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ABSTRACT

This paper examines the factors that give rise to intermediaries in exporting and explores the implications for trade volumes. Export intermediaries such as wholesalers serve different markets and export different products than manufacturing exporters. In particular, high market-specific fixed costs of exporting, the (lack of) quality of the general contracting environment and product-specific factors play important roles in explaining the existence of export intermediaries. These underlying differences between direct and intermediary exporters have important consequences for trade flows. The ability of export intermediaries to overcome country and product fixed costs means that they can more easily respond along the extensive margin to external shocks. Intermediaries and direct exporters respond differently to exchange rate fluctuations both in terms of the total value of shipments and the number of products exported as well as in terms of prices and quantities. Aggregate exports to destinations with high shares of indirect exports are much less responsive to changes in the real exchange rate than are exports to countries served primarily by direct exporters.

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1 Introduction

The growing availability of firm-level international trade data has contributed to the blooming of both theoretical and empirical literatures highlighting the importance of firm heterogeneity in aggregate trade flows. Since the initial empirical papers of Bernard and Jensen (1995, 1999), Roberts and Tybout (1997) and the theoretical models of Melitz (2003) and Bernard et al. (2003), a major focus in international trade has been on the relationship between the characteristics of producing firms, most notably productivity, and their participation in international trade. An emerging stream of research has examined differences *among* trading firms (Bernard, Jensen, Redding and Schott; 2010b; Ahn et al.; 2011; Antràs and Costinot; 2011). These papers emphasize that exporters include both manufacturing firms that organize the production and distribution of their goods abroad as well as intermediaries that specialize in distribution in foreign markets.

In this paper, we examine the underlying factors that give rise to exports by intermediaries and the consequences in terms of trade volumes and the margins of adjustment to external shocks. Existing theoretical and empirical work on intermediaries in exporting emphasizes the importance of country-specific fixed export costs and the variation of intermediary export shares across destinations. We extend that focus to include both broader country-level fixed costs as well as characteristics of the products themselves.

More importantly, this paper also considers additional implications of the lower fixed costs for wholesale exporters. If export intermediaries do indeed face lower fixed costs of exporting then they should also more easily enter and exit export markets in the face of changing profitability. Firm-level export volumes should respond differently for wholesale exporters and manufacturing exporters. Aggregating to the country-level, this firm-level variation implies differential changes in exports between destinations served primarily by direct and indirect exporters.

Using Italian firm-level trade data, we investigate the importance of intermediaries (wholesalers) in exports across destinations and products and examine how they differ from manufacturing firms that export directly. More than one quarter of all exporters are intermediaries and they account for over 10 percent of Italian exports. However, there is substantial variation in the importance of intermediaries across countries and products. New Zealand and China have intermediary export shares near 9 percent (25th percentile) while Paraguay and Malawi are at the 75th percentile with shares above 23 percent.

Intermediary exporters differ in a number of dimensions from manufacturing firms that export directly. They are smaller in terms of exports, sales and especially employment as would be expected since they are only involved in the cross-border distribution of the products and not the production. However, wholesale exporters display higher sales per employee and comparable exports per employee. On average, intermediary exporters reach fewer countries and ship more products

than do direct exporters. One important difference between wholesalers and manufacturers lies in their tendency to add and drop products. Intermediaries add and drop products at much higher rates than direct exporters. These firms face lower sunk costs of exporting and thus are able to adjust their extensive margin more easily.

The existence of intermediaries suggests that they overcome barriers to international trade at a lower cost than manufacturers for some range of goods and for some countries. We examine the role of both country and product characteristics in the choice of the mode of export and the magnitude of country-product exports. The finding of previous studies that country-specific fixed export costs are correlated with the use of export intermediaries is confirmed in the Italian data. In addition, the quality of the general contracting environment is related to the choice of mode of export. Exports through an intermediary are more likely when the quality of the general contracting environment of the country is weak. Product characteristics also play a role in determining the choice of export mode. Lower contract intensity, greater product homogeneity, and higher product-level sunk costs of exporting are associated with a greater reliance on intermediaries in exporting.

The differences in fixed costs across destinations and products give rise to variation in response to common external shocks to profitability such as exchange rates. Total exports by wholesalers are less responsive to exchange rate changes precisely because wholesalers are better able to adjust along the extensive margin. Given the big difference in the share of intermediated exports across countries and products, these firm-level results suggest that there are potentially large, predictable differences in how aggregate exports will respond to changes in the value of the domestic currency. We indeed find that the responsiveness of aggregate exports is much greater in destinations served primarily by direct exporters.

Existing theoretical and empirical work on exporting intermediaries is reviewed in Section 2. Section 3 describes the firm and country level data. Section 4 documents differences between direct exporters and wholesalers. The role of country and product fixed costs on the choice of export mode and export values are examined in Section 5. Section 6 explores the response of exports both at the firm level and in the aggregate to exchange rates shocks. Section 7 concludes.

2 Theoretical frameworks

Recent models of international trade emphasize the role that heterogeneity in productivity plays in explaining the structure of international commerce. According to these models and a large quantity of associated empirical work, more productive firms are more likely to engage in exporting and foreign direct investment. While these frameworks have been extended to examine multiple destinations and multiple products, they generally assume that trade occurs directly between producers in one country and final consumers in another and do not account for the activity of intermediary firms in trade.

Early theoretical work on the role of intermediaries in international trade, e.g Rauch and Watson (2004) and more recently Petropoulou (2007), models international trade as an outcome of search and networks. Several new papers in the theoretical literature on intermediaries in exporting have taken a more technological perspective based on models of heterogeneous firms (Ahn et al.; 2011; Akerman; 2010; Felbermayr and Jung; 2011).

New models of trade, in particular Akerman (2010) and Ahn et al. (2011), extend the heterogeneous firm trade model of Melitz (2003) by introducing an intermediation technology which allows wholesalers to exploit economies of scope in exporting. While all active firms serve the domestic market, manufacturers have a choice of how to potentially serve a foreign market. Domestic manufacturing firms are allowed to choose between direct exports to a consumer in the foreign market and the use of an intermediary firm who controls the goods as they cross the international border.[1]

While the details of the models vary, the general framework is similar. Exporting directly incurs a fixed cost and a variable cost. Indirect exporting takes place through an intermediary firm, or using intermediary 'technology'. The intermediary is assumed to be able to lower the fixed costs of exporting while possibly incurring additional variable costs. This choice means that a number of manufacturing firms may export indirectly through a wholesaler, rather than managing their own distribution networks. These firms pay an intermediary fixed cost which is smaller than their own fixed cost of direct export. In this more realistic setting, firms choose to serve the foreign market either directly or through domestically-based export intermediaries.

Firms sort according to productivity into different export channels. As in the standard model of Melitz (2003), the least productive firms serve only the domestic market while the most productive firms can export directly by incurring the fixed cost of export and any variable trade costs. A third category of firms chooses to export indirectly through wholesalers. This third group, which looks like non-exporters in the data, includes some firms who would not have been exporters in the absence of intermediaries and some firms who would be marginal exporters in the absence of intermediaries.

Analogous to Helpman et al. (2004), we can compare graphically the profits generated by each type of activity for firms with different productivity.[2] The two solid lines in Figure 1 depict profits from the domestic market (π_d) and additional profits for firms that export directly (π_{xd}). The profit functions are increasing in productivity (α) as more productive firms are able to charge a

[1] Blum et al. (2011) and Blum et al. (2010) look the role of intermediaries largely from the perspective of the importing country while Rauch and Watson (2004) discuss when intermediary firms actually take possession of the goods.

[2] In this example we assume that the firm itself has access to the intermediation technology. Akerman (2010) models intermediaries explicitly in a monopolistic competition setting. Intermediaries face fixed costs of exporting that are increasing in the number of varieties handled by the exporter and their variable costs per variety include tariffs and the domestic price of the variety. Producing firms view intermediaries as identical to any other domestic consumer and thus only face domestic fixed costs of production. The resulting pictures and cutoffs are similar although his framework allows for a richer set of predictions on the size and scope of intermediaries.

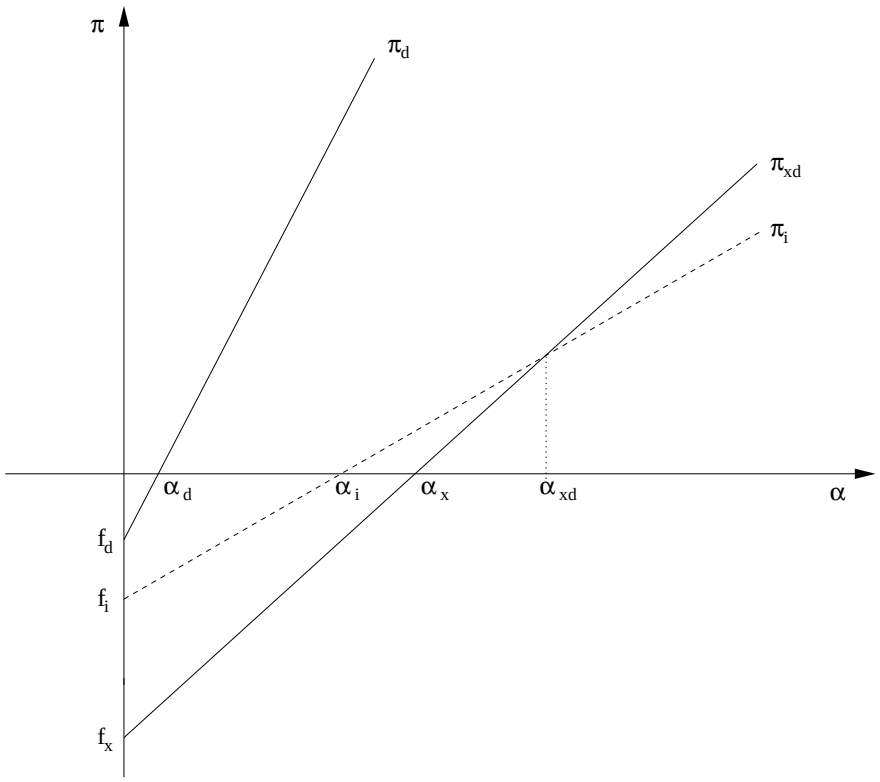

Figure 1: Profits from domestic sales, indirect and direct exports

lower price, capture a large market share and generate larger profits. The intercept of the domestic curve is smaller in absolute value than that of exports because the fixed costs that are incurred for selling on the domestic market (f_d) are lower than what a firm must pay to export directly abroad (f_x). Moreover, since there is a per unit variable cost of export, the slope of the profit function for direct exports is flatter than the slope of the profit function for domestic production. These relationships introduce two productivity cut-offs (α_d and α_x), that in turn indicate which ranges of productivity determine exit, domestic sales only, or direct exports.

With the possibility of exporting through intermediaries, firms now have also an additional option of using the intermediation 'technology' to export. By assumption the fixed costs in the intermediation technology are lower than the fixed costs of direct exporting and are greater than or equal to the fixed costs of domestic sales; f_i is between f_d and f_x in Figure 1. The degree to which the intermediation fixed costs are lower than those of direct exporting depends on the combination of country, industry and country-variety fixed costs of selling in the foreign market as discussed further below.

The dotted curve drawn in Figure 1 depicts profits for firms that export indirectly (π_i) through an intermediary. If using an intermediary does not raise the variable costs of exporting then all manufacturers would employ the intermediation technology and export indirectly, $\pi_i(\alpha) > \pi_d(\alpha)$

$\forall\alpha$. To allow for both direct and indirect exporting, the intermediary exporter faces additional variable costs. In Akerman (2010), the intermediary sets the export price of each variety as a standard mark-up over its own marginal cost, where its marginal cost includes both variable trade costs and the domestic purchase price of the variety, which is itself a mark-up over the variable cost of production. In Ahn et al. (2011), it is assumed that intermediaries face no fixed costs of exporting but charge a variable cost to transport the goods.

The combination of lower fixed costs and higher variable costs at intermediaries introduces a third productivity cut-off, α_i, which is the zero-profit cutoff for exporting through an intermediary.[3] If $\alpha_d < \alpha_i < \alpha_x$ then there will be an equilibrium with 'pure' domestic producers and both direct and indirect exporting. Firms with productivity levels below α_d earn negative profits and exit the industry. Firms with productivity levels between α_d and α_i, produce only for the domestic market. Firms with productivity between α_i and α_{xd} now can profitably access the foreign market through wholesalers. Finally, firms with productivity levels above α_{xd} produce for the domestic market and export directly. Note that the group of firms with indirect exports includes some firms with productivity too low to find it profitable to export directly, $\alpha_i \leq \alpha < \alpha_x$ and some firms of higher productivity that prefer indirect to direct exporting, $\alpha_x \leq \alpha < \alpha_{xd}$.

A firm's decision regarding the mode of export is determined by variable and fixed trade costs, which in turn also depends on country and product characteristics. The degree to which fixed costs are reduced using intermediaries depends on the nature of the fixed cost, e.g. the combination of country, industry and country-variety components. We can write the fixed costs of direct exporting of variety k in industry j to country c as

$$f_x = f_c + f_j + f_{kc}$$

where f_c is a fixed export cost common to all varieties exported to country c, f_j is a fixed export cost common to all varieties in industry j regardless of the number of destinations, and f_{kc} is a fixed export cost specific to the variety and country. The greater the share of idiosyncratic fixed costs, f_{kc}, in total fixed costs, f_x, the lower the possibility for economies of scope and the lower the share of exports handled by intermediaries. Both country and industry-specific fixed costs allow for the possibility of indirect exporting. Exporting intermediaries may arise because they are able to share the country-specific fixed cost of exporting across many industries and varieties and/or they may exist because they are able to spread industry-specific fixed costs across varieties and destinations. Existing theoretical frameworks typically ignore the possibility of industry-specific fixed costs but it remains an empirical question as to whether intermediaries are country- or industry-specific relative to direct exporters.

[3]It is possible that no producer will choose to export through an intermediary if the increase in variable cost is sufficiently large.

The simple framework provides some clear predictions for the variation of direct and indirect trade across countries. To the extent that intermediaries solve only the country-specific fixed costs of exporting, e.g. each variety exported faces indirect fixed costs $f_i = f_c/n + f_{kc}$, where n is the number of varieties handled by the intermediary, the difference between direct and indirect fixed costs will be increasing as country fixed costs rise.

The role of variable trade costs is less clear-cut in these models. A rise in variable trade costs that affects both direct and intermediary exporters, such as tariffs or transportation costs, can increase, decrease or leave unchanged the share of exports handled by intermediaries. In the empirical work we examine the role of variable trade costs including distance and tariffs in determining the share of exports handled by intermediaries.

The existing theoretical frameworks emphasize the interaction of producer firm heterogeneity and fixed export costs in the decision to export directly or indirectly. While these models are all static models of single-product firms, it is relatively easy to envision a dynamic extension where firms potentially make multiple products and their profitability evolves over time (see Bernard, Redding and Schott; 2010; Bernard et al.; 2011). In a dynamic environment, variation in the sunk cost of exporting across firm types would lead to predictable variation in product adding and product dropping in the export market. Firms facing lower sunk costs would be more likely to both add and drop products in steady state and in the face of exogenous shocks to profitability. As intermediary exporters have lower entry costs they should be more likely to churn their export product mix.

2.1 Related empirical literature

Recent papers by Ahn et al. (2011), Akerman (2010) and Bernard, Jensen, Redding and Schott (2010b) examine various aspects of intermediaries in exports for China, Sweden and the US, respectively. None of the papers uses exactly the same definition of an exporting intermediary so the results are not directly comparable to each other or those presented below.[4]

Bernard, Jensen, Redding and Schott (2010b) document the role of intermediaries in US exports. They find that 35 percent of US exporters are wholesalers accounting for 10 percent of US exports by value. Their work emphasizes the differences in the attributes between exporters of different types. Among exporting firms, pure wholesalers are much smaller than 'producer-consumer' firms in terms of employment, but only slightly smaller in terms of exports per worker

[4]Specifically, Ahn et al. (2011) define an intermediary as a firm with certain Chinese characters in its name, Akerman (2010) uses the main activity of the firm and includes both wholesalers and retailers and Bernard, Jensen, Redding and Schott (2010b) distinguish between pure wholesalers, pure retailers and two types of firms that mix manufacturing with wholesaling and retailing. As discussed below we only consider firms with wholesaling as their main activity as intermediaries.

and domestic sales per worker.[5] Other differences include the types of products exported and the destinations served, wholesalers are more likely to export food-related sectors and export to lower income countries.

Akerman (2010) reports slightly more exporting intermediaries than manufacturers and significant differences between the two types of exporters. Intermediaries are smaller in terms of total turnover, much smaller in terms of export value, but export more products and ship to more destinations. Akerman (2010) regresses country-sector intermediary export shares on gravity variables and proxies for country fixed export costs. Intermediary export shares increase in distance and measures of fixed costs and fall with destination GDP.

In contrast with the other studies, Ahn et al. (2011) find much higher exports per firm and unit values for intermediaries than for direct exporters. Intermediaries are also active in many more products than direct exporters. Regressions of product-country intermediary export shares on country characteristics show positive relationships for distance, tariffs and a measure of fixed costs and a negative relationship with destination GDP.

This paper builds on this growing empirical literature and extends it in a number of directions. First, it documents the differences between producing exporters and intermediary exporters in terms of their firm characteristics, destination and product mixes, product churning and export values and quantities. We then examine export participation and levels by direct and intermediary exporters across countries and products and their relation to country and product characteristics. Finally the underlying sources of intermediated trade are shown to cause intermediaries to differ in terms of their responses to aggregate shocks, both in terms of export value and the margins of adjustment.

3 Data

3.1 Trade and Firm data

The analysis of direct versus indirect modes of export is based upon two firm-level datasets collected by the Italian statistical office (ISTAT), namely Statistiche del Commercio Estero (COE) and Archivio Statistico Imprese Attive (ASIA).[6]

The COE dataset consists of all cross-border transactions performed by Italian firms and it covers the period 2000-2007. COE includes the annual value and quantity of export transactions by the firm for product-country destination pairs.[7] A product is defined as a six digit category in

[5] 'Producer-consumer' firms in Bernard, Jensen, Redding and Schott (2010b) include any firm with no reported employment in wholesaling or retailing and thus include both manufacturers and other service firms.

[6] The database has been made available for work after careful screening to avoid disclosure of individual information. The data were accessed at the ISTAT facilities in Rome.

[7] ISTAT, collects data on exports based on transactions. The European Union sets a common framework of rules but leaves some flexibility to member states. A detailed description of requirements for data collection on exports in Italy is provided in the Appendix.

the Harmonized System (HS6).

Using the unique identification code of the firm, we link the firm-level export data to ISTAT's archive of active firms, ASIA. In ASIA, firms are classified according to their main activity, as identified by ISTAT's standard codes for sectoral classification of business (5-digit ATECO). This information allows us to distinguish between four broad categories of firms: manufacturers, wholesalers, retailers, and a residual group including the remaining sectors.[8] ASIA also contains information on firms' operations including the number of employees and total turnover.[9] The combined dataset used for the analysis is not a sample but rather includes all active firms.

3.2 Country level data

Firm-level trade data are complemented by country characteristics including proxies for market size and variable and fixed trade costs.[10] For market size we use total GDP from the World Bank World Development Indicators database. Variable trade costs may be either due to policy barriers, such as tariffs and non-tariff barriers, or to the cost of moving goods across borders, such as transportation costs. Following the large gravity literature, transportation costs are proxied by geographic distance calculated using the great circle formula (Mayer and Zignago; 2005).

As emphasized in the literature on firms and exporting (Roberts and Tybout; 1997; Melitz; 2003; Bernard and Jensen; 2004; Bernard et al.; 2007; Eaton et al.; 2011), firms incur fixed entry costs in order to enter foreign markets. These fixed costs can be related to the establishment of a foreign distribution network, difficulties in enforcing contractual agreements, or the uncertainty of dealing with foreign bureaucracies. We create two measures of country-level fixed costs. To generate a proxy for the market-specific fixed costs of exporting to a country, we use information from three measures from the World Bank *Doing Business* dataset: *number of documents for importing, cost of importing* and *time to import* (Djankov et al.; 2011). Given the high level of correlation between these variables, we use the primary factor (*Market Costs*) derived from principal component analysis as that factor accounts for most of the variance contained in the original indicators (see Table A1 in Appendix).

Data on the contracting environment are available from a variety of sources, e.g. World Bank, Heritage Foundation, and Transparency International. To proxy for institutional quality we use information from the six variables in the World Bank's *Governance* dataset (Kaufman et al.; 2009): *Voice and Accountability, Political Stability and Absence of Violence/Terrorism, Government Effectiveness, Regulatory Quality, Rule of Law*, and *Control of Corruption*. As these six measures are highly correlated, we follow Bernard, Jensen, Redding and Schott (2010a) and use the primary fac-

[8] In particular, we classify firms in sectors from 151 to 372 as manufacturers, and firms in sectors from 501 to 519 (with the exclusion of 502 which concerns the activity of repair of motor vehicles) as wholesalers. Retailers are firms in sectors 521 to 527, and Others contains the remaining sectors.

[9] Information on total turnover are available only for two years, 2000 & 2003.

[10] More details on the country-level variables are available in the Appendix.

tor obtained from principal component analysis, *Governance*, as the proxy for country governance quality.[11] If firms must invest in fixed resources to export to countries with weaker contracting environments, one would expect better *Governance* to be associated with lower intermediary export shares.

Finally, in order to account for the effect of policy barriers on the presence of intermediaries and manufacturers we also consider HS6 product-country import tariffs, taken from World Integrated Trade System (WITS).[12]

3.3 Product level data

The paper also investigates a set of product and industry variables that affect the probability that a producer exports directly rather than through an intermediary. Goods with high destination-specific costs of entering a foreign market, or finding a foreign customer, are more likely to be exported directly. Similarly industries with higher entry costs are less likely to be served by direct exports.

We consider both product characteristics that are related to the specificity of the product and those more generally related to market structure. A measure of industry contract intensity developed by Nunn (2007) is used to measure the importance of relationship-specific investment in intermediate inputs across industries. Nunn's original data, corresponding to US I-O industries, is concorded to HS6 products.[13] Industries that require more relationship-specific investments are expected to be less easily served by intermediaries as the product-market component of fixed costs is relatively large.

In order to account for differentiation within a HS6 product class we employ the coefficient of price dispersion.[14] Lower price dispersion is assumed to be associated with more homogeneous products. For homogeneous products, the product-market component of fixed costs will be lower and thus it is more likely that the export transactions will be carried out by an intermediary.

We adapt a measure of product-level sunk entry costs developed by Bernard and Jensen (2007) to the export market. In steady state, a product with high sunk costs of entry into export markets should have a low entry rate and a low (and equal) exit rate. During transitions between steady states, either the entry rate (expanding product) or the exit rate (shrinking product) may be

[11] Table A2 in Appendix reports the results of the principal component analysis for the governance measure.

[12] WITS contains the TRAINS database on bilateral tariffs at the six-digit level of the Harmonized System (HS) product classification for about 5,000 products and 200 countries. TRAINS provides information on four different type of tariffs: Most-Favored National Tariffs (MFN), Preferential Tariffs (PRF), Bound Tariffs (BND), and the effectively applied tariffs (AHS). We use the AHS tariff in the empirical analysis. The AHS tariff is the MFN Applied tariff, unless a preferential tariff exists.

[13] See the Data Appendix for a description of the concordance procedure.

[14] The coefficient of price variation is computed on COE data as the coefficient of variation in the unit values of any of the HS6 products across all firm-product-country transactions. In the empirical analysis we use data from 2003, but the product ranking in terms of price dispersion does not vary much over the years.

unusually high. However, the minimum of the two rates should still correspond to steady-state entry or exit. We calculate the minimum of the firm-level export entry and exit rates for each product, min(entry, exit).[15] A higher level of entry and exit indicates lower sunk costs of exporting and a lower likelihood that the product will be exported through an intermediary.

4 Manufacturers and Intermediaries

The focus of the present work is to investigate the role of intermediaries in exports. This section documents the extent of intermediation in Italian exports, highlighting important stylized facts about intermediaries and showing how they differ from manufacturing firms. Table 1 reports the total value of exports and the relative share of four broad categories of firms: manufacturers, wholesalers, retailers, and a residual group including firms in all the remaining sectors.

A preponderance of exports, more than 84 percent of the value, is performed directly by manufacturing firms. Manufacturing exporters also represent more than 50 percent of exporting firms. However, an increasing share of exports is conducted by the 27 percent of exporters that are wholesalers, rising from 9.9 percent in 2000 to 11.3 percent of Italian exports in 2007. These figures are in line with those reported for the US in Bernard, Jensen, Redding and Schott (2010b) where wholesalers are 35 percent of exporting firms and control just over 10 percent of US exports. As in other countries, retailers are relatively minor players in exporting, accounting for less than one percent of exports by value. As a result the paper focuses on the role of wholesalers as export intermediaries and uses the two terms interchangeably.

While intermediaries account for just 11 percent of Italian exports, there is substantial variation across both countries and products, see Table 2. At the country level, intermediary export shares range from a low of zero to a high of 88 percent. At the bottom of the interquartile range are countries such as Belgium, Norway, France, New Zealand and China with intermediary export shares close to 9 percent; at the top of the interquartile range, we find Paraguay, Moldova, Malawi and Albania with wholesale export shares near 23 percent. While the overall share of intermediary exports is just under 11 percent in 2003, across destinations, unweighted intermediary export shares average 16.6 percent and are higher on average for non-EU countries. This indicates that wholesalers are relatively more important in smaller markets and in markets outside the EU.

The share of intermediaries across products also displays substantial variation, see the second panel of Table 2. Wholesalers account for 21 percent of the exports for the average product, pointing to the importance of intermediaries in products with lower total export values. While there exist

[15]The entry rate is the number of new exporters of the product between year t and t+s divided by the average number of exporters in the two years. The exit rate is the number of firms that stop exporting the product between t and t+s divided by the average number of exporters in the two years. The min(entry, exit) in a given product is computed on COE data for years 2003 and 2007. Considering different years for the computation of the rates does not significantly affect the results.

both products which are sold abroad only through intermediaries, 1.8 percent of 5,125 products, and others where the share of wholesalers is zero, most products are exported both directly and indirectly.

Specialization is more common at the product-country level. Of the 244,614 product-country combinations with positive exports, 48.6 percent involve direct exports only and 10.4 percent are served exclusively by intermediaries.[16]

4.1 Firm characteristics

In their work on US traders, Bernard, Jensen, Redding and Schott (2010b) find not only that traders differ from domestic firms, but also that substantial heterogeneity exists between trading firms of different 'types'. The results here complement and extend that analysis by comparing manufacturers and wholesalers along a number of dimensions including size, the number of destination countries and the number of products exported.

The top left panel of Figure 2 shows the distribution of employment for all wholesale and manufacturing firms. The employment distribution for wholesalers lies far to the left of that for manufacturers. Overall, intermediaries are much smaller in terms of number of employees. However, when we proxy size with total sales (top right panel) the difference between the two distributions remains but is greatly reduced. The differences between the panels implies that the sales per employee ratio of wholesalers is much higher than that of manufacturers.[17] The bottom panels of Figure 2 show the size distributions for wholesale and manufacturing exporters. The relative ranking of the two distributions is similar to that seen above.

The figures are consistent with the idea that manufacturing firms are performing two activities, the physical production of the goods and the intermediation of the goods to a downstream customer, while wholesalers are only engaged in the latter activity. This distinction is important when attempting to compare the exporting activities of wholesalers and manufacturers as the use of employment as a proxy for firm size may yield misleading comparisons. A manufacturing firm with 100 employees will typically have lower sales and exports than a wholesale firm with the same employment. As a consequence, we use both employment and total sales as proxies for size in the analysis.

Figure 3 displays the binned relation between log exports and log employment, reporting the (log) number of employees a firm needs, on average, for a certain level of exports.[18] The plot

[16] For product-country pairs with a mix of direct and indirect exports the average indirect share is 25.3 percent.

[17] We caution that sales per employee is not a good measure of firm productivity when comparing firms of different types.

[18] Binned plots allow for a succinct representation of the relation between two variables and avoid displaying clouds of thousands of observations. Here data are placed in 20 equally-sized bins according to their (log of) export value, and the x-coordinate displays the average of the bin. The y-coordinate is the average (log of) employment within that bin.

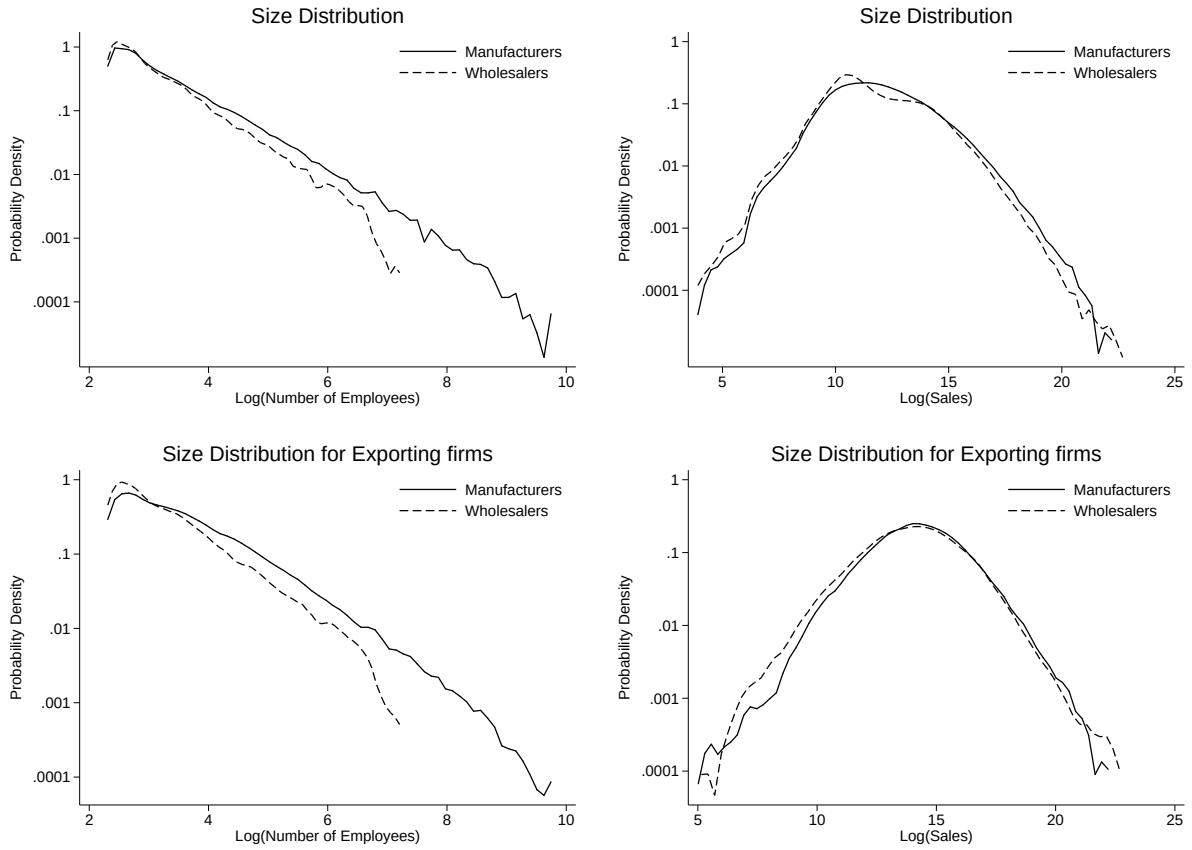

Figure 2: Empirical density of firm size in 2003 - All firms (**Top**) and Exporters (**Bottom**). Size is proxied by (log of) employment (Left) and (log of) sales (Right). Densities estimates are obtained using the Epanenchnikov kernel with the bandwidth set using the optimal routine described in Silverman (1986).

confirms that wholesalers require fewer employees to attain any given level of export value.

To quantify the differences between manufacturers and wholesalers, we estimate the following cross-sectional OLS regression,

$$\ln Y_f = c + \delta D_f^W + \beta D_f^X + \gamma (D_f^W \cdot D_f^X) + \varepsilon_f \tag{1}$$

where $\ln Y_f$ denotes the logarithm of either total sales, number of employees, or sales per employee ratio. D_f^W is a firm-level dummy variable, one for wholesaler and zero for manufacturer; D_f^X is a dummy indicating if a firm is an exporter; and $(D_f^W * D_f^X)$ is the interaction between the two dummies and takes value of one if a firm is a wholesaler exporter and zero otherwise. The results are presented in Table 3.

As expected, manufacturers are on average larger than wholesalers, 0.111 log points (12 percent) in terms of sales and 0.533 log points (70 percent) in terms of employment, δ is negative and

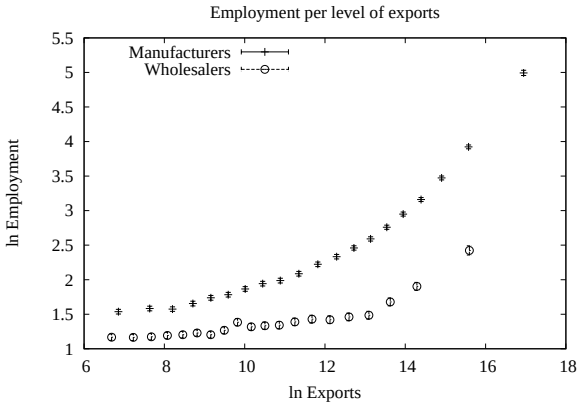

Figure 3: Relation between (log of) employment and exports, 2003. Observations are placed in 20 equally-sized bins according to the variable on x-axis. Coordinates of dots display the average of x and y variables of the data in each bin (see text).

significant in both specifications. In contrast, sales per employee are substantially higher at wholesalers. We also confirm the now-standard results that manufacturing exporters are dramatically larger and have higher sales per employee than their domestic counterparts, β is large, positive and significant.

Perhaps unsurprisingly, we provide the first evidence that the selection of firms into exporting may be working for wholesalers as well. Exporting wholesale firms have total sales 14.8 times larger than non-exporting wholesalers and employ 2.8 times as many workers, $\beta + \gamma$ is positive and significant. Sales per employee at exporting intermediaries are 5 times higher than at non-exporters.

Looking at exports in columns 4 and 5 of Table 3, we find that the value of exports at wholesalers is also much smaller than that of manufacturing exporters but that this difference largely disappears when considering exports per employee.

The regression results of Table 3 confirm the conclusions from the relative distributional plots in Figure 2. In particular, the evidence on higher sales per employee, especially at exporters, supports the idea that wholesalers focus on just the intermediation portion of the activities carried out by manufacturers.

4.2 Product and Geographic Diversity

The theoretical models discussed in Section 2 generally focus on the role of intermediaries in solving the fixed cost problem for specific markets. This section provides evidence on the presence of intermediaries in markets and sectors. Figure 4 displays the relation between geographic and product diversification of the firm and its size, distinguishing between wholesalers and manufacturers. Geographic diversification is proxied by the number of destination countries ($Countries_f$) and product diversification by the number of products exported ($Products_f$); size is represented both

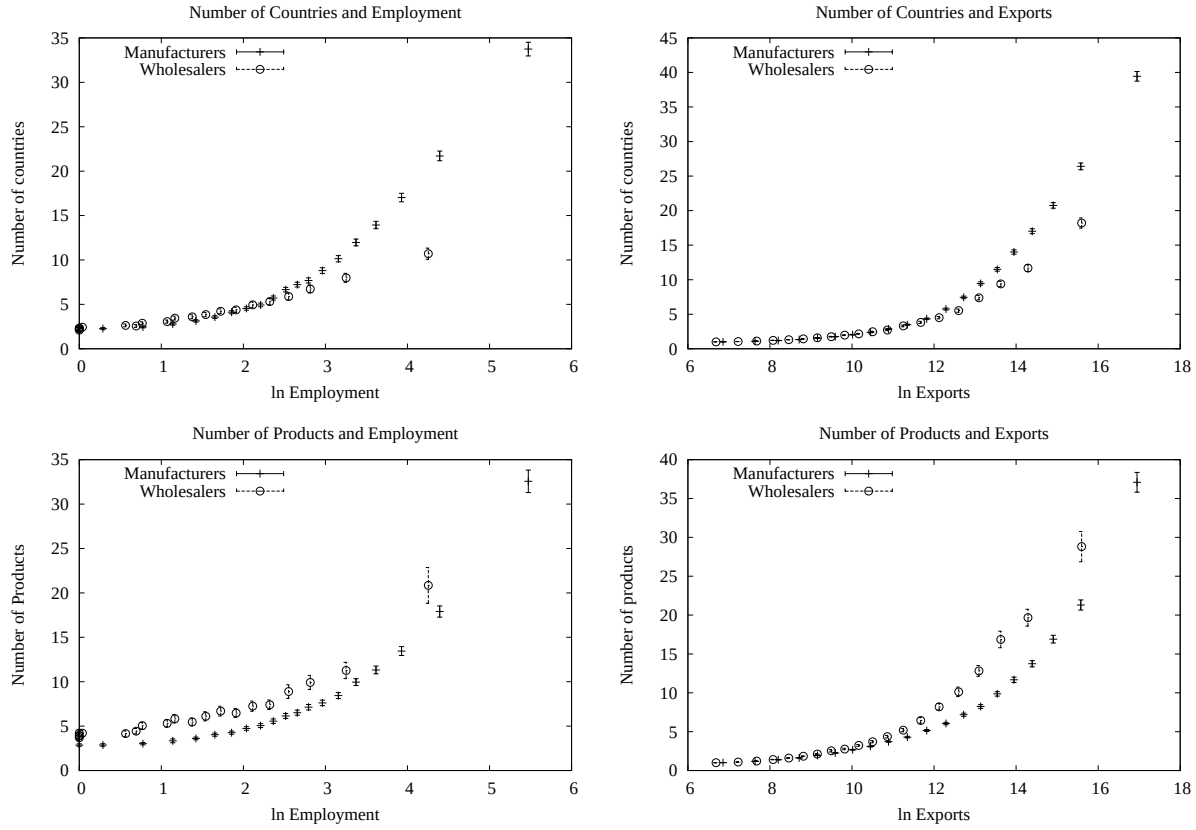

Figure 4: **Top** Number of countries and (left) employment and (right) exports, in 2003. **Bottom** Number of products and (left) employment and (right) exports, in 2003. Observations are placed in 20 equally-sized bins according to the variable on x-axis. Coordinates of dots display the average of x and y variables of the data in each bin (see text).

by employment and export value.

The evidence in Figure 4 suggests that the wholesalers' technology does not convey them an advantage in terms of geographic diversification, wholesalers export to fewer countries than do manufacturers at similar levels of employment and exports.[19] On the contrary, when considering the relation between firm size and product diversification (bottom panel), we find that, at every size class, wholesalers export more products than manufacturers.

Table 4 reports the results of the regression of the number of products exported and the number of destination markets (Products and Countries, respectively) on the firm wholesaler dummy, D_f^W, and a proxy for firm size,

$$Y_f = c + \delta D_f^W + \ln Size_f + \varepsilon_f \qquad if \quad D_f^X = 1. \tag{2}$$

[19] Ahn et al. (2011) report that Chinese intermediaries export more products and export to more countries than direct exporters. However, as noted previously, Chinese intermediary export firms are almost twice as big as direct exporters in terms of total export value.

The first row of Column 1 shows that, unconditionally, wholesale exporters export fewer HS6 products. However, including a control for firm size, either log employment or log export value, the coefficient becomes positive and significant; exporting intermediaries are active in a wider range of products compared to similarly-sized manufacturers. In contrast, intermediaries serve fewer export markets even when adjusting for firm size. These results suggest that intermediaries are indeed able to spread country-specific fixed costs over a wider range of products.

4.3 Within Product-Country

The availability of product level data allows the comparison of wholesalers and manufacturing exporters within product-country destinations.[20] Using exports to Extra-EU destinations for 2003 and considering product-country pairs where both wholesalers and manufacturers are active, we estimate the following specification,

$$\ln Y_{fcp} = c + \delta D_f^W + \beta \ln Sales + d_{pc} + \varepsilon_{fcp} \tag{3}$$

where $\ln Y_{fcp}$ denotes the logarithm of, respectively, the total value, quantity and unit value of the firm's exports in the country-product pair, D_f^W is the firm wholesaler dummy and d_{pc} denotes country-product fixed effects. The results in the first two columns of Table 5 show that wholesalers have a substantially lower total value of exports relative to direct exporters within product-country pairs. The difference in exports across firm types remains even after controlling for firm size, although the magnitude is reduced. Columns 3-6 report similar regressions for export quantities and unit values. The lower exports for wholesalers are driven entirely by lower export quantities; unit values are not statistically different for direct and intermediary exporters.

4.4 Product Adding and Dropping

The cross-sectional analysis reveals that exporting wholesalers are smaller than manufacturers and that they export a larger number of products to a smaller set of destinations. In addition to lower firm-level trade flows, intermediaries also ship less within a product-country pair. These results are broadly supportive of a framework emphasizing country-specific fixed costs of exporting. As discussed earlier, the presence of sunk export costs that vary across firm types also has implications for export dynamics. Lower sunk costs should result in higher probabilities of both entry into exporting and exit from exporting. A dynamic extension of the framework presented earlier would suggest that intermediaries should be more likely to add and drop products from their export portfolio than direct exporters. This is confirmed by the unconditional drop rates across firms

[20] We focus all the remaining empirical work on exports to Extra-EU destinations for several reasons. Most importantly, firm-level exports to the EU are not recorded for all exporters and these criteria have changed over time. Also, real exchange rate changes within the eurozone countries are driven entirely by changes in relative price levels.

types: on average the fraction of exported firm-products outside the EU that is dropped every year is 50% among all firms, 48% for manufacturers and 53% for wholesalers.

Following Bernard, Redding and Schott (2010), we analyze export product switching between t and $t+1$ using those years for which we have information on firms' total turnover, 2000-2001 and 2003-2004. We estimate a linear probability model of product dropping for firms that export in year t and $t+1$ of the form,

$$Drop_{fpt} = c + \delta D_{ft}^{W} + \beta_1 \ln Sales_{ft} + \beta_2 Deviation_{fpt} + \beta_3 \ln Products_{ft} + d_p + d_t + \varepsilon_{fpt} \quad (4)$$

where $Drop_{fpt}$ takes value 1 if the product is exported by the firm f in year t and not exported in year $t+1$ and equal zero if the product is exported in both years. D_{ft}^{W} is the firm wholesale dummy and is the variable of interest. To control for firm attributes associated with product switching, we include firm size, $\ln Sales_{ft}$, the relative importance of the firm in the exports of the product given by the log difference between the firm's exports in product p and average firm exports in product p, $Deviation_{fpt}$, and the number of products exported by the firm in year $t, \ln Products_{ft}$. Product and year fixed effects, d_p and d_t respectively, are also included.

Table 6 reports the results of the estimation of the firm-product dropping specification equation 4 for Extra-EU countries. Wholesaler exporters are much more likely to drop a product than manufacturer exporters, 6.9 percentage points or 14.4 percent. This differential persists even controlling for firm size, the number of exported products and the relative importance of the firm in the product, although the magnitude of the coefficients is reduced.

If wholesalers have lower sunk costs per product, then they should also be more likely to add products.[21] We examine the probability that a current exporter adds a product to its export portfolio between years t and $t+1$ in the specification,

$$Add_{ft} = c + \delta D_{ft}^{W} + \beta_1 \ln Sales_{ft} + \beta_2 \ln Products_{ft} + d_{ind} + d_t + \varepsilon_{ft} \quad (5)$$

where Add_{ft} takes value 1 if the firm adds an export product and zero otherwise. D_{ft}^{W}, $\ln Sales_{ft}$, and $\ln Products_{ft}$ are defined as above. Additional controls include year fixed effects, d_t, and industry-mix fixed effects, d_{ind} that controls for firms with the same mix of industries at the HS2 level.[22]

Results of Table 7 show that intermediaries are more likely to add a product than manufacturers. This finding is robust to controlling for firm size and number of exported products, and the effect is more pronounced when comparing wholesalers and manufacturers among single product firms.

[21] On average the fraction of firms that add at least one export product outside the EU every year is 79%: 79% for manufacturers and 80% for wholesalers. Among single product (multiple products) firms the ratio is 65% (83%) for all firms, 62% (83%) for manufacturers and 69% (83%) for wholesalers. On average the fraction of firms that drop at least one export product outside the EU every year is 80%: 80% for manufacturers and 79% for wholesalers.

[22] While the dropping regression was estimated at the firm-product level, the adding specification is at the firm-level.

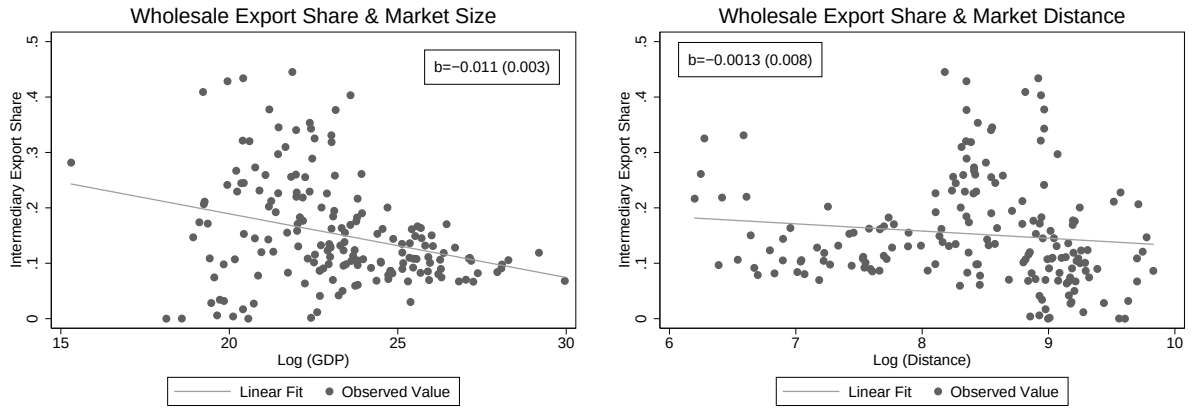

Figure 5: Wholesale export share and gravity variables, 2003. Figures report the relationship between wholesale export share and gravity variables: (Left) Real GDP; (Right) Geographic distance. Each panel reports the coefficient, b, of a country-level univariate regression for intermediary export share. Robust standard error is shown in parenthesis.

The results on both export product dropping and export product adding suggest that intermediary exporters face lower sunk costs of participation in the export market. These findings suggest that shocks such as changes in tariffs or exchange rates may have differential effects on wholesalers and manufacturers even within the same country-product pair. We return to examine the effects of exchange rate changes across firm types in the final section of the paper.

5 Exports by Intermediaries

The previous sections have shown that exporting wholesalers differ from manufacturing exporters in terms of size, geographic coverage, product portfolio and entry and exit. This section focuses on differences in the role of wholesalers across countries and products.

5.1 Intermediary Export Share

We start by exploring the relationship between the intermediary export share by destination market and a set of relevant country variables (Figures 5-6). The correlation of intermediary export shares by country with market size and distance is displayed in the two panels of Figure 5. Wholesale export share is declining in log GDP, smaller markets have greater intermediary export shares, consistent with the idea that in smaller destination markets, fixed entry costs have to be spread over fewer units. In contrast, there is no statistically significant relationship between distance, a common proxy for variable trade costs, and the intermediary export share.

Country-specific fixed costs of trade are generally expected to be positively related to inter-

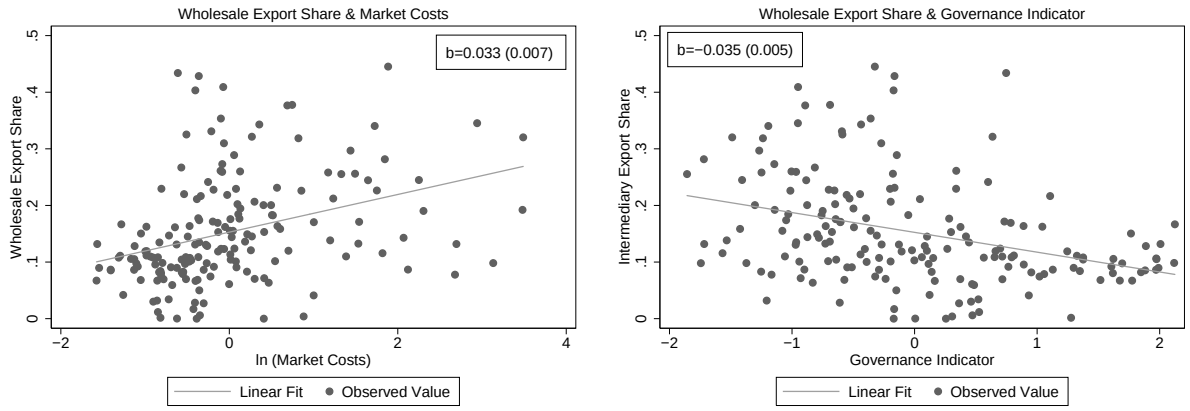

Figure 6: Wholesale export share and country-level fixed costs, 2003. Figures report the relationship between wholesale export share and the two proxies for fixed market entry costs: (Left) Market Size; (Right) Governance indicator. Each panel reports the coefficient, b, of a country-level univariate regression for intermediary export share. Robust standard error is shown in parenthesis.

mediary trade shares.[23] The plot at the left of Figure 6 displays the relationship between the percentage of export value that goes through intermediaries and the *Market Costs* variable. As found by Ahn et al. (2011) and Akerman (2010), this measure of market access costs is positively and significantly related to intermediary trade shares.

The right panel of Figure 6 plots the intermediaries export share against country *Governance*. As expected, the quality of country governance is negatively and significantly related to intermediaries export share. This evidence supports the idea that as country-level fixed costs increase, more firms use wholesalers for exporting.

Finally, we investigate the link between the HS6 product characteristics and intermediary export shares. While the theoretical models remain largely silent on this aspect, product characteristics would be expected to play a role in explaining the type of firm handling the exports.[24] If goods with higher relation-specificity have relatively larger product-country fixed costs of exporting, the share of direct exports is likely to be greater. Transactions involving complex goods, whose production process is intensive in the use of highly specialized and customized inputs, may require specific knowledge and tasks because of the effort associated with the identification of potential customers, more detailed contracts, post-sale service, etc. For those goods, the product-market component of fixed costs is relatively large and such goods are more likely to be exported directly by manufacturing

[23] Higher country-level fixed costs of exporting and weaker governance are associated with smaller total levels of exports (Lawless; 2010; Djankov et al.; 2011), here we consider their relationship to the composition of exports by firm type.

[24] While not discussed explicitly in his paper, Akerman (2010) models the price of exports by intermediaries as a double mark-up over tariff-adjusted marginal cost. Increases in the demand elasticity reduce the mark-ups and narrow the difference between the export prices of intermediaries and those of direct exporters and increase the share of exports by intermediaries.

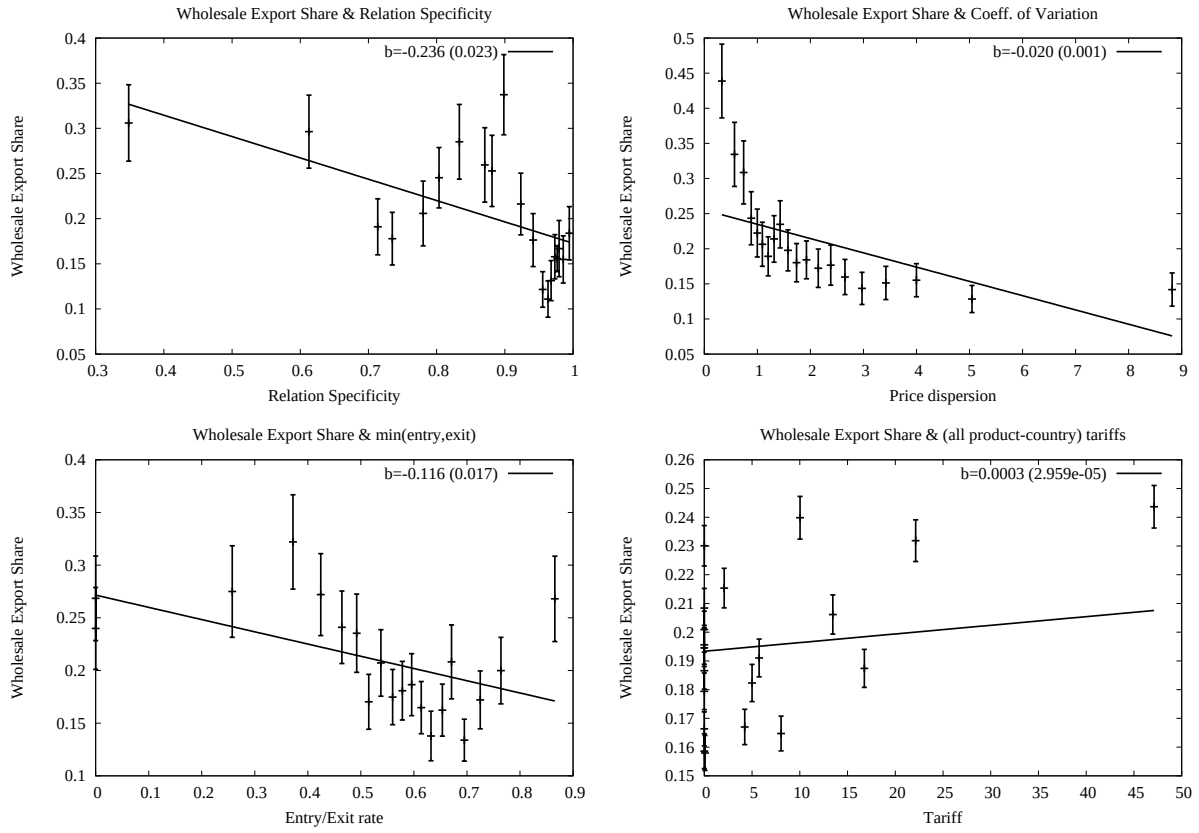

Figure 7: Wholesale export share and Product/Country-Product characteristics, 2003. Figures display the relationship between wholesale export share and the following characteristics: (Top Left) Relation Specificity; (Top Right) Coefficient of Variation of the unit values for each product; (Bottom Right) min(entry, exit) in the export market for a given product; (Bottom Left) Country-Product export tariffs. Observations are placed in 20 equally-sized bins. Coordinates of dots display the average of tariffs and intermediary export share of the data in each bin. Each panel reports the coefficient, b, of a product-level univariate regression for intermediary export share. Robust standard error is shown in parenthesis.

firms. On the contrary, the indirect mode of export would prevail if the traded good does not require a relation-specific investment, as for commoditized products. This prediction is in line with the hypothesis put forward by Peng and Ilinitch (2001) "the higher the commodity content of the product, the more likely that export intermediaries will be selected by manufacturers". This is confirmed by Figure 7 (top left) which shows a negative and significant relationship between intermediary export share and the measure of relation specificity. Note that, given the very large number of observations, data are binned in all plots of Figure 7, although the regression coefficients are based on all the data.

The relation between product price dispersion, as proxied by the coefficient of variation of export unit values, and intermediary share is negative and significant, Figure 7 top right. This is the expected relationship if lower price dispersion is associated with more homogeneous products which are more likely to be handled by intermediaries.

The plot at the bottom left of Figure 7 displays the relation between min(entry, exit) rate in a product and intermediary export share. The negative and significant slope suggests that easier export entry and exit is associated with a lower export share for wholesalers. Products that have higher sunk costs of entry (low rates of entry/exit) are more likely to be handled by intermediaries.

Finally we consider the incidence of tariffs on the presence of intermediaries in product-country pairs. The bottom right of Figure 7 shows the relation between product-country tariff and intermediary export share. There is a small, positive relation between product-country tariffs and intermediary share.

The overall message of these figures is consistent with the idea that there is a systematic relationship between the share of exports managed by wholesalers and both country and product characteristics.

5.2 Selection into different modes of export

The previous section has investigated the univariate correlations of country and product characteristics with the intermediary export share. This section and the next explore the relationship between country and product characteristics and export participation and levels by wholesalers and manufacturers.

Recent work on the importance of distance and GDP on the level of exports has emphasized the role of firm selection, e.g. Helpman et al. (2008). The empirical literature on intermediation has not considered selection effects. The issue is more difficult than the standard export problem in that there are potentially different selection criteria for intermediary and direct exporters. Ideally, we would see the characteristics of the producing firm and the choice of whether or not to export and by what method. However, the trade data limits us to observing whether or not a product is exported by wholesalers alone, manufacturers alone or by both methods. We pursue an admittedly

imperfect solution by first examining the relationship between product and country attributes and the type of exporter and then examining how the value of exports varies between wholesalers and manufacturers.

The theoretical framework outlined in Section 2 gives some guidance to the selection problem. Four mutually exclusive situations might arise as fixed costs of exporting increase. If such costs are zero, or very low, manufacturers will choose to export directly. For higher fixed costs, some firms will find it profitable to export indirectly while some, more productive firms still export directly. With sufficiently high fixed costs, a third outcome is possible where all firms go through wholesalers. At the extreme, prohibitive fixed costs will result in no exports in the product-country pair.

We rank the categories in order of increasing difficulty in entering the export market (direct only, both direct and indirect, indirect only) and estimate an ordered probit model to investigate the effects of country and product variables in determining the probability of being in one of the three states,

$$Category_{pc} = c + \beta_1 C_c + \beta_2 P_p + \beta_3 \tau_{pc} + \varepsilon_{pc} \tag{6}$$

where $Category_{pc}$ accounts for the possible three outcomes described above, C_c and P_p are country and product variables, and τ_{pc} is tariff to a particular country-product destination. Results are reported in the first column of Table 8. While most of the coefficients have the predicted sign and are significant, the proportional odds approach is easily rejected as indicated by the χ^2 test.

Given the rejection of the ordering of outcomes, columns 2 and 3 of Table 8 report the results for a multinomial logit specification, where the baseline category is exports by manufacturers only. Country GDP is positively associated with both type of firms serving the market but is negatively associated with the likelihood of the market being served by wholesalers alone. Geographical distance lowers the probability of both groups exporting relative to only manufacturing; comparing only wholesalers to only manufacturing we find the same negative sign with a lower magnitude.

The measures of fixed costs of exports, *Market Costs* and *Governance*, behave as predicted by the theory. *Market Costs* show the expected positive sign; higher market costs increase the probability of both categories of firms exporting with respect to the baseline category, only manufacturing, and also increase the probability that wholesalers are the only exporters in the product-country pair. Better country governance reduces the likelihood that the market will be served by both wholesalers and manufacturers. Similarly, the *Governance* measure is negatively associated with only wholesaling.

Looking at the product characteristics, we find the expected sign on the min(entry, exit) proxy for product-level sunk costs. Lower sunk costs reduce the probability of both categories exporting relative to the baseline category and the same relation holds also for wholesalers versus manufacturers only. The effects of product price dispersion and relation specificity are less clear and depend

on the groups being compared.

5.3 Product-country exports

This section investigates the effects of country and product characteristics on the level of exports of manufacturers and wholesalers for product-country pairs. Columns 1 to 3 of Table 9 report regression results with the log of country-product exports by exporter type, $\ln X^i_{cp}$, as dependent variable and country and product characteristics, C_c and P_p, as explanatory variables, together with a full set of interactions with the wholesaler dummy, D^W,

$$\ln X^i_{cp} = c + \delta D^W + \beta_1 C_c + \gamma_1 C_c * D^W + \beta_2 P_p + \gamma_2 P_p * D^W + \beta_3 \tau_{pc} + \gamma_3 \tau_{pc} * D^W + d_j + \varepsilon_{cp}. \quad (7)$$

Columns 1 and 2 add country and product fixed effects, respectively, while column 3 includes all the available product and country characteristics.[25]

Results on the country characteristics in columns 1 and 3 suggest that the level of exports of both manufacturers and wholesalers exports is positively correlated with GDP, however the effects are significantly lower for wholesalers. In contrast to Ahn et al. (2011), geographical distance affects negatively the value of trade equally for both types of firms.[26]

The results on *Market Costs* and *Governance* are in line with the theoretical predictions. Intermediaries' exports increase with market costs, suggesting that wholesalers are better able to spread fixed costs across products. The country governance indicator yields a similar pattern of results: better governance is associated with higher exports from manufacturers but that effect is greatly reduced or disappears entirely for wholesalers.

Columns 2 and 3 of Table 9 report the results on the product characteristics. We focus on the sign and significance of the interaction terms with the wholesaler dummy. Wholesalers export relatively less in products with lower sunk entry costs, i.e. greater min(entry, exit), higher price dispersion, and higher relationship specificity. All these coefficients have the expected signs and point to product characteristics playing an important part in the endogenous choice of firms to export directly or through an intermediary.

Finally, we include tariffs in column 3. As expected, the coefficient of tariffs exhibits a negative sign; firms export less in country-product pairs with higher tariffs. The wholesaler interaction is positive but not significant.

This section has examined the role of country and product characteristics in the choice of the mode of export and the magnitude of country-product exports. Results confirm the findings of previous studies that country-specific fixed export costs are correlated with the use of export

[25] In Column 3 we cluster both on countries and products using cluster2 packages for Stata (Petersen; 2009).

[26] The specification of Ahn et al. (2011) is slightly different as they include a smaller set of covariates and do not include the interacted wholesale dummy.

intermediaries. We further show that the quality of the more general contracting environment is related to the choice of mode of export. Exports through an intermediary are more likely when the quality of the general contracting environment of the country is weak.

We also show that the characteristics of the product play a role in determining the choice of export mode. Lower contract intensity, greater product homogeneity, and higher product-level sunk costs of exporting are associated with a greater reliance on intermediaries in exporting.

6 Intermediaries and exogenous shocks

We have documented the variation in the share of indirect exports across countries and products. The results support the idea that export intermediaries arise in large part because of the presence of significant fixed export costs at the country and product level. In addition, product adding and product dropping in the export market are greater for wholesale exporters than for manufacturers. Taken together this evidence suggests that a common shock to profits across destinations, e.g. a common tariff cut, may have different effects both across types of exporting firms *and* in the aggregate across countries due to variation in the composition of exporters.

This section examines whether intermediaries and manufacturers respond differently to exogenous currency shocks. Using annual fluctuations in bilateral real exchange rates as measures of exogenous changes in export profitability, we investigate the effects on firms' export behavior. We consider the impact of exchange rate changes on firm exports to country c, as well as on the number of exported products and the average value of exports to that destination. Following Bernard et al. (2007) a firm's total exports to a destination can be decomposed into extensive and intensive margins,

$$\ln X_{fc} = \ln Prod_{fc} + \ln avgX_{fc} \tag{8}$$

where $\ln X_{fc}$ is the log of total exports by firm f to country c, $Prod_{fc}$ is the number of distinct HS6 products exported by firm f to country c, and $avgX_{fc}$ is the average exports per exporting firm f to country c. We regress the annual log change from 2000 to 2007 of firm total exports to country c and the annual changes of the two components on a dummy for wholesaler (D^W_{ft}), the change in the log of the real bilateral exchange rate of the Italian currency ($\Delta \ln RER_{ct}$) and their interaction

$$\Delta \ln X_{fct} = c_1 + \delta_1 D^W_{ft} + \beta_1 \Delta \ln RER_{ct} + \gamma_1 \Delta \ln RER_{ct} * D^W_{ft} + d_j + \varepsilon^1_{fct} \tag{9}$$

$$\Delta \ln Prod_{fct} = c_2 + \delta_2 D^W_{ft} + \beta_2 \Delta \ln RER_{ct} + \gamma_2 \Delta \ln RER_{ct} * D^W_{ft} + d_j + \varepsilon^2_{fct} \tag{10}$$

$$\Delta \ln avgX_{fct} = c_3 + \delta_3 D^W_{ft} + \beta_3 \Delta \ln RER_{ct} + \gamma_3 \Delta \ln RER_{ct} * D^W_{ft} + d_j + \varepsilon^3_{fct} \tag{11}$$

where d_j indicates a set of fixed effects. Using data from the International Financial Statistics database (IMF, 2010), we define the RER_{ct} index for each year:

$$RER_{ct} = ER_{ct}\frac{CPI_t}{CPI_{ct}}$$

where ER_{ct} is the nominal Italian exchange rate expressed as the number of foreign currency units per home currency unit and $\frac{CPI_t}{CPI_{ct}}$ is the ratio of the domestic consumer price level and the consumer price index abroad.[27] An upward (downward) movement therefore represents an appreciation (depreciation) of the domestic currency.

Table 10 reports results from estimating equations 9-11. Since real exchange rate variations inside the Eurozone are related only to price levels changes and given the relevant role of wholesalers in Extra-EU destinations, we include in the regressions only countries outside the EU.

The first two columns of Table 10 present the results for export value, including country and year fixed effects (column 1) and country and firm fixed effects (column 2). Exchange rate movements have the expected effects on firm exports to country c: an appreciation of the euro currency is associated with a decrease in firm exports. However, the interaction of wholesaler type and the real exchange rate is positive and significant in both columns; firm exports fall less (3.7-8.4 percent) for intermediaries than for manufacturers when the Italian currency appreciates.

Looking at columns 3-6 we observe that, for both manufacturing and wholesale firms, the fall in exports in response to an appreciation of the domestic currency is driven both by a decrease in the number of products exported and by a decline in the firm's average exports per country. However, for wholesalers, the adjustment on the extensive margin of the number of products is greater, while the response of average exports is more muted. These results would appear to confirm that wholesale exporters face lower fixed costs and are thus able to adjust more easily along the extensive margin than direct exporters.

We next explore the sensitivity of the firm's response within a country-product pair to annual exchange rate movements by considering export value, quality and unit value. The estimation equation is

$$\Delta \ln Y_{fpct} = c_1 + \delta D_{ft}^W + \beta_1 \Delta \ln RER_{ct} + \gamma \Delta \ln RER_{ct} * D_{ft}^W + d_j + \varepsilon_{fpct} \tag{12}$$

where $\ln Y_{fpct}$ is the log of firm-level product-country export value, quantity or unit value. Columns 1, 3 and 5 of Table 11 report results with country, product and year fixed effects, while in columns 2, 4 and 6 replace product dummies with firm-product fixed effects. As before, exports fall as the Italian currency appreciates but the effect for wholesalers is 15-30 percent smaller. For direct exporters the adjustment to a stronger home currency is primarily due to reductions in export

[27] Details on the exchange rate variables are available in the Appendix.

quantities (90 percent) rather than in unit value (10 percent). For wholesalers, the overall adjustment is smaller due to a much smaller quantity response. Wholesalers drop their unit values more as the currency rises, pass-through is lower, and quantities fall less.

The literature on intermediaries in trade largely has focused on the underlying choice of firms to export directly or indirectly and in particular on the role of fixed export costs. This section has shown that these choices give rise to different responses to common external shocks to profitability. Wholesalers are less responsive to exchange rate changes precisely because they are better able to adjust along the extensive margin.

6.1 Aggregate Exports

The firm-level results presented above suggest that the endogenous choice of direct or indirect exporting by producing firms should matter for the response of aggregate, country-level export volumes to exogenous shocks such as changes in the exchange rate. Destinations with high wholesale export shares should show smaller responses of exports in response to exchange rate changes than countries with low wholesale export shares.

In Table 12 we consider a simple specification of the form

$$\Delta \ln Y_{ct} = c_1 + \delta D_c^W + \beta_1 \Delta \ln RER_{ct} + \gamma \Delta \ln RER_{ct} * D_c^W + d_j + \varepsilon_{ct} \tag{13}$$

where $\ln Y_{ct}$ is the log of country exports and D_c^W is a dummy that equals one if the country-level share of wholesale exports is greater than the median (mean), and the exchange rate is defined as before. Columns 1 and 3 report results with year fixed effects, while columns 2 and 4 include both year and country fixed effects.

In every case, the results strongly confirm the importance of the mode of export in shaping the aggregate responses to changes in the real exchange rate. The exchange rate export elasticity for countries with low wholesale shares is negative and significant, ranging from -0.232 to -0.499 across the specifications. In contrast, countries with wholesale export shares above the mean or median have elasticities that are insignificantly different from zero.

7 Conclusions

The present paper examines the role of intermediaries in exporting, the factors that lead firms to export indirectly, and the consequences of intermediary exporters on trade value and the margins of adjustment to external shocks. Using Italian firm-level trade data, we investigate the importance of wholesalers in exports across destinations and products and examine how they differ from manufacturing firms that export directly. Intermediary exporters are smaller, ship more products and reach fewer countries than direct exporters.

We confirm the findings of previous research that wholesalers are more likely to export to countries with high fixed export costs and to smaller markets. However, exporting by wholesalers is also more common in destinations with weak contracting environments and in products that are more homogeneous, have higher sunk entry costs and have lower relationship specificity. The ability of intermediaries to effectively lower destination and product fixed costs means that they are to churn their product mix more often and adjust along the extensive margin.

The differences in fixed costs across destinations and products have important implications for firm-level and aggregate responses to exogenous changes in profitability such as exchange rates. Wholesalers are more likely to adjust their product mix in response to an exchange rate change and their total exports adjust less. Given the big difference in the share of intermediated exports across countries and products, these firm-level results suggest that there are potentially large differences in how aggregate exports will respond to changes in the value of the domestic currency that are linked to the type of the exporting firm. We find significantly lower responses of aggregate exports to changes in the exchange rate for destinations served primarily by wholesale exporters.

Table 1: Exports and Number of exporting firms: share by type of firms, 2000-2007

Year	Total Exports (billion)	Manuf	Whol	Retail	Others
			Share (%)		
2000	246.79	85.09	9.85	0.74	4.32
2001	258.99	86.49	9.88	0.86	2.76
2002	260.75	84.75	10.93	0.83	3.49
2003	254.91	85.52	10.71	0.86	2.91
2004	274.38	85.65	10.5	0.82	3.91
2005	286.56	85.5	10.75	0.85	4.91
2006	319.01	84.95	11.32	0.85	5.91
2007	350.57	85	11.27	0.84	6.91
Year	Exporters (N. of firms)	Manuf	Whol	Retail	Others
			Share (%)		
2000	137347	57.3	26.43	7.67	8.6
2001	141520	56.46	27.01	7.95	8.58
2002	145473	55.64	27.06	8.14	9.16
2003	143421	55.57	27.41	7.72	9.3
2004	139598	55.34	27.61	7.46	10.3
2005	133473	54.96	27.48	7.3	11.3
2006	139360	53.7	28.07	7.31	12.3
2007	128472	54.77	27.91	6.88	13.3

Note: Table reports the share of exports and the share of exporters by type of firms (Manufacturers, Wholesalers, Retailers and Others).

Table 2: Descriptive statistics of Wholesale export share at Country, Product and Country-product level, 2003

		Obs	Zeros	Ones	Mean	Median
Country	All sample	228	8	0	.166	.133
	Intra-EU	14	0	0	.118	.109
	Extra-EU	214	8	0	.170	.137
Product	All Sample	5125	226	95	.211	.098
	Intra-EU	5009	579	156	.204	.056
	Extra-EU	5011	332	129	.220	.116
Country-Prod	All Sample	244614	118891	25506	.208	.001
	Intra-EU	51274	17717	3559	.187	.014
	Extra-EU	193340	101174	21907	.213	0

Table 3: Export premia, 2003

	ln Sales$_f$	ln Employment$_f$	ln Sales/Empl.$_f$	ln Exports$_f$	ln Exports/Empl.$_f$
	(1)	(2)	(3)	(4)	(5)
D_f^W	-0.111***	-0.533***	0.433***	-1.047***	-0.025
	(0.004)	(0.002)	(0.003)	(0.016)	(0.015)
D_f^X	2.775***	1.533***	1.229***		
	(0.007)	(0.005)	(0.004)		
$D_f^W \cdot D_f^X$	-0.081***	-0.489***	0.388***		
	(0.012)	(0.008)	(0.008)		
R-squared	0.22	0.29	0.14	0.03	0.001
Observations	985719	1022424	985710	118994	118994

Notes: Table reports OLS regression of noted characteristic on dummy for wholesaler (D_f^W), dummy for exporter (D_f^X), and their interaction ($D_f^W \cdot D_f^X$). Robust standard errors are reported below coefficients. Asterisks denote significance levels (***: p <1%; **: p<% 5%; *: p<10%). Data are for 2003.

Table 4: Export premia: Number of Countries and Number of Products, 2003

	Products_f	Products_f	Products_f	Countries_f	Countries_f	Countries_f
D_f^W	-1.269***	3.005***	1.668***	-4.562***	-0.158***	-1.630***
	(0.093)	(0.118)	(0.088)	(0.058)	(0.053)	(0.043)
ln Employment_f		4.180***			4.307***	
		(0.070)			(0.036)	
ln Exports_f			2.805***			2.801***
			(0.027)			(0.015)
R-squared	0.001	0.13	0.25	0.03	0.27	0.45
Observations	118994	118994	118994	118994	118994	118994

Notes: Table reports OLS estimates of the number of HS6 products exported (Products_f) and the number of destination countries (Countries_f) on a dummy for wholesaler (D_f^W). The regression sample is exporting firms. Robust standard errors are reported below coefficients. Asterisks denote significance levels (***: p< 1%;**: p<5%; *: p<% 10%). Data are for 2003.

Table 5: Firm's exports, quantity and unit value by product and country by different type of firms, 2003 - Extra-EU

	ln Exports_{fcp}	ln Exports_{fcp}	ln Quantity_{fcp}	ln Quantity_{fcp}	ln UnitValue_{fcp}	ln UnitValue_{fcp}
	(1)	(2)	(3)	(4)	(5)	(6)
D_f^W	-0.307***	-0.113***	-0.314***	-0.115***	0.007	0.002
	(0.011)	(0.010)	(0.015)	(0.015)	(0.010)	(0.010)
ln Sales_f		0.196***		0.201***		-0.005
		(0.003)		(0.005)		(0.004)
Country-Product FE	Yes	Yes	Yes	Yes	Yes	Yes
Clustering	Firm	Firm	Firm	Firm	Firm	Firm
Adj R-squared	0.15	0.19	0.42	0.44	0.63	0.63
Observations	1190313	1190313	1190313	1190313	1190313	1190313
Countries	184	184	184	184	184	184
HS6 Products	4042	4042	4042	4042	4042	4042
Firms	105649	105649	105649	105649	105649	105649

Note: Table reports results of regressions at the firm product country level, using data on exports, quantity and unit value for 2003 and Extra-EU destinations only. D_f^W is a dummy for wholesaler; Sales is firm's total sales. Only product-country pair in which both wholesalers and manufacturers are both active are included. Robust standard errors clustered at firm level are reported in parenthesis below the coefficients. Asterisks denote significance levels (***: p<1%; **: p<5%; *: p<10%).

Table 6: Product dropping each year (2000&2003) by different type of firms, Extra-EU.

	Drop_{fpt} (1)	Drop_{fpt} (2)	Drop_{fpt} (3)	Drop_{fpt} (4)
D^W_{ft}	0.069***	0.043***	0.017***	0.021***
	(0.001)	(0.001)	(0.001)	(0.001)
ln Sales_{ft}		-0.034***	-0.010***	-0.004***
		(0.000)	(0.000)	(0.000)
Deviation_{fpt}			-0.099***	-0.099***
			(0.000)	(0.000)
ln Products_{ft}				-0.013***
				(0.001)
Year FE	Yes	Yes	Yes	Yes
Product FE	Yes	Yes	Yes	Yes
Clustering	Firm-Product	Firm-Product	Firm-Product	Firm-Product
Adj R-squared	0.06	0.07	0.19	0.19
Observations	1221737	1221737	1221737	1221737
HS6 Products	5259	5259	5259	5259
Firms	110452	110452	110452	110452

Note: Table reports OLS regression results of a dummy variable indicating a firm-product drop between t and $t+1$. D^W_{ft} is a dummy for wholesaler; Sales_{ft} is firm's total sales; Deviation_{fpt} is (log of) firm's exports in product p minus (log of) average exports in product p; and Products_{ft} is the number of products exported by each firm. All variables are computed at time t. The regression sample is surviving exporting firms. Robust standard errors in parentheses are adjusted for clustering by firm-product. Asterisks denote significance levels (***: p<1%; **: p<5%; *: p<10%).

Table 7: Adding regression (2000&2003) by different type of firms, Extra-EU

	All firms Add_{ft} (1)	SPF Add_{ft} (2)	MPF Add_{ft} (3)	All firms Add_{ft} (4)	SPF Add_{ft} (5)	MPF Add_{ft} (6)	All firms Add_{ft} (7)	MPF Add_{ft} (8)
D^W_{ft}	0.026***	0.072***	0.010**	0.031***	0.071***	0.017***	0.036***	0.022***
	(0.005)	(0.008)	(0.004)	(0.006)	(0.009)	(0.005)	(0.006)	(0.004)
ln Sales_{ft}				0.023***	0.009***	0.026***	0.013***	0.012***
				(0.002)	(0.003)	(0.002)	(0.002)	(0.002)
ln Products_{ft}							0.057***	0.085***
							(0.006)	(0.005)
Year FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-Mix FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustering Industry-Mix	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Adj R-squared	0.006	0.110	0.002	0.013	0.111	0.003	0.021	0.003
Observations	167081	31175	135906	167081	31175	135906	167081	135906
Firms	110452	28304	90041	110452	28304	90041	110452	90041
Industry-mix	32383	88	32382	32383	88	32382	32383	32382

Note: Table reports OLS regression results of a dummy variable indicating a firm adding a product between t and $t+1$. D^W_{ft} is a dummy for wholesaler; Sales_{ft} is firm's total sales; and Products_{ft} is the number of products exported by each firm. SPF and MPF are, respectively, single and multi product firms. All variables are computed at time t. The regression sample is surviving exporting firms. Industry-mix FE allows to control for firms with the same mix of industries at the HS2 level. Robust standard errors in parentheses are adjusted for clustering by industry-mix. Asterisks denote significance levels (***: p<1%; **: p<5%; *: p<10%).

Table 8: Logistic Regression, 2003 - Extra-EU

	Ordered Probit	Multinomial Logit	
		Category (1) vs Category (2)	Category (1) vs Category (3)
ln GDP_c	0.061***	0.162***	-0.169***
	(0.003)	(0.004)	(0.006)
ln $Distance_c$	-0.332***	-0.474***	-0.152***
	(0.005)	(0.006)	(0.011)
Market $Costs_c$	0.147***	0.069***	0.212***
	(0.011)	(0.012)	(0.019)
Governance $Indicator_c$	-0.032***	-0.100***	-0.250***
	(0.008)	(0.009)	(0.017)
$Tariff_{cp}$	0.047**	0.027	0.093***
	(0.019)	(0.024)	(0.031)
$\min(entry,exit)_p$	-0.465***	-0.420***	-0.652***
	(0.033)	(0.036)	(0.070)
Coefficient of $Variation_p$	0.04***	0.077***	-0.035***
	(0.002)	(0.002)	(0.006)
Relation $Specificity_p$	0.349***	0.876***	-0.649***
	(0.045)	(0.051)	(0.074)
Observations	134322	134322	
Observations Category 1	65775	65775	
Observations Category 2	58556	58556	
Observations Category 3	9991	9991	
Test for prop. odd model (Prob $> \chi^2$)	0.000		

Note: Table reports ordered probit and multinomial logit regression of different categories of product-country combinations. Category (1) product-country in which only manufacture exports; Category (2) product-country in which both manufacture and wholesale export; Category (3) product-country in which only wholesale exports. Categories (1), (2) and (3) contains respectively, 4957, 4467 and 4624 products. Standard errors are reported in parenthesis below the coefficients. Asterisks denote significance levels (***: p<1%; **: p<5%; *: p<10%). Data are for 2003. Results of the ordered probit suggests that the proportional odds approach is not appropriate since the χ^2 test is statistically significant.

Table 9: Total exports by country-product, 2003 -Extra-EU

	$\ln X_{cp}^i$	$\ln X_{cp}^i$	$\ln X_{cp}^i$
	(1)	(2)	(3)
D^W	3.208***	-0.869***	4.432***
	(0.847)	(0.141)	(0.900)
ln GDP_c	0.487***		0.370***
	(0.102)		(0.073)
$*D^W$	-0.189***		-0.194***
	(0.039)		(0.039)
ln Distance_c	-0.503***		-0.276***
	(0.120)		(0.086)
$*D^W$	-0.012		0.003
	(0.060)		(0.060)
Market Costs_c	-0.117		-0.100
	(0.105)		(0.085)
$*D^W$	0.111*		0.103*
	(0.072)		(0.060)
$\text{Governance Indicator}_c$	0.264***		0.134**
	(0.099)		(0.070)
$*D^W$	-0.181***		-0.189***
	(0.063)		(0.063)
Tariff_{cp}			-0.165**
			(0.068)
$*D^W$			0.058
			(0.043)
$\min(\text{entry,exit})_p$		-0.710***	-0.660***
		(0.155)	(0.171)
$*D^W$		-0.305**	-0.309**
		(0.119)	(0.128)
$\text{Coefficient of Variation}_p$		0.101***	0.103***
		(0.013)	(0.014)
$*D^W$		-0.028***	-0.040***
		(0.008)	(0.009)
$\text{Relation Specificity}_p$		1.212***	1.223***
		(0.226)	(0.275)
$*D^W$		-0.798***	-0.929***
		(0.140)	(0.186)
Country FE	No	Yes	No
Product FE	Yes	No	No
Clustering	Country	HS6 Product	Country-Product
Adj R-squared	0.44	0.25	0.24
Observations	117112	117112	117112
Countries	142	142	142
HS6 Products	3623	3623	3623

Note: Table reports OLS regression of logarithm of aggregate exports by type for Extra-EU. D^W is a dummy for wholesale and $*D^W$ is the interacted dummy. Robust standard errors clustered at different levels are reported in parenthesis below the coefficients. Asterisks denote significance levels (***: p<1%; **: p<5%; *: p<10%). Data are for 2003.

Table 10: Exchange rates and firm-country exports (1 and 2), number of products (3 and 4), average exports (5 and 6) over time, by different type of firms, Extra-EU

	Annual Differences					
	ln X_{fct}	ln X_{fct}	ln $Prod_{fct}$	ln $Prod_{fct}$	ln Avg X_{fct}	ln Avg X_{fct}
	(1)	(2)	(3)	(4)	(5)	(6)
D_{ft}^W	-0.015***		-0.001		-0.014***	
	(0.004)		(0.002)		(0.003)	
ln Real Ex $Rate_{ct}$	-0.519***	-0.461***	-0.186***	-0.086**	-0.333***	-0.375***
	(0.150)	(0.121)	(0.047)	(0.037)	(0.107)	(0.089)
$*D_{ft}^W$	0.042*	0.017*	-0.046**	-0.046*	0.087**	0.064*
	(0.026)	(0.011)	(0.023)	(0.028)	(0.039)	(0.038)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Year FE	Yes	No	Yes	No	Yes	No
Firm FE	No	Yes	No	Yes	No	Yes
Clustering	Country-Year	Country-Year	Country-Year	Country-Year	Country-Year	Country-Year
Adj R-squared	0.004	0.005	0.004	0.001	0.003	0.001
Observations	2483679	2483679	2483679	2483679	2483679	2483679
Countries	149	149	149	149	149	149
Firms	137262	137262	137262	137262	137262	137262

Note: Table reports results of regressions at the firm country level, using data on exports, number of products and average exports between 2000 and 2007. The dependent and independent variables are defined as annual differences. D_{ft}^W is a dummy for wholesaler and $*D_{ft}^W$ is the interacted dummy. Robust standard errors clustered at country-year level are reported in parenthesis below the coefficients. Asterisks denote significance levels (***: p<1%; **: p<5%; *: p<10%).

Table 11: Exchange rates and firm's exports, quantity and unit value by product and country over time, by different type of firms, Extra-EU

	Annual Differences					
	ln X_{fcpt}	ln X_{fcpt}	ln Quantity$_{fcpt}$	ln Quantity$_{fcpt}$	ln UnitValue$_{fcpt}$	ln UnitValue$_{fcpt}$
	(1)	(2)	(3)	(4)	(5)	(6)
D^W_{ft}	-0.020***		-0.018***		-0.002***	
	(0.003)		(0.004)		(0.001)	
ln Real Ex Rate$_{ct}$	-0.321***	-0.385***	-0.287***	-0.353***	-0.035***	-0.032***
	(0.095)	(0.113)	(0.100)	(0.117)	(0.011)	(0.011)
$*D^W_{ft}$	0.072*	0.065*	0.092**	0.090**	-0.020*	-0.025*
	(0.039)	(0.041)	(0.041)	(0.042)	(0.012)	(0.014)
Country FE	Yes	Yes	Yes	Yes	Yes	Yes
Product FE	Yes	No	Yes	No	Yes	NO
Year FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm-Product FE	No	Yes	No	Yes	No	Yes
Clustering	Country-Year	Country-Year	Country-Year	Country-Year	Country-Year	Country-Year
Adj R-squared	0.004	0.004	0.004	0.001	0.004	0.001
Observations	4008339	4008339	4008339	4008339	4008339	4008339
Countries	150	150	150	150	150	150
Firms	119201	119201	119201	119201	119201	119201
HS6 Products	5201	5201	5201	5201	5201	5201

Note: Table reports results of regressions at the firm product country level, using data on exports, quantity and unit value between 2000 and 2007. The dependent and independent variables are defined as annual differences. D^W_{ft} is a dummy for wholesaler and $*D^W_{ft}$ is the interacted dummy. Robust standard errors clustered at country-year level are reported in parenthesis below the coefficients. Asterisks denote significance levels (***: p<1%; **: p<5%; *: p<10%).

Table 12: Exchange rates and country exports, Extra-EU

Annual Differences				
(Above)	ln X_{ct} Median (1)	ln X_{ct} Median (2)	ln X_{ct} Mean (3)	ln X_{ct} Mean (4)
D_c^W	0.0215		-0.004	
	(0.029)		(0.032)	
ln Real Exchange $Rate_{ct}$	-0.269**	-0.499***	-0.232**	-0.460***
	(0.145)	(0.162)	(0.115)	(0.145)
$*D_c^W$	0.253*	0.511***	0.224**	0.497***
	(0.150)	(0.164)	(0.117)	(0.147)
Year FE	Yes	Yes	Yes	Yes
Country FE	No	Yes	No	Yes
Observations	1489	1489	1489	1489
Adj R-squared	0.021	-0.057	0.020	-0.06
R-squared	0.028	0.062	0.028	0.063
Countries	160	160	160	160

Note: Table reports results of regressions at the country-year level, using data on exports between 2000 and 2010. The dependent and independent variables are defined as annual differences. D_c^W is a dummy that takes value 1 if the intermediary export share to country c is above the median (mean) value of intermediary export share across countries $*D_c^W$ is the interacted dummy. Robust standard errors are reported in parenthesis below the coefficients. Asterisks denote significance levels (***: p<1%; **: p<5%; *: p< 10%).

Appendix

Firm trade data

ISTAT collects data on export transactions, which are the basic unit of observation for trade flows. It is then possible to link transactions to firms using the value added tax identification code (*partita IVA*) of the firm which is also recorded in the transaction.[28] There are different requirements in order for a transaction to be recorded. These requirements depend on the destination, Intra or Extra-EU, and on the value of the transactions. The European Union sets a common framework but leaves some flexibility to member states.

As far as Extra-EU transactions are concerned there is a good deal of homogeneity among member states as well as over time. Since the adoption of the euro as a common currency, Italy set the threshold at 620 euro (or 1,000 Kg), so that all transactions bigger than 620 euro (or 1,000 Kg) are recorded. All these records of Extra-EU transactions report complete information, that is, also information about the product. From 2007 onward the threshold is at 1,000 euro (or 1,000 Kg).

Most of the existing differences are due to varying Intra-EU requirements. In 2003 there were two reporting thresholds: 200,000 euros[29] and 40,000 euros. Firms with more than 200,000 euros of exports (based on the previous year) have to fill in the Intrastat document monthly. They report complete information including details about products. Firms with exports between 40,000 and 200,000 euros have to fill in the Intrastat form on a quarterly basis. The value of exports is recorded but *not* information on products. Below 40,000 euros per year the transactions are not recorded.

Country and product data

In Section 3.2 we complement the firm-level trade data with country characteristics including proxies for market size and variable and fixed trade costs.

To proxy transportation costs we use data on geographic distance taken from CEPII. Distances are calculated following the great circle formula, which uses latitudes and longitudes of the most important city (in terms of population) or of the official capital, if different.

As a proxy for policy barriers we use a measure of country-level import tariffs. Tariff data are taken from World Integrated Trade System (WITS), a project jointly developed by the World Bank and UNCTAD. WITS contains the TRAINS database on bilateral tariffs at the six-digit level of the Harmonized System (HS) product classification for about 5,000 products and 200 countries.

To generate a proxy for the market-specific fixed costs of exporting to a country, we use information from the World Bank Doing Business database (DB). The World Bank compiles procedural requirements for importing a standardized container of goods by ocean transport. All

[28] The value-added tax identification number also allows the linking of export data to various Censuses conducted by ISTAT.

[29] In 2007 this threshold was raised to 250,000.

documents needed by the exporters and importers in each country to trade goods across the border are recorded, along with the time and cost necessary for completing the transaction (for details, see Djankov et al.; 2011). For the purpose of the analysis three variables are used: *number of documents for importing* includes all documents required per shipment to import the goods from a given destination; *cost of importing* measures the fees levied on a 20-foot container in US dollars; *time to import* reflects the number of days needed to import a standard container of goods from a factory in the largest business city to a ship in the most accessible port. Data are available from 2004 to 2010. Given the low variability of these indicators, we take the average value over the available years.

To compute the real exchange rate used in Section 6 we use data from the International Financial Statistics dataset (IMF, 2010). The official exchange rate available at IMF refers to the exchange rate determined by national authorities or to the rate determined in the legally sanctioned exchange market. It is calculated as an annual average based on monthly averages. Consumer price index reflects changes in the cost of a basket of goods and services that may be fixed or changed at specified intervals. The Laspeyres formula is generally used to compute such price index.

In addition to country characteristics, product and industry characteristics are also taken into account. The first variable that we consider is a measure of industry contract intensity developed by Nunn (2007) to measure the importance of relationship-specific investment in intermediate inputs across industries. Nunn's data are classified according to the industry classification of the US I-O table compiled by the Bureau of Economic Activity. To match each I-O industry to an HS6 product, first we use information from Lawson et al. (2002) to construct a concordance between I-O industry classification and NAICS1997 code. Then the data are converted from NAICS1997 to NAICS2002. Finally, we exploit the concordance between Harmonize System Codes and NAICS Industries developed by Pierce and Schott (2009) to obtain the information on contract intensity at the level of HS6 product.

Principal Components

Tables A1 and A2 report the principal component analysis (PCA) on standardized variables for *Market Costs* and *Governance*, respectively.

Because principal component is intended to study correlation patterns, it is first necessary to standardize the variables of interest so that they all have the same variance. Without standardizing, indeed, the principal component method would favor the variables with larger variances at the expenses of those with smaller values.

The panel in the middle of Tables A1 and A2 shows the total variance accounted by each factor. The Kaiser criterion suggests to retain those factors with variance equal or higher than 1. In both cases there is only one factor that satisfies this criterion and this factor explain the

77 percent and the 86 percent of the sum of all observed variances. The lower panel of the two tables reports the factor loadings which are the parameters of the linear function that relates the observed variables and the factor. The higher the load the more relevant the variable in defining the factor's dimensionality. According to Table A1, the loadings on Factor1 are relatively large for all the variables. The same holds when looking at Table A2. Finally, uniqueness is the variance that is "unique" to the variable and not shared with others. Again all variables, in both tables, have a low percentage of variance not accounted by other variables.

Table A1: PCA for Market Costs

Number of Obs.	180	
Retained Factors	1	
Number of Parameters	3	
	Variance	Proportion
Factor1	2.30	0.77
Factor2	0.51	0.17
Factor3	0.18	0.06

Standardized Variables	Factor1 Loadings	Uniqueness
Number of documents for importing	0.81	0.34
Cost of importing	0.87	0.23
Time to import	0.93	0.12

Table A2: PCA for Governance Indicator

Number of Obs.	193	
Retained Factors	1	
Number of Parameters	6	
	Variance	Proportion
Factor1	5.16	0.86
Factor2	0.4	0.07
Factor3	0.28	0.05
Factor4	0.09	0.01
Factor5	0.05	0.01
Factor6	0.03	0.01
Standardized Variables	Factor1 Loadings	Uniqueness
Voice & Accountability	0.86	0.25
Political Stability	0.85	0.27
Government Effectiveness	0.96	0.09
Regulatory Quality	0.95	0.1
Rule of low	0.98	0.05
Control of Corruption	0.96	0.09

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