivity. Furthermore, productivity is also increasing as the number of products exported or imported rises. These positive relationships are suggestive that both fixed costs of imports and of exports are incurred for each new country or product with which firms start trading.

Simple regression analysis uncovers that firms that both import and export are the most productive. They are followed, in order, by importing-, exporting-only

[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.

[6] Eaton et al. (2004) and Damijan et al. (2004) present similar findings concerning the exporting activities of French and Slovenian firms.

firms and non-traders. Although from this analysis we cannot determine the direction of causality between participation in international markets and productivity, they indicate that the productivity advantage of exporters towards non-exporters may have been overstated in the current literature, because of the neglected role of imports. Also, using a dynamic panel probit model we show that a high degree of hysteresis is a feature of not only export, but also import behaviour. This provides evidence of the existence of sunk costs of imports, which our point estimates indicate to be as large as those of exports.

The rest of the paper is organised as follows. The next section briefly overviews the existing literature concerning importing and exporting behaviour at the level of the firm. The dataset 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 microeconomic literature in international trade was pioneered by the work of Aw and Hwang (1995) and Bernard and Jensen (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. Melitz (2003) builds these stylised facts into an international trade general equilibrium model featuring heterogeneous firms and sunk costs of exports. Because of sunk costs, only the most productive firms self-select into export markets. Bernard et al. (2003) and Melitz and Ottaviano (2008) present different selection mechanisms based on variable trade costs only. Contrary to Melitz (2003), both models generate variable mark-ups and, as a result, not all firms will be able to start exporting even in the absence of sunk costs of exports. In this setting, only market size and variable costs affect the toughness of competition and hence determine the self-selection of the most productive firms into a market. However, these two explanations need not be mutually exclusive; most probably the selection processes based on sunk costs and variable mark-ups actually co-exist and reinforce each other. The vast empirical literature on firm-level exports has shown the lagged export status is one of the most important determinants of current status (e.g. Roberts and Tybout, 1997; Bernard and Jensen, 2004). This can be taken as supportive evidence for the existence of sunk costs of exports since the selection mechanisms identified by Bernard et al. (2003) and Melitz and Ottaviano (2008) based on variable cost only, when extended to a dynamic framework, would not generate hysteresis in export market participation.[7]

[7] This is because firms, unencumbered by fixed costs, will freely enter or exit export markets according to the productivity shocks they have received.

An alternative explanation has also been put forward to explain the productivity advantage of exporters over non-exporting firms (Clerides et al., 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, 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.[8]

More recently, the hypothesis under test has started to consider whether or not there is any productivity improvement conditional on self-selection. 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 et al. (2004) and De Loecker (2007) for Slovenia, and Van Biesebroeck (2005) for a set of African countries find evidence of productivity improvements. On the other hand, Wagner (2002) for Germany finds no evidence supporting the learning-by-exporting hypothesis. Admittedly, these results are difficult to compare because of the vastly different datasets and methodologies used. To overcome this problem The International Study Group on Exports and Productivity (2009) has provided cross-country comparable empirical evidence on 14 European countries. The results overwhelmingly suggest self-selection into export markets. There is nearly no evidence of learning-by-exporting.[9]

Recently, Eaton et al. (2004) and Damijan et al. (2004) have added a new dimension to the literature on exports at the company level by investigating data on export destination. Eaton et al. (2004) look at a cross-section of French firms in 1986. Their contribution runs along two main lines of thought. First, 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. Second, 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 a 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

[8] 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 to the methodology used to compute productivity.

[9] See also Mayer and Ottaviano (2007) for cross-country comparable results on firm-level exports and FDI from a number of European countries.

firms already exporting to the same destination. Damijan et al. (2004) show that productivity is positively associated with the number of export markets that firms serve. This suggests that fixed costs of exporting reoccur 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.[10] It is a truism to say that the surge in international trade is due not only to the rise in exports, but also in imports and that therefore both sides of the coin deserve to be investigated. However, 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 et al. (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.[11]

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 et al. (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). Imports have also been the subject of recent theoretical literature on incomplete contracts and intra-firm trade (Antras, 2003; Antras and Helpman, 2004). Empirical evidence on this question is provided by Nunn and Trefler (2008) using US import data aggregates and Bernard et al. (2008) for the US.

[10] 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.

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

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.[12] Only Bernard et al. (2008) for the US, Tucci (2005) for India, MacGarvie (2006) for France and Andersson et al. (2007) for Sweden 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 et al. (2007) and Bernard et al. (2009). 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 larger.[13] 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

a. 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

[12] 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 (2007) 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.

[13] In a related study, MacGarvie (2006) analyses 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. 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. Andersson et al. (2007) find that there is also a labour productivity premium to importing, which increases in both number of markets and number of products traded.

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.[14] There are some exceptions. The dataset does not cover firms in the financial sector. Also, some non-financial enterprises do not have to file any annual accounts.[15] 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.[16] 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.

In this dataset we are able to identify entries and exits. We define entry as the filing of a balance sheet by a firm with a new VAT number, and exit as the absence of a balance sheet being filed by a VAT entity who had done so at least in the previous year. This means we are capturing excessive entry and exit: production units that are bought by other firms will appear as an exit, and firms created as a spin-off of an existing company will appear as an entry. Although this is not a straightforward exercise, some of these errors could be controlled for by careful use of data on bankruptcies. However, data at the production unit level is not available to us, and there are no data that provide the links between various VAT entities of one given firm within Belgium.

b. 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

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

[15] 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.

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

a change in ownership.[17] 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.

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 for their annual receipts or shipments must fill in the extended declaration.[18] 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 are 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 €1,000 or their weight smaller than one tonne. Intrastat and Extrastat both include arm's-length and intra-firm trade transactions.[19]

c. 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

[17] 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.

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

[19] We recognise that with these data we are unable to observe indirect exports and imports. These are shipments and purchases from abroad that take place through third parties, based in Belgium, and involving changes in ownership. This issue can only be properly investigated with datasets linking firms trading with each other and having information on exports and imports. Because of a lack of this type of data, the literature on indirect exports and imports is underdeveloped and we know little about the importance of this phenomenon.

TABLE 1
Merged Balance Sheet Data and Foreign Trade Data

	Number of Firms		*Number of Employees ('000)*		*Value Added (€000)*	
	1996	*2004*	*1996*	*2004*	*1996*	*2004*
Firms included in the balance sheet dataset	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%)	93,931.1 (94.12%)	137,351.2 (93.01%)
Firms included in the customs dataset, but not in the balance sheet dataset	15,601	9,050				

Source: NBB–BBSTTD.

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 dataset. These legal entities have a VAT number but do not file any accounts with the Central Balance Sheet Office.[20] Although these firms make up only a marginal fraction of the whole population, they accounted for 26.4 and 35.9 per cent of total imports in 1996 and 2004, and 25.5 and 37.2 per cent of total exports, respectively. 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.[21] 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.

Firms with less than one employee are unlikely to behave according to the same type of economic model and could exist only for fiscal reasons. The selected firms together account for most of the economic activity in Belgium.

[20] 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.
[21] Henceforth, if we refer to an employee or worker, one should understand this to mean a full-time equivalent employee. This corresponds to item 9087 in the balance sheet.

TABLE 2
Unmerged Balance Sheet Data and Foreign Trade Data (2004)

Type of Firms	*Percentage of Unmatched Exporting Firms*	*Percentage of Unmatched Exports*	*Percentage of Unmatched Importing Firms*	*Percentage 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

Note:
The judicial situation of firms with no balance sheet is obtained through the Crossroads Bank for Enterprises (BCE-KBO).

Source: NBB–BBSTTD.

Table 1 shows that firms employing at least one worker accounted for 94.12 per cent of total reported value added[22] in 1996 and 93.01 per cent in 2004. Hence, our matched dataset appears to adequately represent the Belgian economy.

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 from 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,

[22] 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 3
Number of Firms and Employees per Sector

Sector	*NACE Code Bel*	*Number of Firms*				*Number of Employees ('000)*			
		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, of which:		*96,416*	*107,180*	*37,518*	*42,730*	*1,589*	*1,804*	*1,477*	*1,660*
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	*74,152*	*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.

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.[23] The share of manufacturing declined markedly during the same period. Considering firms with at least five employees, their share dropped 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.

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. The last two columns of Table 3 show the shares of

[23] 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.

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.

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 along with the importance of sunk costs of imports and exports.

a. Importers, Exporters and Two-way Traders

This subsection provides new stylised facts on how intertwined exports and imports 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).[24] Again, we focus our attention on firms with at least one or at least five employees.

[24] 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.

TABLE 4
Number and Employees of Traders and Non-traders

	Number of Firms				*Number of Employees ('000)*			
	Firms with at least 1 Full-time Employee		*Firms with at least 5 Employees*		*Firms with at least 1 Full-time Employee*		*Firms with at least 5 Employees*	
	1996	*2004*	*1996*	*2004*	*1996*	*2004*	*1996*	*2004*
Total, of which:	*96,417*	*107,180*	*37,496*	*42,730*	*1,589.4*	*1,804.1*	*1,477.5*	*1,660.3*
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.

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.[25] 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.[26] Also, companies are more likely to engage in two-way trade (export and import at the same time) than doing just one or 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. Moreover, 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).

[25] Bernard et al. (2009) 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 et al. (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 datasets 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.

[26] When considering all firms in the US economy in 2000 with no limit of size, Bernard et al. (2009) 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.

As shown in Table 5, the growth in the total number of firms is generated mostly 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, meaning that fewer firms are engaged in international trade. These changes are counterbalanced by the drop in the relative number of two-way traders.[27] 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 carefully addressed by further research.

[27] 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.

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%	6.6%	8.0%
Exporters only	4.4%	7.3%	7.4%	6.6%	2.2%	2.1%	3.2%	7.2%	1.4%	1.7%	4.2%	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, '000)

	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*	*1,589.4*	*1,804.1*
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.

Our results concerning the changes in the number of firms and jobs (as a share of the total economy) and their trading status are in stark contrast with what Bernard et al. (2009) report for the US. They find that, over the 1993–2000 period, the contribution of traders (whether exporters, importers or both) to the total number of firms and workers in the US economy increased. 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, the contribution of Belgian manufacturing value added to total GDP decreased by 9.96 per cent, from 20.28 to 18.26 per cent. In contrast, 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.[28]

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.[29] 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.

b. 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

[28] 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).

[29] 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)		*Import Value (€million)*		*Employment*	
	1996	*2004*	*1996*	*2004*	*1996*	*2004*
Total, of which:	*86,794*	*127,187*	*79,076*	*120,006*	*1,589,388*	*1,804,072*
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.

across the different trading categories over our sample period. These evolutions are reported in Tables 8 and 10.[30]

Considering Panel A 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 rarer 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.

The results in Table 8 can be written as the transition matrix of a Markov(1) process, as in Table 9. The steady-state vector is reported in the last line of the table and provides the ergodic distribution of this Markov process. In steady state, there will be simultaneous entry and exit of 28 per cent of firms. The near majority of firms would be non-traders (46 per cent), while two-way traders would constitute the majority of trading firms, with 15 per cent against 6 and 5 per cent, respectively, for importers-only and exporters-only.

[30] Similar tables are reported for the whole US economy by Bernard et al. (2009).

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

Trading Status	*1996*	*Keep Same Status*	*Exit*	*Entry*	*Continuing Firms*			*2004*
					Start Trading	*Stop Trading*	*Switched Trading Status*	
Panel A: Number of Firms								
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
Panel B: Share of Firms Relative to 1996 Levels (%)								
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

Notes:
Panel A gives firm counts, while Panel B 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.

Source: NBB–BBSTTD.

TABLE 9
Transition Matrix of a Markov(1) Process

	Entry/Exit	*Non-trader*	*Importer Only*	*Exporter Only*	*Two-way Trader*
Entry/Exit	0	0.70	0.07	0.07	0.16
Non-trader	0.43	0.48	0.03	0.03	0.03
Importer only	0.36	0.27	0.24	0.02	0.11
Exporter only	0.38	0.32	0.04	0.15	0.11
Two-way trader	0.26	0.07	0.08	0.06	0.53
Steady-state distribution	0.28	0.46	0.06	0.05	0.15

Note:
This is the transition matrix of a Markov(1) process using the figures reported in Table 8.

Source: NBB–BBSTTD.

The surprising drop in the number of two-way traders is due to two elements. First, exits of firms were not offset by the number of entries, both by new and old firms. Second, 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.

TABLE 10
Entry and Exit of Firms across Trading Status in Terms of Employment

Trading Status	*1996*	*Keep Same Status*	*Exit*	*Entry*	*Continuing Firms*				*2004*
					Start Trading	*Stop Trading*	*Firms Keep Trading*		
							Switched Trading Status	*Same Trading Status*	
Panel A: Change in Employment ('000)									
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
Panel B: Change in Employment Relative to 1996 Levels (%)									
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

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.

Source: NBB–BBSTTD.

Most of these comments can be carried over to Table 10 which reports movements in 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.

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 11
Gini Coefficients

	Whole Economy		*Manufacturing*		*Wholesale and 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.

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 10 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.[31]

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.

The main findings reported in this subsection highlight the role of firm 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.

c. Trade Concentration

Bernard et al. (2007, 2009) show for the US that trade is highly concentrated. This subsection looks at this issue in more detail for the Belgian data. Table 11 shows the Gini coefficients of exports, imports and total trade (in addition to

[31] Respectively 68 per cent and 88 per cent, summarised in the 49 per cent and 74 per cent figures of Table 10, which sum up all trading status switches.

value added and employment by way of comparison).[32] 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 11 are larger than 0.74. 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.[33]

The degrees of international trade concentration in Table 11 are similar to those that Bernard et al. (2007) 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. This suggests 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 Table A1 in the Appendix, 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, make up only 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.

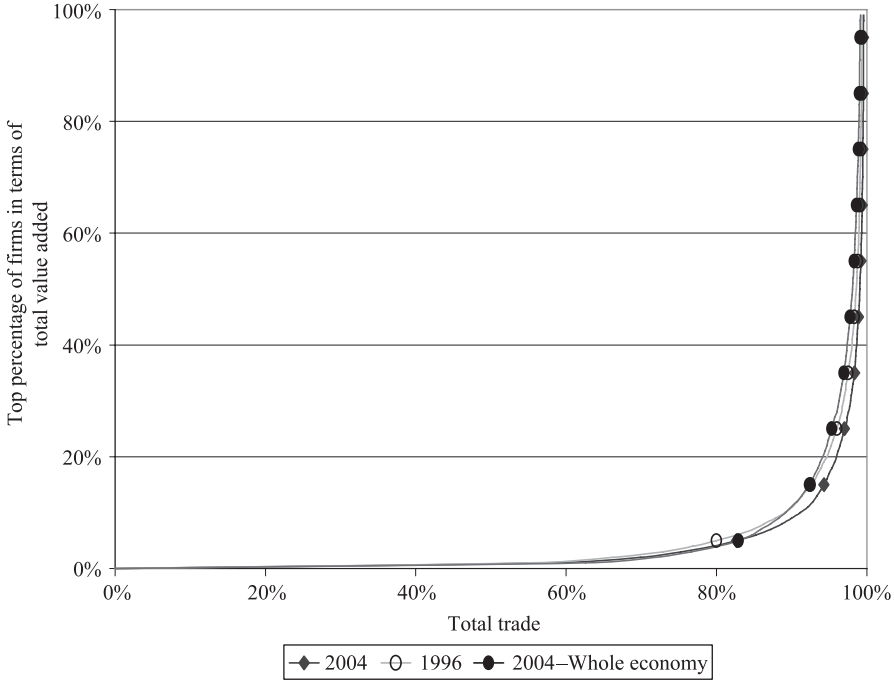
The fact that exports are so highly concentrated among the largest firms is consistent with recent theoretical models (Bernard et al., 2003; Melitz, 2003) and empirical evidence showing that only the largest and most productive firms will start selling abroad. A similar phenomenon seems to be at work for imports. Because of fixed costs, importing is profitable for the largest firms only. 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

[32] 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.

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

FIGURE 1
Concentration of Trade Value across Total Value-added Percentiles (Manufacturing)



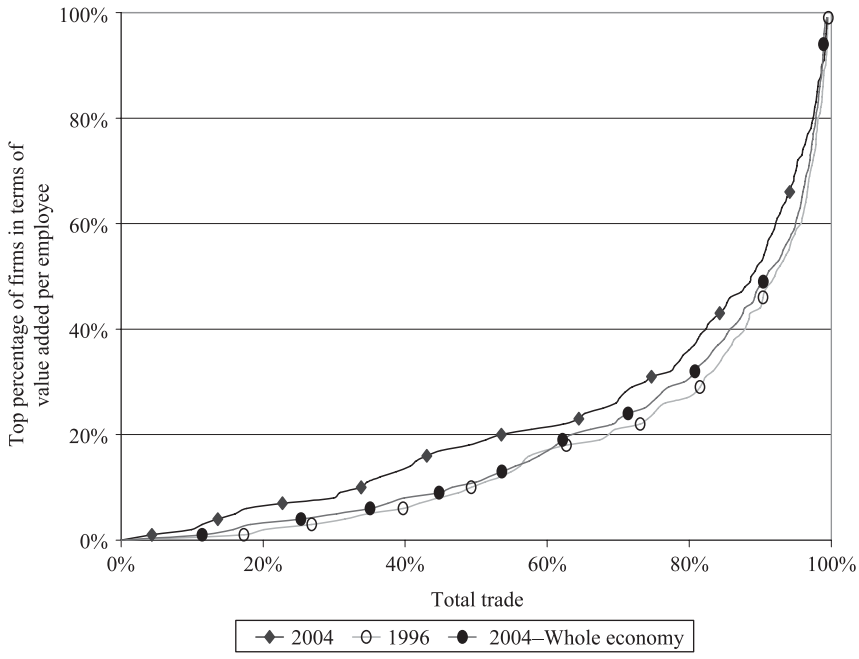
Source: NBB–BBSTTD.

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 A1, 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.[34]

Illustrating this concentration within the manufacturing sector, Figure 1 depicts the Lorenz curve of total trade (i.e. imports plus exports) with respect to total value added. The top 10 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

[34] The figures for wholesale and retail trade show a surprisingly large share of international trade conducted by firms with fewer than 20 employees. We conducted a robustness check, looking at the concentration figures of wholesale and retail sub-industries at the two-digit NACE level. These are: sector 50 ‘sale, maintenance and repair of motor vehicles; fuel sale’, 51 ‘wholesale trade and commission trade exc. motor veh.’ and 52 ‘retail trade exc. motor vehicles; repair of pers. goods’. Industries 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.

FIGURE 2
Concentration of Trade Value across Value Added/Employee Percentiles (Manufacturing)



Source: NBB–BBSTTD.

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 of trade in 2004.

This subsection has depicted how extremely concentrated trade is. Both imports and exports are conducted primarily 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.[35]

[35] As highlighted in Section 2, Bernard et al. (2003) and Melitz and Ottaviano (2008) show how self-selection of most productive firms into export markets can also be generated by variable mark-ups alone. As regards imports, to date there is not any other theoretical mechanism capable of explaining the self-selection of some firms into imports besides the existence of sunk costs.

d. Firm-level Characteristics of Traders vs. Non-traders

The microeconometric-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 et al., 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.

In this subsection, we explore the relationships between firm-level characteristics and international trading status. Table 12 exhibits regression results of firm-level variables, in log, regressed on trading status dummies. These results, although showing simple correlations, have the advantage that estimated coefficients can be interpreted in percentage terms. Also, we are able to control for time and industry fixed effects, adding a full set of year and two-digit NACE-BEL industry dummies. Table 12 shows the percentage differences in the firm-level variables among different types of firms. In the fourth column, total factor productivity (TFP) is measured using the Levinsohn and Petrin (2003) approach. Two-way traders appear to enjoy the largest premia for the various coefficient values followed in order by importers and exporters. Firms that both import and export are on average 42 ([exp(0.35) − 1]100) per cent more labour productive and 120 per cent more productive than those doing neither (TFP is computed for manufacturing firms only). The labour productivity advantage of exporting- and importing-only firms is 18 per cent for both. The TFP advantage for manufacturing firms that only import is 42 per cent, around 11 per cent higher than for firms that only export. Furthermore, Table 12 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. The sum of the 'exporter-only' and 'importer-only' coefficients is significantly smaller than the 'two-way trader' coefficient for (the logarithms of) employment, value-added, TFP and investment, as reported in the last lines of Table 12.

This suggests there might exist additional spillovers between importing and exporting that a two-way trader benefits from. The sum of the coefficients is significantly greater for (the logarithm of) value-added per employee although the difference is not large. As for investment per employee and capital per employee, the differences between the two-way traders and sum of exporter-only and importer-only coefficients are not significantly different from zero.

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.

TABLE 12
Characteristics of Firms per Trading Status – Descriptive Regressions (Whole Economy)

Dependent Variable	*(1) Log Employment*	*(2) Log Value-added*	*(3) Log VA per Employee*	*(4) Total Factor Productivity*	*(5) Log Capital*	*(6) Log Capital per Employee*	*(7) Log Investment*
Exporter only	0.554**	0.743**	0.181**	0.238**	0.597**	0.044**	0.545**
	[0.006]	[0.006]	[0.004]	[0.012]	[0.009]	[0.008]	[0.010]
Importer only	0.779**	0.973**	0.189**	0.353**	0.840**	0.059**	0.857**
	[0.005]	[0.006]	[0.003]	[0.014]	[0.008]	[0.006]	[0.008]
Two-way trader	1.504**	1.865**	0.356**	0.789**	1.601**	0.102**	1.560**
	[0.005]	[0.005]	[0.003]	[0.009]	[0.007]	[0.005]	[0.007]
Year dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	914,935	897,766	897,766	130,477	845,069	845,069	785,667
R^2	0.22	0.25	0.13	0.41	0.16	0.08	0.13
Two-way – (exporter + importer)	0.171**	0.149**	–0.014**	0.198**	0.164**	–0.001	0.158**
Wald test: *F*-statistic	406.48	248.92	8.42	94.11	171.38	0.00	134.12
Wald test: *p*-value	0.00	0.00	0.0037	0.00	0.00	0.98	0.00

Notes:
OLS regressions. Industry dummies for two-digit NACE-BEL. Robust standard errors reported in brackets. ** denotes statistical significance at the 1 per cent level. Constant included but not reported. TFP is computed for manufacturing firms only following the methodology of Levinsohn and Petrin (2003). The two-way trader coefficient minus the sum of the coefficients on exporter only and importer only is reported. Wald test (*F*-statistic and *p*-value reported) in the last rows tests whether the sum of the coefficients on 'Exporter only' and 'Importer only' is significantly different from the coefficient on 'Two-way trader'.

Source: NBB–BBSTTD.

e. Export Destinations, Import Origins and Products Traded

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

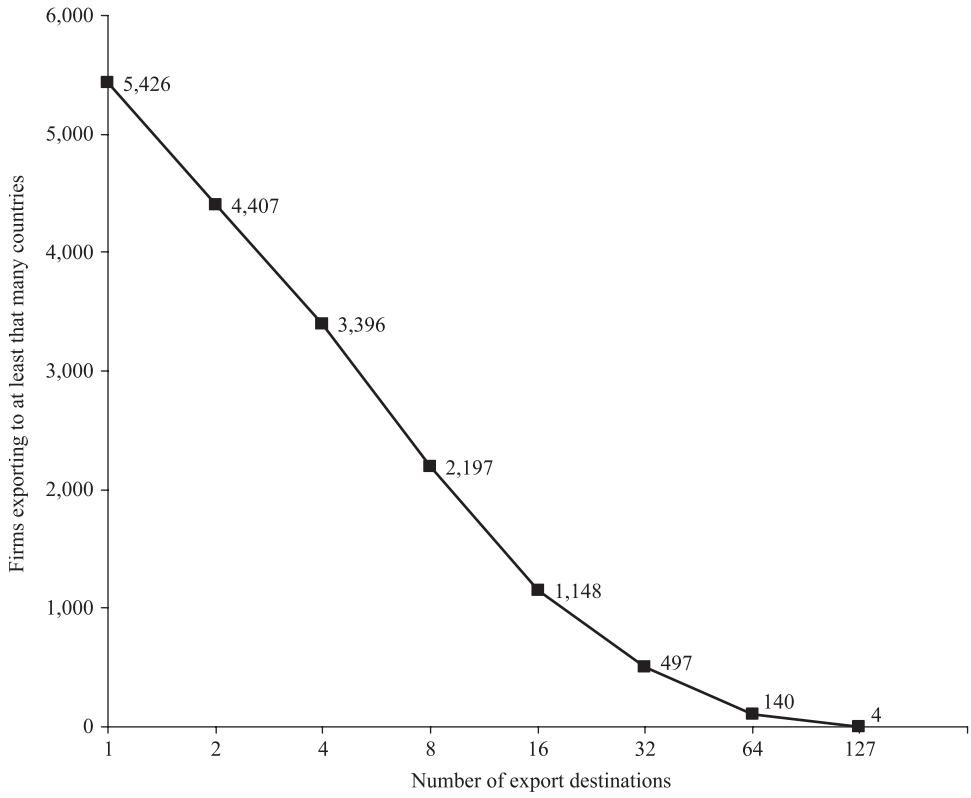
We first consider destinations of exports and origins of imports. The number of firms exporting to at least a certain number of export destinations and the number of firms importing from at least a certain number of foreign countries are represented in Figures 3 and 4. There is a clear negative relationship 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 trading partners.

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 five 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 et al. (2004) and Bernard et al. (2009) 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 10 or more overseas markets. The corresponding figures for French manufacturers are 34.5 per cent and 19.7 per cent.

Our data suggest that 18.8 per cent of Belgian exporters serve just one market whereas 31 per cent of them ship to 10 or more.[36] 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

[36] The French figures refer to the year 1986, the US and ours to 2000. Bernard et al. (2009) 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 10 or more. Eaton et al. (2004) consider only manufacturing firms.

FIGURE 3
Number of Export Destinations (2000)



Source: NBB–BBSTTD.

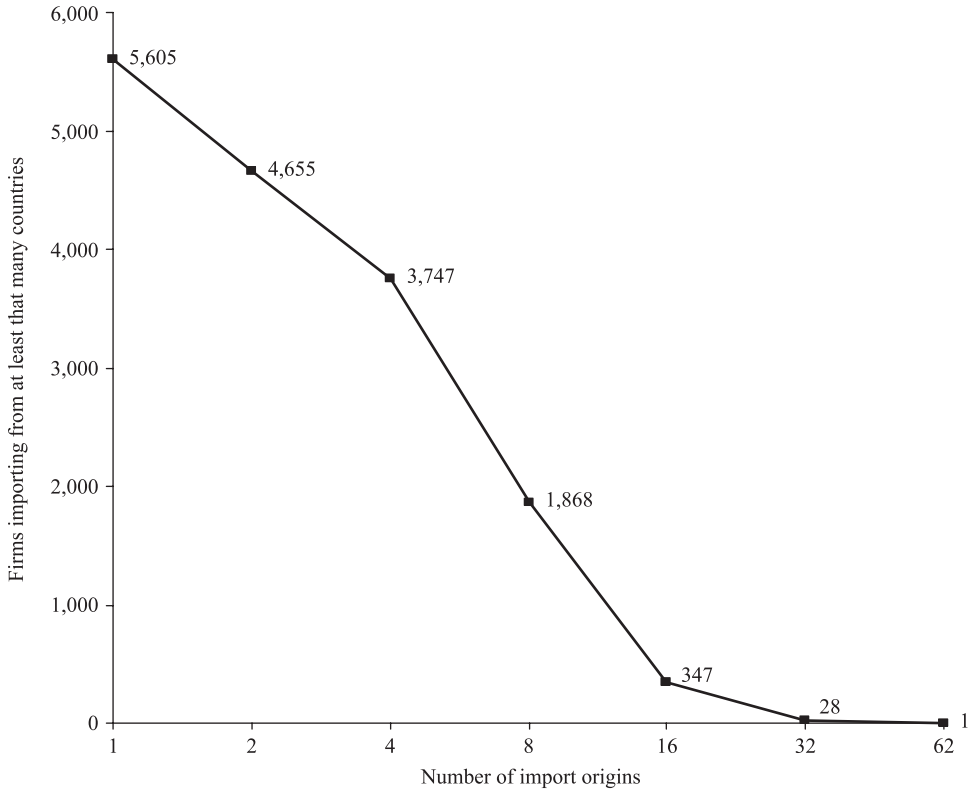
export to more destinations than French and US firms to take full advantage of increasing returns to scale, which is one of the reasons for Belgium being a more open economy than the US. The same is true when France is compared to the US.

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.[37] Thereafter, the distribution of imports dominates that of exports for up to 13 trading partners. Some 57 per cent of importers trade with four to 13 countries while only 37 per cent of exporters

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

FIGURE 4
Number of Sourcing Countries (2000)



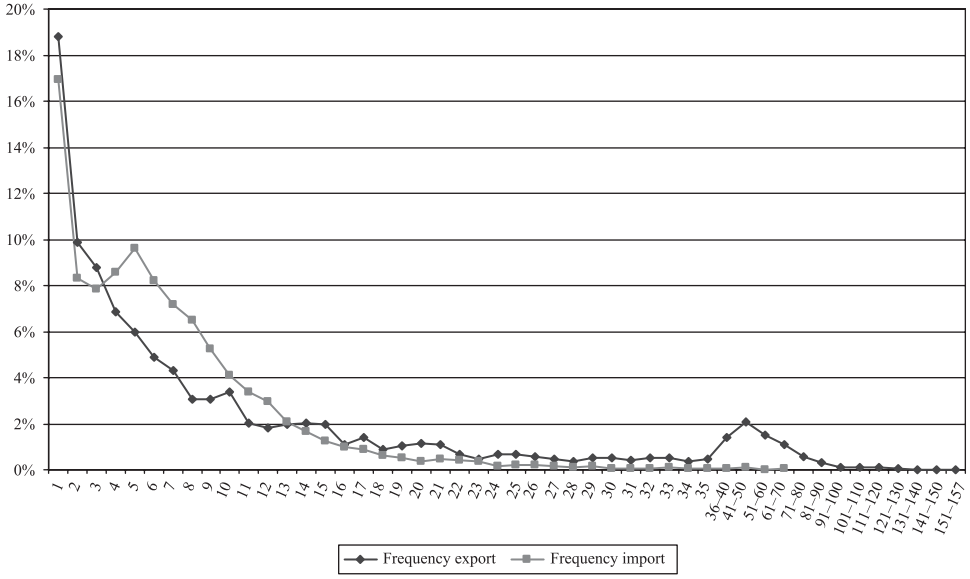
Source: NBB–BBSTTD.

do the same. Beyond 14 trading partners, export destinations dominate import origins again. Such a pattern is also reported by Bernard et al. (2009) for the US.[38]

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 suggests that fixed costs of imports may be as relevant as fixed costs of exports. There is some evidence that fixed costs of exports reoccur at each new foreign market entry (Damijan et al., 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 reoccur for each new sourcing country, the majority

[38] The figures they report suggest that exporters are more likely than importers to trade with just one or with 10 or more countries. However, in the two-to-nine-countries range, the frequency of imports is higher than that of exports.

FIGURE 5
Frequency of Manufacturing Firms Exporting to and Importing from a Certain Number of Countries (2000)



Source: NBB–BBSTTD.

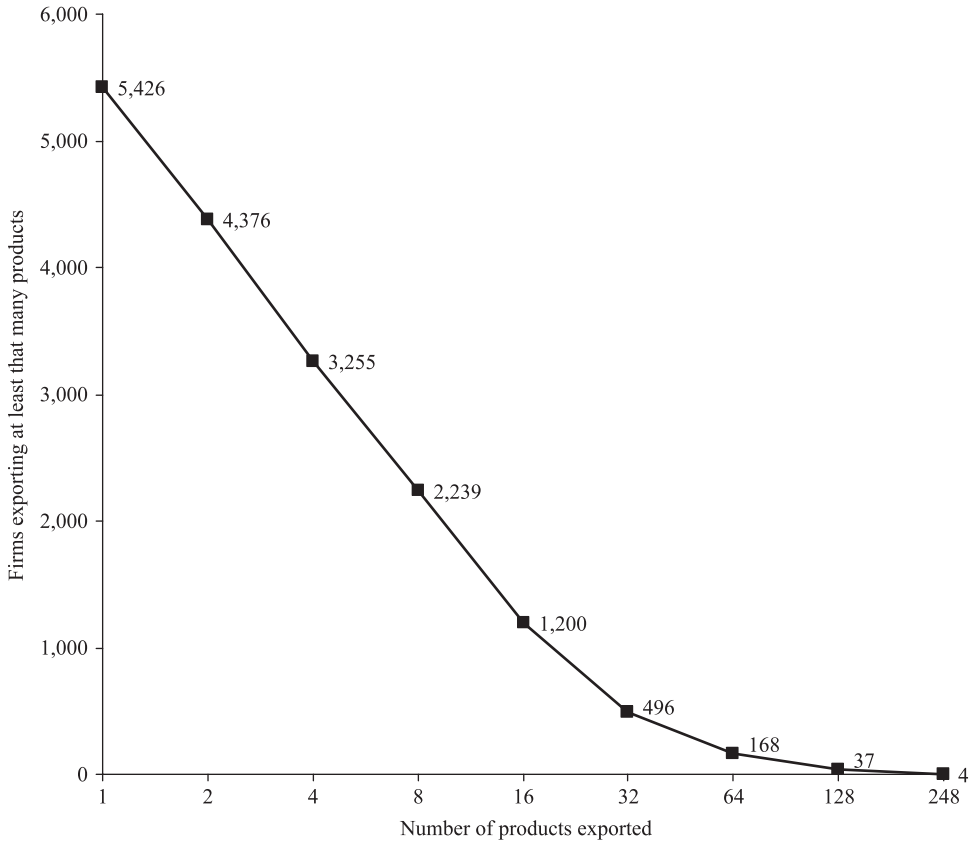
of firms will import goods from a relatively small number of countries. In our data, 90 per cent of importers import from fewer than 14 countries.

We now turn to the product extensive margin, given that our dataset allows us to investigate the number of products that firms trade across national borders. Bernard et al. (2009) 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 12 products and sourced about 34 products from abroad.[39] Therefore, Belgian companies appear to be more geared towards trading internationally than US firms. Looking in more detail at imported and exported products, Figures 6 and 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

[39] The median of the two distributions is around five for exports and 17 for imports. For comparison with the US data, if all sectors of the Belgian economy are considered, the average number of products exported and imported by firms is 12 and 29, respectively.

FIGURE 6
Number of Products Exported (2000)



Source: NBB–BBSTTD.

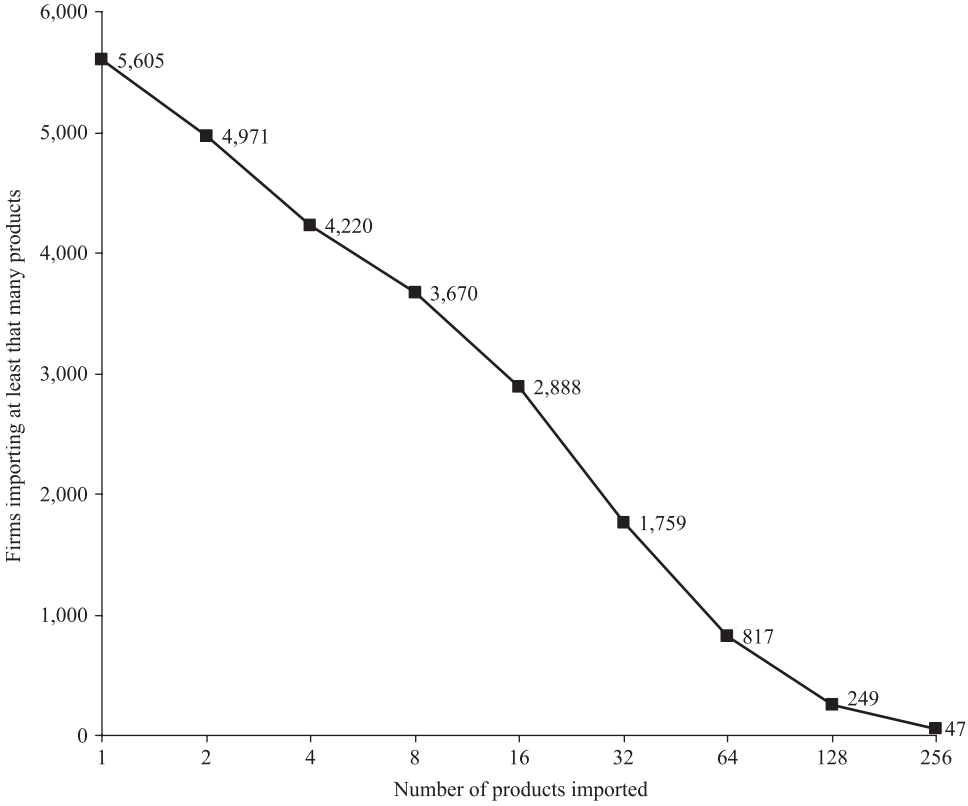
distributions are skewed towards the right, as when considering destinations and sourcing countries. Furthermore, from Figure 8 it is possible to note that Belgian traders are more likely to source 10 or more products from abroad than to export them: only around 31 per cent of exporters sell more than 10 products abroad compared with 62 per cent of importers sourcing more than 10 goods.[40]

f. Exporting, Importing and Productivity

In this subsection, we explore the relationship between productivity and exporting and importing activities of firms. For comparability with existing studies, we

[40] This is again consistent with the findings of Bernard et al. (2009) for the US, where about 17 and 21 per cent of exporters and importers, respectively, trade more than 10 products.

FIGURE 7
Number of Products Imported (2000)



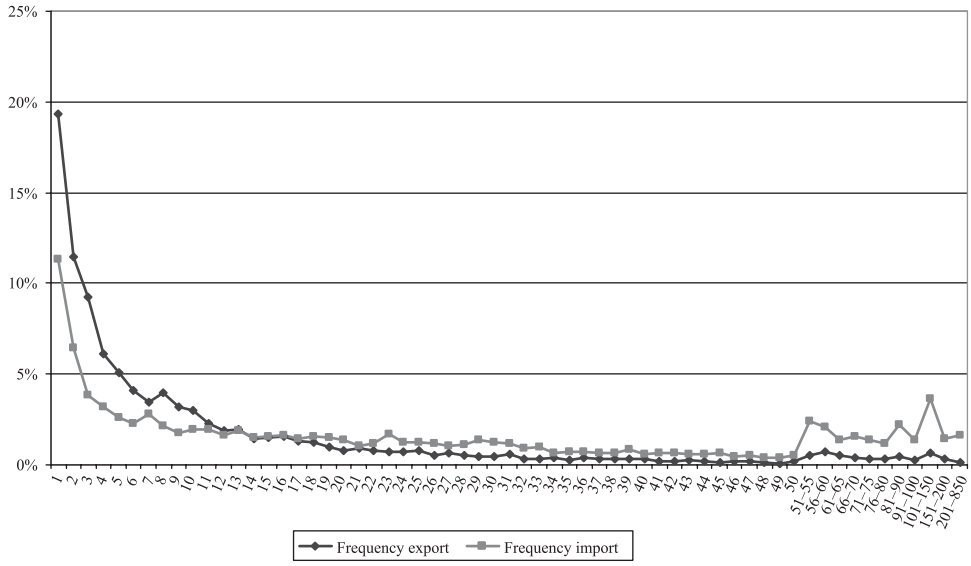
Source: NBB–BBSTTD.

focus on manufacturing. This is also the sector for which TFP can be estimated most reliably. We also investigate the role of the number of products traded and the number of countries firms trade with.

Table 13 shows the correlation coefficients of two measures of productivity with different trade characteristics. In the first column, TFP is measured using the Levinsohn and Petrin (2003) approach. In the second column labour productivity (LP) is measured as the logarithm of value-added per employee. The results for the two types of productivities are equivalent and all the coefficients are significant at the 1 per cent level. 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 coefficients, as we cannot say whether this is due to self-selection into international markets or to post-entry productivity improvements.

There is also a positive correlation between productivity and the number of export destinations on the one hand and the number of countries of origin of

FIGURE 8
Frequency of Manufacturing Firms Importing and Exporting a Certain Number of Products (2000)



Source: NBB–BBSTTD.

TABLE 13
Correlation between Productivity and Trade (Manufacturing)

	Log of Total Factor Productivity	*Log of Labour Productivity*
Total value of exports	0.26**	0.13**
Number of export destinations	0.21**	0.21**
Number of products exported	0.15**	0.13**
Total value of imports	0.32**	0.10**
Number of import origins	0.18**	0.18**
Number of products imported	0.20**	0.15**

Notes:
Correlations computed for 2003. ** indicates significance at the 1 per cent level. TFP is measured using the Levinsohn and Petrin (2003) approach. LP is measured as value added per employee

Source: NBB–BBSTTD.

imports on the other. 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 the third and sixth lines of Table 13. The coefficients show a clear positive relationship between productivity and the number of goods shipped to

TABLE 14
Total Factor Productivity Regressions (Manufacturing)

Dependent Variable	*(1)*	*Total Factor Productivity*	*(2)*
		Two-way traders	0.21**
			[0.010]
Importer	0.12**	Importers only	0.09**
	[0.01]		[0.01]
Exporter	0.09**	Exporters only	0.06**
	[0.01]		[0.01]
Log (Employment)	0.29**	Log (Employment)	0.29**
	[0.00]		[0.00]
Year dummy	Yes	Year dummy	Yes
Two-digit sector dummy	Yes	Two-digit sector dummy	Yes
Observations	130,477	Observations	130,477
R^2	0.45	R^2	0.45

Notes:
The table reports OLS regressions. Robust standard errors in brackets. ** $p < 0.001$. Constant included but not reported. TFP is measured following the Levinsohn and Petrin (2003) approach. Two-way traders are firms that both import and export.

Source: NBB–BBSTTD.

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 TFP regressions on dummies identifying the trading status of firms. TFP is estimated using the Levinsohn and Petrin (2003) approach. We control for time and industry effects by including dummies. The results are shown in Table 14. The reference category is that identifying non-traders. 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.[41]

The results show that importers have a larger productivity advantage than exporters when compared to non-traders. Importing companies appear to be 12 per cent more productive than non-traders, whereas exporters are 9 per cent more efficient. In the second column, however, our results show that two-way traders have the largest productivity advantage. They are 2 per cent more productive than non-traders. Importing- and exporting-only companies are, respectively, 9 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.

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

In the previous sections we have stressed the possibility that there exist sunk costs of imports in addition to sunk costs of exports. In the next table we test more rigorously for this hypothesis and gauge the relative importance of these sunk costs. We estimate two dynamic panel probit panel models separately, one for the decision of exporting and the other for that of importing. As in the existing literature, we interpret the coefficient of the lagged dependent variable as a measure of the importance of sunk costs (e.g. Roberts and Tybout, 1997; Bernard and Jensen, 2004). The rationale for this is that sunk costs generate hysteresis in export (import) market participation.

Recently the importance of sunk costs for the selection process of the most productive firms into export markets has been called into question. For instance, Melitz and Ottaviano (2008) and Bernard et al. (2003) build heterogeneous firm models with variable mark-ups. Contrary to Melitz (2003), they show that in this setting the most productive firms self-select into export markets even in the absence of sunk costs. Obviously, this result does not show that sunk costs of exports are irrelevant for the actual firm-level choices to participate or not in international markets. Their correct interpretation is that sunk costs may not be the only determinant of the self-selection process. However, in a dynamic framework, sunk costs will necessarily cause hysteresis, whereas variable mark-ups, in the absence of sunk costs, will not.[42] Therefore, in principle, detecting hysteresis in import and export markets suffices to identify the presence of sunk costs.

The empirical model we estimate is the following:

$$P(y_{it} = 1 \mid x_{it}, y_{it-1}, u_{it}) = \Phi(\alpha_0 + \rho y_{it-1} + \beta' x_{it} + u_i), \tag{1}$$

where i and t indexes firms and years; y is a binary variable indicating whether the firm exports (imports) or not. Included in x are a series of firm and industry controls drawn from the existing empirical and theoretical literature; u_i is the firm-level specific effect capturing variables such as managerial abilities, which are unobserved; Φ is the cumulative normal distribution. Models, such as this, but without a lagged dependent variable can be estimated by means of a random effects probit model. This deals successfully with the 'incidental parameter' problem introduced by u_i. Estimating dynamic limited dependent variable models by maximum likelihood has another complication, namely the 'initial condition' problem. This is related to the fact that since we cannot observe the stochastic process from its start, it is not possible to treat y_0 (i.e. the first observation of the dependent variable in our dataset) as fixed.[43] This is crucial to obtain consistent

[42] This is because extending the rationale of Bernard et al. (2003) and Melitz and Ottaviano (2008) in a dynamic setting would allow firms to freely enter and exit export markets in each period according to their productivity shocks. On the contrary, sunk costs will lock companies in or out of international markets for longer periods, thus generating hysteresis.

[43] Even if it were possible to observe the stochastic process from its start, it would still be questionable to treat the first observation of the dependent variable as non-random.

estimates in dynamic models estimated through maximum likelihood (Hsiao, 2003, pp. 206–07). To tackle the bias introduced by the initial condition and the possible correlation between the control variables and unobserved heterogeneity, we adopt the methodology of Wooldridge (2005). This hinges on modelling the firm-specific effects u_i as a function of the initial condition and the other explanatory variables. We assume u_i can be expressed as

$$u_i = \beta_0 + \beta_1 y_{i0} + \beta_2 \bar{x}_i + \xi_i, \tag{2}$$

where ξ_i is assumed to be independently and normally distributed. $\bar{x}_i$ is the firm-level average of x_{it} over time. Inserting equation (2) into equation (1) we obtain

$$P(y_{it} = 1 \mid y_{i0}, x_{it}, y_{it-1}, \xi_{it}) = \Phi(\gamma_0 + \rho y_{it-1} + \beta' x_{it} + \beta_1 y_{i0} + \beta_2 \bar{x}_i + \xi_i), \tag{3}$$

where $\gamma_0 = \beta_0 + \alpha_0$. The remaining firm-specific effect, i.e. ξ_i, is now orthogonal to the other explanatory variables. The parameters in equation (3) can then be estimated using the standard random effects probit model.[44]

The results for exports and imports are reported in Table 15. Following the previous theoretical and empirical literature on firm-level exports, our set of explanatory variables includes the number of employees to control for size, TFP and wage per employee to proxy workforce skill level. All these variables are in log and lagged by one year to avoid endogeneity problems. We also include year and two-digit-level industry dummies.

The results in the first two columns of Table 15 provide evidence that, as for exporting, importing behaviour appears to be characterised by a high degree of hysteresis. This suggests that firms face sunk costs of imports that are as large as sunk costs of exports. The point estimate of the lagged dependent variable in the import equation is larger than that in the export equation, but the difference is small. These results are consistent with the similar patterns of firm-level export and import behaviour described in the previous sections. Also, the coefficient estimates of the initial export and import status are high and highly significant, suggesting that they correct for the bias introduced by the 'initial condition' problem. Among the remaining explanatory variables, size and productivity affect positively the probability of exports and imports, as expected, whereas wage per employee is surprisingly insignificant.[45]

[44] It is worth noting that, as underlined by Wooldridge (2005), using the density of $(y_{i1}; y_{i2}; \ldots; y_{it})$ given $(y_{i0}; x_i)$ is not like assuming y_{i0} non-random. In this case u_i will be independent of y_{i0} and therefore $\beta_1 = 0$.

[45] The parameters of $\bar{x}_i$ are estimated, but not reported to save space. They are available upon request from the authors.

TABLE 15
Dynamic Panel Probit Model Controlling for Initial Condition

	(1) *Exporter*	*(2)* *Importer*	*(3)* *Exporter*	*(4)* *Importer*
Exporter ($t-1$)	1.15**		1.09**	0.46**
	[0.02]		[0.02]	[0.02]
Importer ($t-1$)		1.23**	0.42**	1.17**
		[0.02]	[0.02]	[0.02]
Log of employment ($t-1$)	0.42**	0.37**	0.36**	0.32**
	[0.03]	[0.03]	[0.03]	[0.03]
Log of wage ($t-1$)	0.05	0.00	0.00	–0.04
	[0.04]	[0.04]	[0.04]	[0.04]
Log of TFP ($t-1$)	0.09**	0.12**	0.08**	0.11**
	[0.02]	[0.03]	[0.02]	[0.03]
Initial exporter dummy	2.62**		2.45**	
	[0.05]		[0.05]	
Initial importer dummy		2.46**		2.27**
		[0.05]		[0.05]
Year dummy	Yes	Yes	Yes	Yes
Two-digit sector dummy	Yes	Yes	Yes	Yes
Observations	107,664	107,664	107,664	107,664
Firms	19,178	19,178	19,178	19,178

Notes:
The table reports dynamic panel probit regressions. The dependent variables are dummy variables for the exporter or importer status. ($t-1$) indicates that the variable is lagged. Standard errors in brackets. ** $p < 0.001$. TFP is computed with the method of Levinsohn and Petrin (2003).

Source: NBB–BBSTTD.

As seen in the previous sections, most internationally trading firms do not just import or export only, but do both. The third and fourth columns of Table 15 take this feature of the data into account. They show the estimates of the same dynamic panel probit models as in the first two columns, adding the lag of imports (exports) status to the exports (imports) regression. This allows us to analyse in a more rigorous setting the relationship between exports and imports and investigate how previous participation in export and import markets affect each other in the current period. As reported in the third and fourth columns, this yields lower estimates of the sunk costs of exports and imports, but the difference with the previous estimates is small (of the order of 5 per cent). Moreover, the lagged imports status in the export model (column (3)) being positive and significant indicates that previous international experience in purchasing inputs from abroad raises the probability of exporting in the current period. The reverse is true also, as shown in the fourth column. This is suggestive that some of the sunk costs to start participating in international markets are common to export and import activities; therefore after one firm begins to sell outputs or purchase

inputs from abroad, it will face lower costs to start operating internationally at the other end of the market than a similar company with no previous international experience. With the data at our disposal it is not possible to investigate whether this is due to some overlap between export and import channels or to some learning process within the firm, whereby companies become more able to operate internationally as they gain experience in either exporting or importing.[46] This would require survey data having information on the internal organisation and operation of firms. Here, it suffices to underline how exports and imports appear to be closely related: most internationally trading firms do both at the same time, and exporting or importing in one period raises the probability of not only doing the same activity in the next period, but also starting the other.

5. CONCLUSION

Using a newly available dataset 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 due mainly 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 et al.'s (2009) 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.

[46] Common sunk costs of imports and exports might result, for instance, from relying on the same system to make and receive payments internationally and sharing the same distribution network.

Our results also suggest the possible 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 et al. (2009) 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 cannot 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. Also, using a dynamic panel probit model we show that import behaviour is characterised by the same level of hysteresis as exports. This is indicative of the existence of sunk costs of imports, which our point estimates suggest to be as large as those of exports.

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 in future research. The driving forces behind importing decisions and the effect of both imports and exports on productivity and job creation and destruction should be investigated and the interactions between destination and product choices of exporters analysed in order to understand their effects on the various trade margins.

APPENDIX

TABLE A1
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/Empl.*	*Share of Firms*	*Share of Empl.*	*Share of Total VA*	*Share of Total Exports*	*Share of Total Imports*	*Average VA/Empl.*
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/Empl.*	*Share of Firms*	*Share of Empl.*	*Share of Total VA*	*Share of Total Exports*	*Share of Total Imports*	*Average VA/Empl.*
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

TABLE A1 *Continued*

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/Empl.*	*Share of Firms*	*Share of Empl.*	*Share of Total VA*	*Share of Total Exports*	*Share of Total Imports*	*Average VA/Empl.*
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

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.

Source: NBB–BBSTTD.

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