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Intermediaries in International Trade: direct versus indirect modes of export*

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Abstract

This paper contributes to the relatively new literature on the role of intermediaries in international trade. Using Italian firm-level data, we document significant differences between exporters of different types and highlight the role of country-specific fixed cost in the choice of direct versus indirect modes of export. Recent theoretical work suggests that intermediaries are typically providing solutions to country-specific fixed costs. Our empirical results largely confirm this relationship. Measures of country fixed costs are positively associated with intermediary exports both in the aggregate and within firms. In contrast, proxies for variable trade costs are largely not correlated with differences between direct and indirect exports.

*The statistical exercises which follow would not have been possible without the valuable help of the Italian Statistical Office (ISTAT) and in particular of Roberto Monducci.

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1 Introduction

The growing availability of firm-level data has contributed to the blooming of both theoretical and empirical literatures that highlight firm heterogeneity as important for the understanding of international trade. 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 firm characteristics, most notably productivity, and the firm participation in international trade. As a result a great deal of effort has been devoted to the investigation and understanding of differences between exporting and non-exporting firms. It was only recently, however, that attention shifted to the differences existing among trading firms and to the nature of their activities (Bernard et al.; 2010b; Ahn et al.; 2010; Antràs and Costinot; 2010). These papers point out that there exist both manufacturers that organize the production and distribution of their goods abroad as well as intermediaries that specialize in distribution.

The present paper examines the extent to which intermediaries contribute to Italian exports. We investigate the role of intermediaries in exports and examine how they differ from manufacturing firms. In particular, we highlight the characteristics of the destination market that are associated with a greater export role for intermediaries. We combine data on cross-border transactions from Italian custom records with comprehensive information at the firm level, including employment, turnover and industry classification. Firms are assigned to 5-digit industries according to the main activity they report in the Census of Business. Around one quarter of all exporters are intermediaries and they account for more than ten percent of Italian exports. Intermediary exporters are smaller than manufacturing exporters in terms of employment, sales and especially exports but they display higher sales per employee and comparable exports per employee. They also have higher industry diversification relative to manufacturing exporters, but are less geographically diversified.

The mere 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 investigate the market characteristics that are associated with the presence of intermediaries. The volume of exports of intermediaries is less affected by geographic distance than that of manufacturers. Similarly, intermediaries' exports are also less affected by fixed costs such as market entry costs and quality of governance in the country. Thus it would appear that the specific 'technology' available to intermediaries enables them to better cope with higher, country-specific, fixed costs.

In the following we discuss existing theories and empirical work on exporting intermediaries in Section 2. In Section 3, we describe the firm and country level data. We then document differences between manufacturers and intermediaries and their exporting behavior in Section 4, and in Section 5, we investigate the impact of a set of country variables on the volume of exports for the two types of firms. Section 6 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), model 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.; 2010; Akerman; 2010; Felbermayr and Jung; 2009).

New models of trade, in particular Akerman (2010) and Ahn et al. (2010), 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, now 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 average fixed cost per good exported by pooling the country or industry-specific fixed costs of exporting across more than one good. This choice means that a number of manufacturing firms may export indirectly through a wholesaler, rather than managing their own distribution networks, by paying 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 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

[1] Blum et al. (2008) 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.

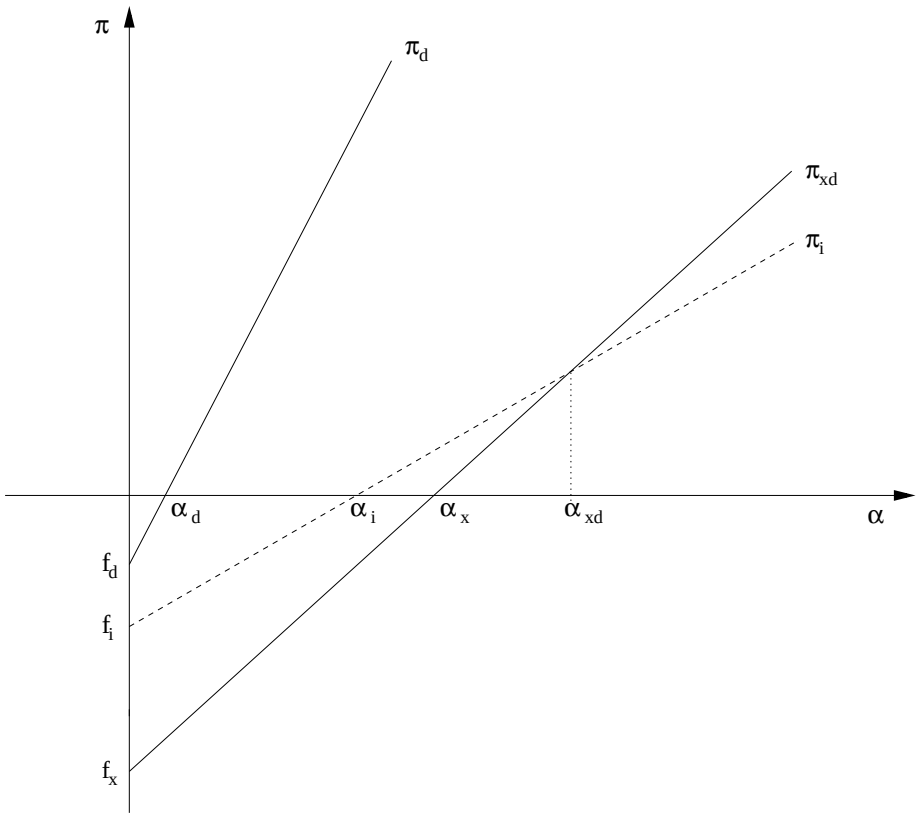

Figure 1: Profits from domestic sales, indirect and direct exports

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 linear function of productivity (α) as more productive firms are able to charge a 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 export 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

[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.

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 affect 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 indirect 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.

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

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

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.

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 indirect exporters such as tariffs or transportation costs, can increase, decrease or leave unchanged the share of exports handled by intermediaries. In our empirical work we examine the role of variable trade costs including distance and tariffs in determining the share of exports handled by intermediaries.

2.1 Related empirical literature

Recent papers by Ahn et al. (2010), Akerman (2010) and Bernard et al. (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 et al. (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 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

[4]Specifically, Ahn et al. (2010) 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 et al. (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.

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

costs and fall with destination GDP.

In contrast with the other studies, Ahn et al. (2010) find much higher exports per firm for intermediaries than direct exporters as well as many more destinations and products and products per destination. 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.

3 Data

3.1 Firm level data

Our analysis of direct vs 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 1998-2003. COE includes the annual value of export transactions of the firm disaggregated by destination countries.[7] The data also record the number of 4-digit industries that the firm has exported although the value of exports by industry are not available.[8] The limitation of the export data, specifically the lack of product-by-country exports at the firm level means that our analysis is limited to an examination of the variation of exports across countries, both across and within firms.

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.[9] ASIA also contains information on firms' operations including the number of employees and total turnover. The combined dataset used for the analysis is not a sample but rather includes all active 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]The total value of the firm-country transaction, recorded in euros, is broken down into five broad categories of goods, Main Industrial Groupings, identified by EUROSTAT as energy, intermediate, capital, consumer durables and consumer non-durables which based on the Nace Rev. 2 classification, are defined by the Commission regulation (EC) n.656/2007 of 14 June 2007. None of our results are sensitive to using these aggregate sector classifications.

[8]The 4-digit industries are classified according to the *Classificazione dei Prodotti per Attivita' Economica* (CPATECO), which is the statistical classification of products by activity. The CPATECO corresponds up to the fourth digit to the *Classificazione delle Attivita' Economiche* (ATECO), which is the Italian classification for economic activities that corresponds, to a large extent, to the Eurostat NACE 1.1 taxonomy.

[9]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.

3.2 Country-level data

We complement the firm-level trade data with 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 related to the cost of moving goods across borders, such as transportation costs. Following the large gravity literature we proxy transportation costs with geographic distance calculated using the great circle formula (Mayer and Zignago; 2005). As a proxy for policy barriers we use a measure of country-level import tariffs calculated as the HS6 product-country import tariffs weighted by aggregate Italian exports at the HS6 product level. Tariff data are taken from World Integrated Trade System (WITS), and the data on Italian exports at the HS6 level are from the National Statistical Office (www.coeweb.istat.it).[11]

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.; 2009), firms incur market-specific 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.; 2006). Given the high level of correlation between these variables, in our multivariate regression analysis, 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 et al. (2010a) and use the primary factor obtained from principal component analysis,*Governance Indicator*, as our proxy for country governance quality.[12]

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

[11] WITS contains the TRAINS database on bilateral tariffs at the six-digit level of the Harmonized System (HS) product classification for about 5000 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 our empirical analysis. The AHS tariff is the MFN Applied tariff, unless a preferential tariff exists.

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

3.3 Constructed country variables

Product and industry characteristics are expected to play a significant role in determining the share of trade exported by intermediaries. Due to data limitations our analysis considers only cross-country variation in intermediary export shares. To examine the role of product and industry characteristics we aggregate several product-level measures to the country level. The first variable is a measure of industry contract intensity developed by Nunn (2007) to measure the importance of relationship-specific investment in intermediate inputs across industries. We concord Nunn's original data, corresponding to US I-O industries, to NAICS 2002.[13] These product-level measures of relationship specificity are then weighted by the share of Italian exports in the HS6 product-country to create a country-level measure of relationship-specificity.

We also construct a country-level measure of the elasticity of substitution between varieties of imported goods. The demand elasticities are estimated by Broda et al. (2006) and reported using the first three digits of the Harmonized System codes. We then compute the country-level *export elasticity* that is a weighted average of the demand elasticities for each HS3 product. The weights are given by the share of Italian exports in the HS3 product-country. The greater the export elasticity for a given destination the more likely that the exports are homogeneous rather than differentiated.

The third product characteristic is timeliness. We proxy the timeliness of a product by the share of value of that product that is exported by air. This information is provided by ISTAT-COEWEB for 10 broad product categories (NST classification). We convert the NST data to the HS product classification and construct a country-level timeliness index using the shares of Italian exports in the HS6 product-country as weights.

These constructed variables suffer from the likely endogeneity of product-country export shares and we recognize that a complete analysis of the role of product characteristics in direct versus indirect export modes would require firm-product-country level exports.

4 Manufacturers and Intermediaries

The focus of the present work is to investigate the role of intermediaries in exports. In this section we document the extent of Italian intermediary 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 the remaining sectors.

A preponderance of exports, more than 84 percent of the volume, is performed directly by manufacturing firms. Manufacturing exporters also represent more than 50 percent of exporting firms. However, an increasing share of exports are conducted by the 27 percent of exporters that are wholesalers, rising

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

from 9.4 percent in 1998 to 11 percent of Italian exports in 2003. These figures are in line with those reported for the US in Bernard et al. (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 we focus on the role of wholesalers as export intermediaries and will use the two terms interchangeably. Second, we observe that wholesalers are, relative to manufacturers, of smaller size. Imposing a 20 employee threshold on the database dramatically reduces the share of wholesalers' exports from 11.02 percent to 4.67 percent in 2003.

While intermediaries account for just 11 percent of Italian exports in 2003, there is substantial variation across countries. Intermediary export shares range from a low of 3 percent for Malaysia to a high of 41 percent for Cameroon and Sri Lanka. 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 wholesaler export shares of 23 percent. Across destinations, intermediary export shares average 17 percent, suggesting that wholesalers are relatively more important in smaller markets.

4.1 Firm characteristics

In their work on US traders, Bernard et al. (2010b) find not only that traders differ from domestic firms, but also that substantial heterogeneity exists between trading firms of different "types". Our results complement and extend that analysis by comparing manufacturers and wholesalers along a number of dimensions: employment, total sales, export volume, the number of destination countries and the number of industries exported.

The top left panel of Figure 2 shows the distribution of employment for all wholesale and manufacturing firms. The employment distribution for wholesalers clearly 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.[14] In the bottom panels of Figure 2, we show the size distributions for wholesale and manufacturing exporters. The relative ranking of the two distributions is similar to that seen above although the distributions are shifted to the right as exporters of both types are larger than purely domestic firms.

The figures are consistent with the idea that manufacturing firms are likely 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

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

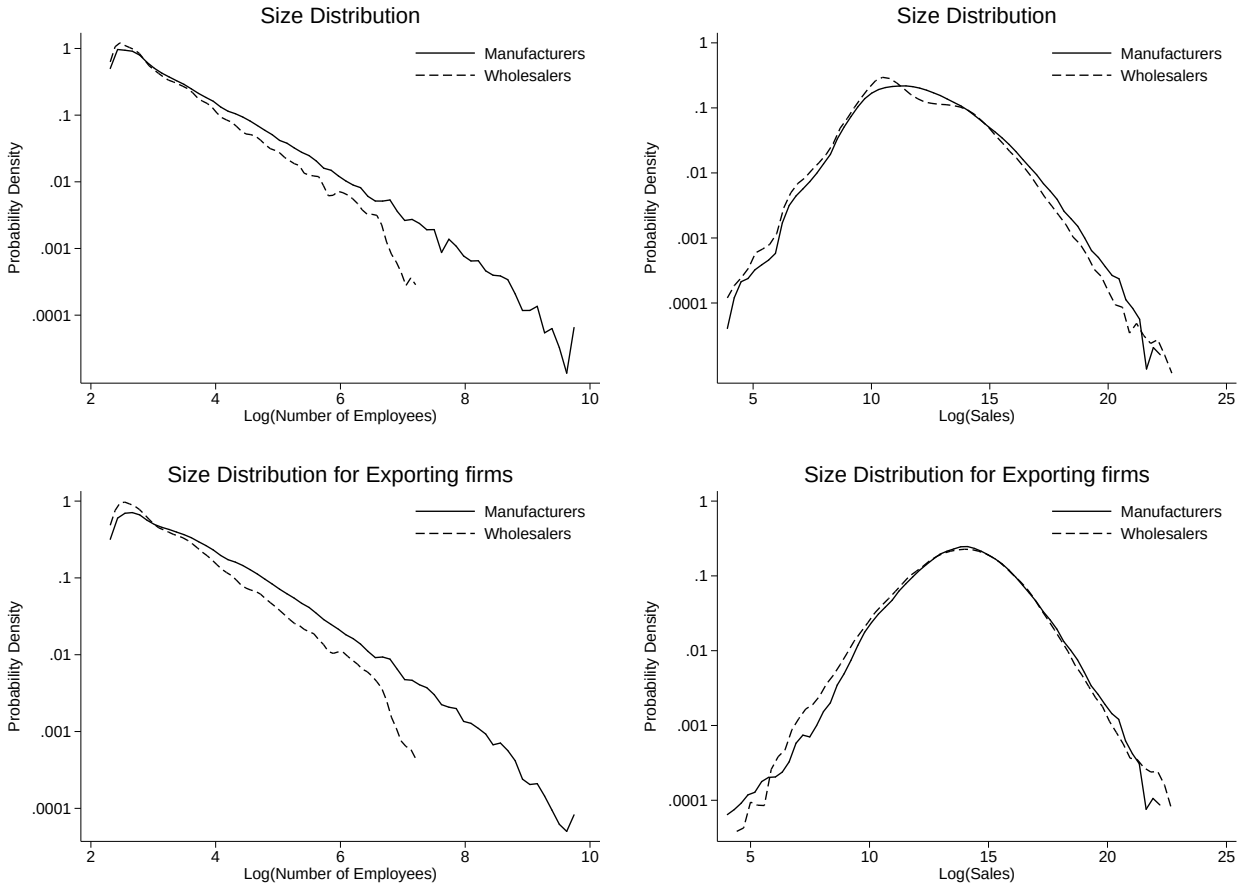

Figure 2: Empirical density of firm size in 2003 - All firms (Top) and Exporters (Bottom). Size is proxied by (log) number of employees (Left) and by (log) sales (Right). Densities estimates are obtained using the Epanenchnikov kernel with the bandwidth set using the optimal routine described in Silverman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

a proxy for firm size may yield misleading comparisons. A manufacturing firm with 100 employees will typically have lower sales and exports that a wholesale firm with the same employment. As a consequence, we employ both employment and total sales in our analysis.

Figure 3 displays the binned relation between the log of volume of export and the log of employment.[15] The plot reports the (log) number of employees a firm needs, on average, to attain a certain amount of exports. The plot confirms that wholesalers require a smaller number of employees to attain any given level of export volume.

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

[15]Binned plots allow for a succinct representation of the relation between two variables and avoid displaying clouds of thousands of observations. Here data are binned in 15 classes according to their (log of) volume of export, and the x-coordinate is the average of every bin. The y-coordinate is the average (log of) employment within that bin.

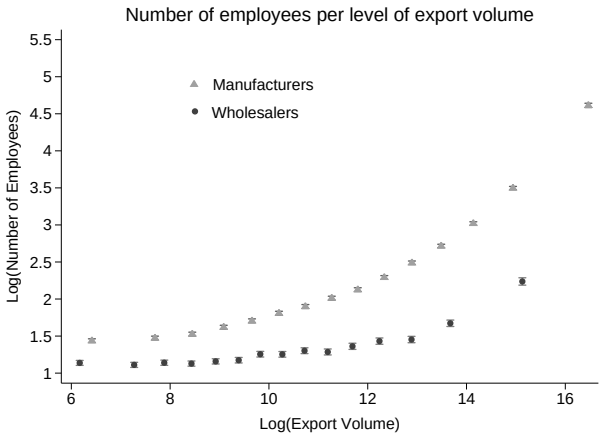

Figure 3: Relation between number of employees and export volume, 2003. Data are binned in 15 classes according to their (log of) volume of export, and the x-coordinate is the average of every bin (see text).

sectional OLS regression,

$$\ln(Y_f) = c + \beta_1 D_f^W + \beta_2 D_f^X + \beta_3 (D_f^W \cdot D_f^X) + \varepsilon_f \tag{1}$$

where $\ln(Y_f)$ denotes the logarithm of either total sales, number of employees, or sales per employee ratio. D_f^W is a dummy variable taking value 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 one if a firm is a wholesaler exporter and zero otherwise. The results are presented in Table 2.

As expected, manufacturers are on average larger than wholesalers, 0.094 log points (9.9 percent) in terms of sales and 0.52 log points (68 percent) larger in terms of employment, β_1 is negative and 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_2 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 13.4 times larger than non-exporting wholesalers and employ 2.7 times as many workers, $\beta_2 + \beta_3$ is positive and significant. Sales per employee at exporting intermediaries are 4.8 times higher than at non-exporters.

Looking at exports in rows 4 and 5 of Table 2, 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 2 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 of wholesalers focusing on just the intermediation portion of the activities carried out by manufacturers.

Recent work on firm-level exports has emphasized the extreme concentration of exports in a small number of firms. Bernard et al. (2009) report that the top 5 percent of US exporters account for 93 percent of total US exports in 2000. Similarly, Mayer and Ottaviano (2008) find concentrated exports in a number of European countries including Germany, France, Hungary, and Norway in 2003. Table 3 reports the share of Italian export volume generated by different size classes computed using export value and defined within each type. We find that wholesalers exports are less concentrated among large firms than are direct exports by manufacturers. The largest 5 percent of manufacturing exporters account for 80.0 percent of total exports by Italian manufacturing firms, while the top 5 percent of wholesale exporters account for 73.3 percent of Italian wholesaler exports. These figures are similar to those reported for the US by Bernard et al. (2010b).

4.2 Industry 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. In this section, we provide evidence on the presence of intermediaries in markets and sectors. Figure 4 displays the relation between geographic and industry diversification of the firm and its size, distinguishing between wholesalers and manufacturers. Geographical diversification is proxied by the Number of Countries of Export (NCE) and industry diversification by the Number of Industries Exported (NIE); size is represented both by employment and export volume.

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.[16] On the contrary, when considering the relation between firm size and industry diversification (bottom panel), we find that at every size class wholesalers export in more industries than manufacturers.

Considering only the sample of exporting firms, we investigate differences between manufacturers and wholesalers in terms of industry and geographic diversification. In Table 4 we regress the number of industries exported and the number of destination markets (NIE and NCE, respectively) on a dummy variable, D_f^W, indicating if a firm is a wholesaler or a manufacturer,

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

The first row of Column 1 shows that, unconditionally, wholesale exporters export in fewer four-

[16] Ahn et al. (2010) report that Chinese intermediaries export to more products and to more countries than direct exporters. However, as noted previously, intermediary export firms in the Chinese data are almost twice as large as direct exporters in terms of total export volume.

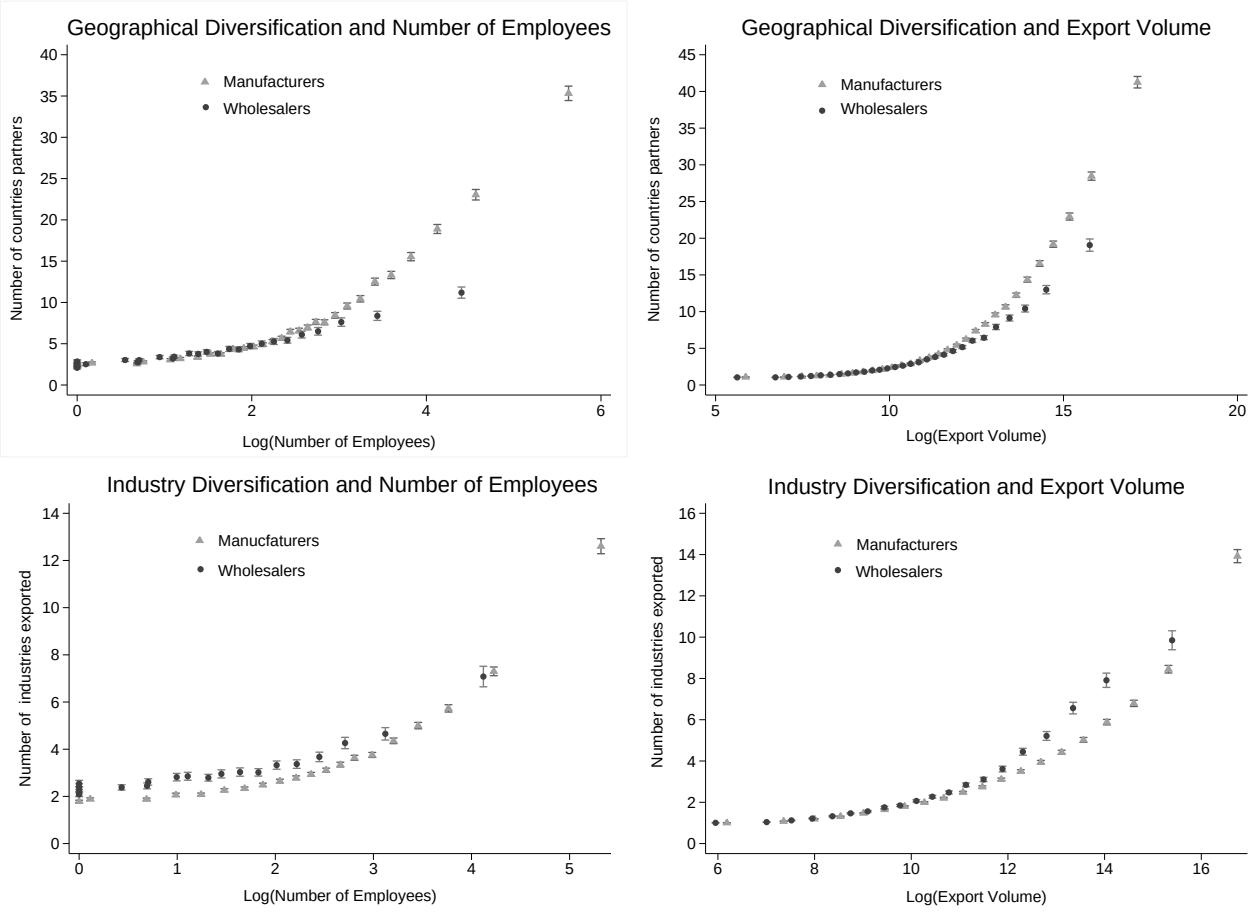

Figure 4: Relation between geographical diversification (Top) and industry diversification (Bottom) and number of employees (left); export volume (right), 2003. Data are binned in 15 classes according to their (log of) x variable, and the x-coordinate is the average of every bin (see text).

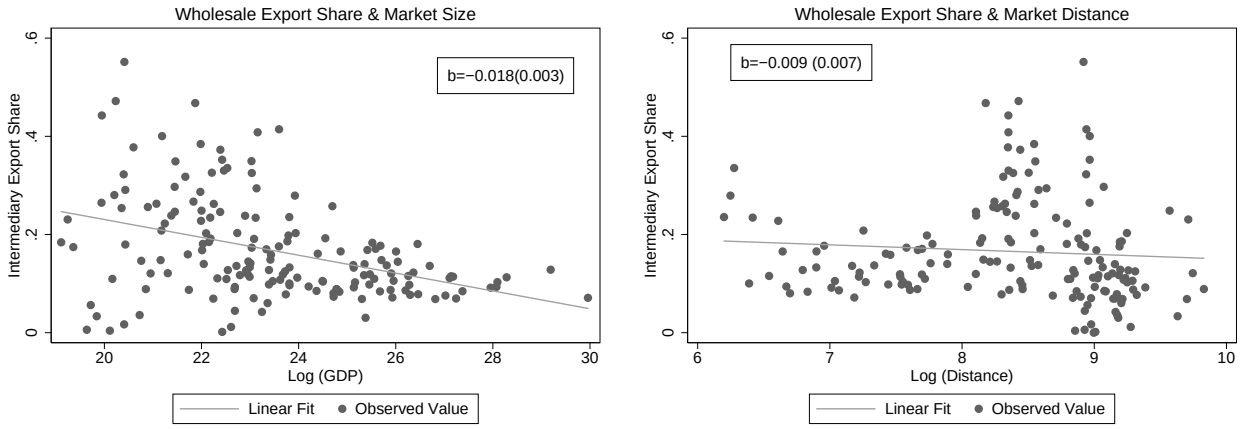

Figure 5: Intermediary export share and gravity variables, 2003. Figures report the relationship between intermediary export share and gravity variables: (Left) Real GDP; (Right) Geographic distance. Each panel reports the coefficient, b, of a country-level univariate regressions for intermediary export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

digit industries. However, including a control for firm size, either log employment or log export volume, the coefficient becomes positive and significant; exporting intermediaries are active in a wider range of industries compared to similarly-sized manufacturers. In contrast, intermediaries serve fewer export markets even when adjusting for firm size. These results suggest that intermediaries are somewhat more focused geographically and are able to overcome market-specific trade costs in order to export a wider range of products.[17]

5 Exports by Intermediaries

The previous sections have shown that exporting wholesalers differ from manufacturing exporters in terms of in size, geographic coverage and the number of industries exported. In the following we investigate the relationship of aggregate and firm exports by intermediaries and manufacturers to country characteristics including fixed and variable trade costs.

5.1 Intermediary Export Share

We start by exploring the relationship between the overall intermediary export share by destination market and the set of relevant explanatory variables (Figures 5-7). 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

[17] A more detailed breakout of export value and exporting firms by type, number of destination countries and number of exported industries is shown in Table A3 in the Industry and Country Appendix.

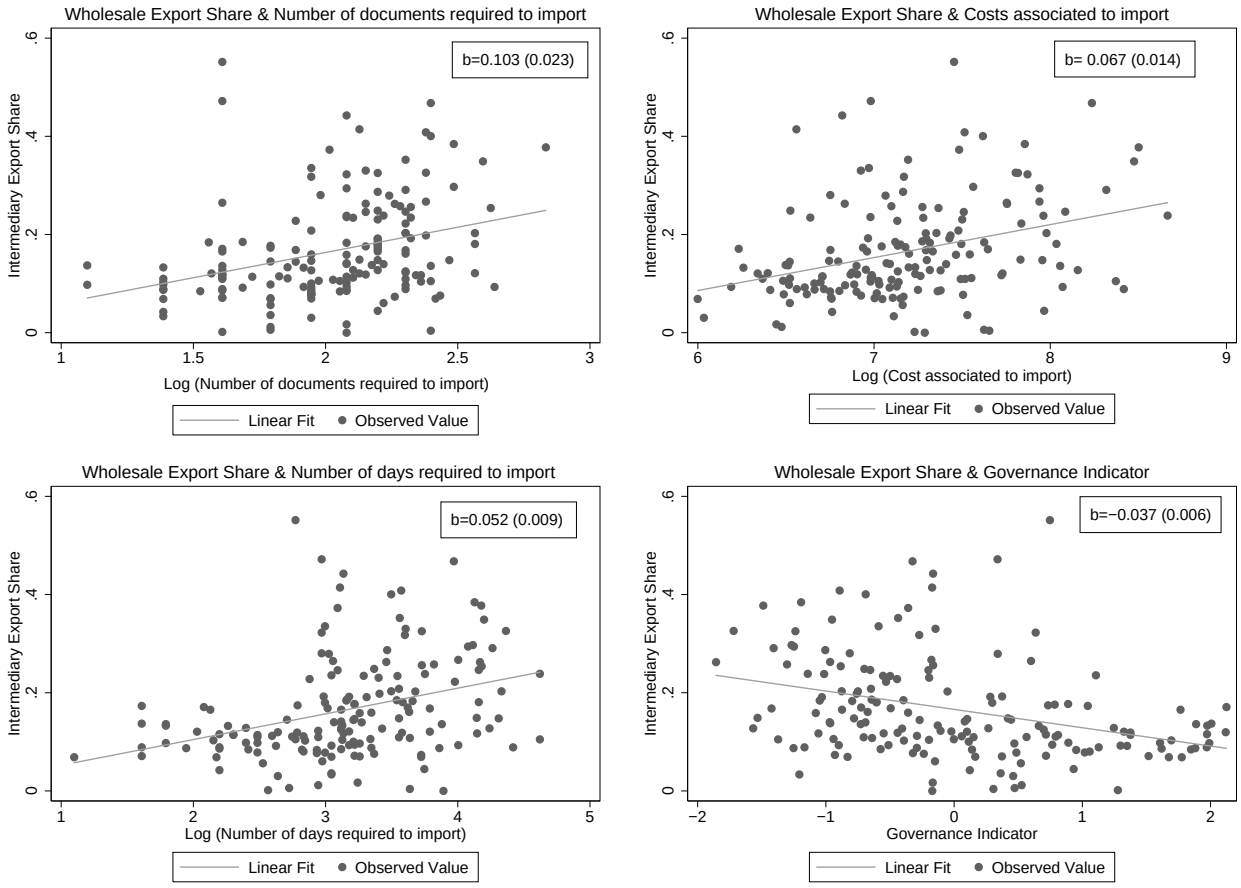

Figure 6: Intermediary export share and country-level fixed costs, 2003. Figures report the relationship between intermediary export share and different proxies for fixed market entry costs: (Top Left) Number of documents for importing; (Top Right) Cost of importing; (Bottom Left) Time to import; (Bottom Right) Governance indicator. Each panel reports the coefficient, b, of a country-level univariate regressions for intermediary export share. Robust standard error is shown in parenthesis. Data are for 2003.

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.

We turn next to the role of country fixed costs of trade, which are generally expected to be positively related to intermediary trade shares. The two plots at the top and the one at the bottom left of Figure 6 display the relationship between the percentage of export volume that goes through intermediaries and the three proxies for market-specific fixed costs provided by the World Bank Doing Business: *number of documents for importing*, *cost of importing* and *time to import*, respectively. As found by Ahn et al. (2010) and Akerman (2010), these measures of market access costs are positively and significantly related to intermediary trade shares.

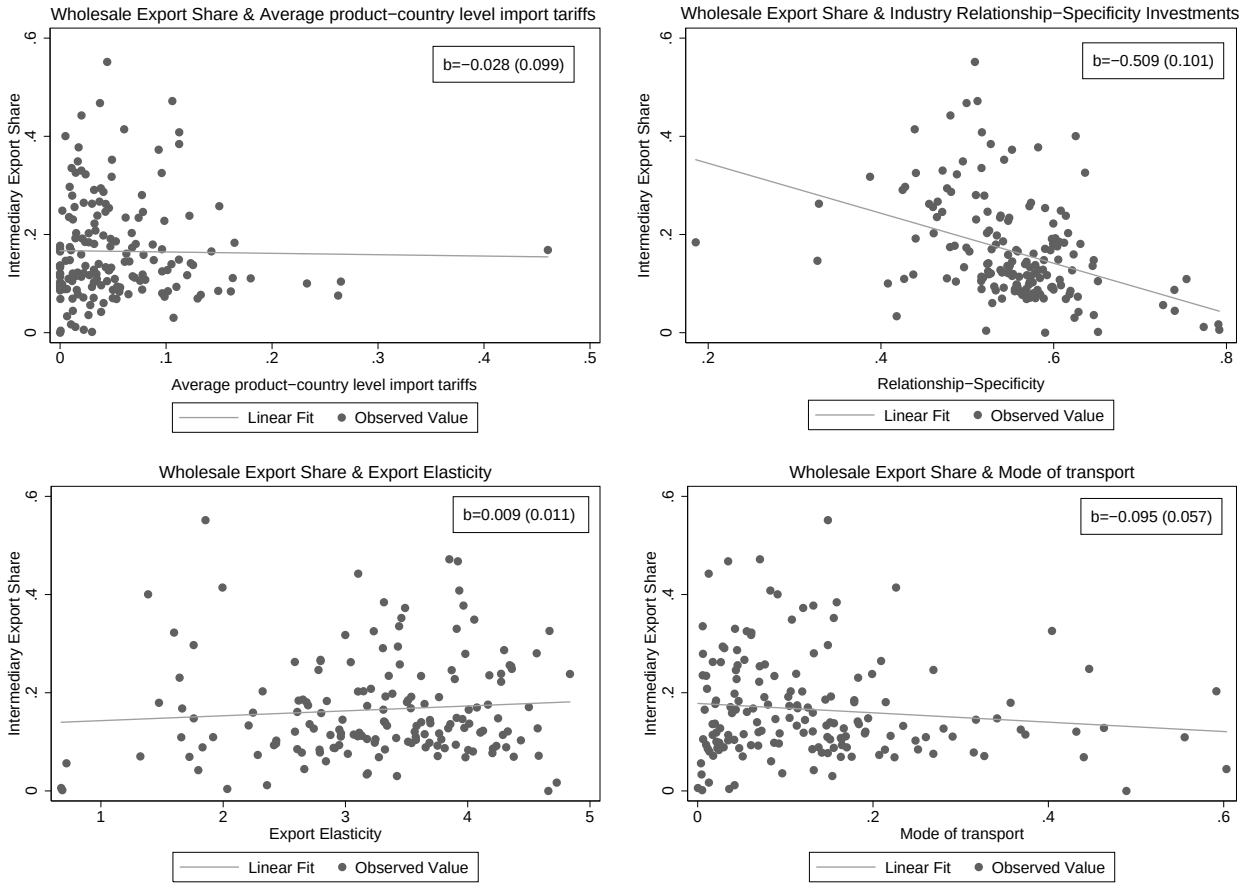

Figure 7: Intermediary export share and product characteristics, 2003. Figures report the relationship between intermediary export share and product measures aggregated to the country level: (Top Left) Tariff; (Top Right) Contractibility; (Bottom Left) Export elasticity; (Bottom Right) Mode of transport. Each panel reports the coefficient, b, of a country-level univariate regressions for intermediary export share. Robust standard error is shown in parenthesis. Data are for 2003.

In the bottom right of Figure 6 we plot the intermediaries export share against the country *Governance Indicator*. 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 choose to use wholesalers to export.

The top left panel of Figure 7 investigates the role played by variable trade costs proxied by the country-level import tariff. The panel shows no significant relationship between tariff and intermediary export share. As with distance, measures of variable trade costs are not systematically related to the intermediary share.

Finally, we investigate the link between the aggregated product characteristics and intermediary share. While the theoretical models remain largely silent on this aspect, we would expect that product-

specific characteristics might also play a role in explaining the type of firm handling the exports.[18] If goods with higher relation-specificity face more inelastic demand, the share of direct exports is likely to be higher for transactions involve products requiring relation-specific investments. On the contrary, the indirect mode of export would prevail for homogeneous products such as commodities. This prediction is in line with the hypothesis put forward by Peng and Ilinitch (2001) according to which "the higher the commodity content of the product, the more likely that export intermediaries will be selected by manufacturers".

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 related 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 firms. Figure 7 (plot on the top right) shows a strong negative and significant relationship between intermediary export share and the measure of relationship specificity. In the bottom left of Figure 7 we find that the measure of export elasticity is positive but not significant.

Finally, we consider the share of each product-country export shipped by air freight. We expect this variable to be negatively correlated with the percentage of indirect exports. Hummels (2007) emphasizes that time in transit matter less for commodity-type goods or simple manufactures. These types of products are thus more likely to be exported by intermediaries. Indeed, the higher is the percentage of the volume exported by air-shipping, the lower should be the indirect mode of export. In our regression the estimated coefficient (Figure 7 bottom right) turns out to be negative but only marginally significant.

The overall message of these figures is consistent with the idea that there are a systematic relationship between the relative volume of export managed by wholesalers and country characteristics. In the next section we provide further evidence by comparing the relations of exports to country characteristics, fixed and variable trade costs for intermediaries and manufacturers.

5.2 Aggregate exports, number of exporters and average exports

As reported by Eaton et al. (2009) and Bernard et al. (2007) the extensive margin of trade dominates the cross-country variation in exports. As such we examine not only the effects of country characteristics on aggregate exports for wholesalers and manufacturers but we consider also the impact on participation as well as on the average shipments to a destination. Total exports to a destination can be decomposed

[18] 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.

into an extensive and intensive margin,

$$\ln X_c^i = \ln \#firms_c^i + \ln avgX_c^i \tag{3}$$

where $\ln X_c^i$ is the log of total exports by firms of type i to country c, $\#firms_c^i$ is the number of exporting firms of type i to country c, and $avgX_c^i$ is the average exports per exporting firm of type i to country c, where i indicates either manufacturers or wholesalers.[19]

In Tables 5-7, we regress log exports and its two components on a dummy for whether or not the exports are done directly by a manufacturer or by an intermediary, on country characteristics and a full set of interactions,^{i}

$$\ln X_c^i = c_1 + \delta_1 D^W + \beta_1 X_c + \gamma_1 X_c * D^W + \varepsilon_c^1 \tag{4}$$

$$\ln \#firms_c^i = c_2 + \delta_2 D^W + \beta_2 X_c + \gamma_2 X_c * D^W + \varepsilon_c^2 \tag{5}$$

$$\ln avgX_c^i = c_3 + \delta_3 D^W + \beta_3 X_c + \gamma_3 X_c * D^W + \varepsilon_c^3. \tag{6}$$

Throughout robust standard errors are clustered by country.

Table 5 shows the results for aggregate export by type. Results for the two gravity variables, GDP and distance in column (1), confirm the typical findings that exports are higher to those countries that have higher GDP and that are closer. Moreover, the results for GDP suggests that trade by intermediaries is less sensitive to country size than exports by manufacturers. A one log point increase in market size implies a 95 percent raise in manufacture exports, but only a 85 percent increase in intermediary exports. The distance variable yields a surprising result. The interaction of wholesaler type and distance has a negative and significant coefficient, suggesting that wholesale exports are more sensitive to distance than direct exports.

In column (2) we add the measures of fixed and variable trade costs. Higher fixed costs of exporting, proxied by the *Market Costs* measure, are negatively and significantly related to log exports. The coefficient of the interaction with the intermediary dummy is positively and significant at the 10 percent level suggesting that intermediaries are less affected by market-specific fixed costs.

Aggregate direct exports are not significantly related to country governance quality. However, the interaction with the intermediary dummy is negative and significant. Better country governance, and thus lower fixed costs, is associated with lower exports by wholesalers. These results conform closely to the predictions that higher fixed costs of serving a market make it more difficult for direct exports and more likely that trade will go through intermediaries. The tariff measure is insignificant for both types of trade.

[19] Bernard et al. (2007) introduce this type of decomposition and report gravity regressions on firm and product extensive margins separately. Due to the lack of availability of product-level data in our dataset we consider only the firm extensive margin.

Column (3) of the Table reports a specification with all the available country variables and the aggregated product characteristics. As in the previous specifications, trade by intermediaries is less sensitive to country size and fixed costs proxied by Governance indicator. The market cost measure retains its sign and magnitude but is no longer significant. The two measures of variable trade costs, distance and tariffs show no difference between direct and indirect exports.

We observe that product-specific characteristics enter differently for exports by wholesalers and manufacturers. In particular, the higher is the relationship-specificity of the products exported to a certain destination, the lower are the indirect exports. Moreover, the more homogeneous are the products exported to a country, i.e. the higher is the export elasticity, the more likely that exports to that country are handled by intermediaries. The mode of transport variable is negatively related to direct exports but not statistically correlated with indirect exports.

All together these results emphasize the importance of both country and product characteristics in explaining the aggregate exports for wholesalers and manufacturers and their differences.

In Tables 6 and 7, we report the same regressions for the number of exporting firms of type i to country c and the average exports per exporting firm of type i to country c, respectively. The general pattern of results is similar as that found for aggregate exports. As expected from the earlier work of Bernard et al. (2007) and Mayer and Ottaviano (2008), the effects of country characteristics are strongest for the extensive margin of the number of firms exporting in the case of both manufacturers and wholesalers. For the product-based variables, we find that the intensive margin of trade reacts more strongly than the extensive margin.[20]

5.2.1 Robustness

We report several additional specifications on aggregate country exports by firm type in Table 8 to check for robustness. Column (1) repeats the regression including all the country characteristics from Column (3) in Table 5. To get a sense of the economic significance of the estimated coefficients we report in Column (2) the beta coefficients from the baseline regression that represent the change in terms of standard deviations in the dependent variable that result from a change of one standard deviation in an independent variable (Wooldridge; 2008). The standardized coefficients suggest that GDP and distance, have a strong impact on the dependent variable. A one standard deviation increase in country's GDP raises the logarithm of aggregate exports by 0.64 standard deviations. A strong impact is observable also for the relation-specificity variable.

The aggregate data for 2003 reveal that more than 55 percent of total Italian exports is directed to European Union countries (EU15). To rule out the possibility that our results are driven by differences between intra-EU and extra-EU destinations, we estimate our base specification for extra-EU markets.

[20]Note however that the strong role for the product extensive margin (number of products exported) found in other research suggests that average exports per firm may be responding largely to changes in the number of products exported to each destination.

Column (3) drops EU countries from the sample with no substantial changes to the results.

Some concerns may arise regarding the inclusion of multinationals in the analysis, as some of them are classified as wholesalers in the Italian sectoral classification of business. We run again our baseline model excluding these firms in column (4). The sign and the significance of the coefficients are all unchanged.

5.3 Firm exports and country characteristics

In this section we further investigate the role of market characteristics in the choice of the export mode, by taking a firm level perspective.

We regress the (log) firm-country export value on country characteristics and interact each characteristic with a dummy for whether or not the firm is an intermediary,

$$\ln X_{fc} = c + \beta_1 X_c + \beta_2 X_c * D_f^W + \delta_f + \varepsilon_{fc} \tag{7}$$

where X_{fc} is the value the exports of firm f to country c, X_c is a vector of market characteristics, and D_f^W is a dummy equaling one when the firm is a wholesaler and zero otherwise.

In Table 9, we estimate the equation controlling for firm fixed effects, δ_f, allowing us to examine the within-firm variation of exports separately for intermediaries and manufacturers. Results for the two gravity variables, GDP and distance, in column (1) confirm earlier findings that exports are higher to those countries that are closer and have higher GDP. However, intermediary exporters are significantly less sensitive to these country characteristics than their manufacturing counterparts. Market size is positively related to firm's export volume, but the effect is only half as strong for intermediaries as for manufacturers. In contrast to the aggregate results, export values decrease as firms trade with more distant markets, but less so for wholesalers. A one log point increase in distance implies a 21.0 percent drop in manufacturer exports, but only a 14.1 percent decline for wholesaler exports.

Column (2) includes fixed and variable trade costs. For the gravity variables, GDP and distance, the sign and the significance of the coefficients is the same as in the bivariate specification. Also the magnitude of the coefficients changes only slightly. The two proxies for market entry costs,*Market Costs* and *Governance Indicator*, show even sharper differences between wholesalers and manufacturers. Manufacturers export volumes do not appear to vary with market or administrative costs. On the contrary for wholesalers there is a positive relationships between fixed costs and export volumes. These findings support the conjecture that the higher the fixed costs of exporting to a given country, the more likely that the operation is carried out by intermediaries.

Column (3) includes all the variables. Although the magnitudes of the various coefficients have changed with respect to other specifications, the overall message is unchanged. Export volume grows with country GDP, but less so for wholesalers. Geographical distance and higher tariffs decrease exports equally for manufacturers and wholesalers. Greater market fixed costs, either higher market costs or

weaker governance, are associated with higher exports by intermediaries. Firm level exports does not seem to be much related to aggregated product variables

5.3.1 Robustness

We report several additional specifications in Table 10 to check for robustness. Column (1) repeats the regression including all the country characteristics from Column (3) in Table 9. Column (2) drops EU countries from the sample. Overall the results are quite similar with no changes in sign. The governance indicator is larger and now is significantly positively correlated with direct exports while the magnitudes of the coefficients on GDP and relationship specificity are smaller. In Column (3) we drop all multinational firms from the sample. There are no substantial changes in sign, magnitude and significance from the baseline results.

6 Conclusions

This paper contributes to the relatively new literature on the role of intermediaries in international trade. Using Italian firm-level data, we document significant differences between exporters of different types and highlight the role of country-specific fixed costs in the choice of direct versus indirect modes of export.

Exporting intermediary firms are smaller than manufacturing exporters in terms of employment, sales and exports but have higher sales per worker and comparable exports per worker. These differences highlight the fact that direct manufacturing exporters are actually performing multiple activities, i.e. production of the good and distribution of the good to the foreign market, while intermediaries only perform the distribution activity.

Recent models of intermediaries in exporting focus on the role of fixed and variable costs in the determination of the relative importance of direct and indirect exports across countries. We find that intermediaries are more focused geographically and export a larger number of industries. This idea that intermediaries are typically providing solutions to country-specific fixed costs is confirmed by the empirical work. Measures of country fixed costs are positively associated with intermediary exports both in the aggregate and within firms. In contrast, proxies for variable trade costs are largely not associated with differences between direct and indirect exports. Further research is needed on the effect of intermediaries on trade volumes, responses to aggregate shocks, and aggregate welfare.

Table 1: Export volumes and Number of exporting firms: share by type of firms, 1998-2003

Year	Total Exports (billion)	Manuf	Whol	Retail	Others
			Share (%)		
1998	213.61	87.07	9.41	0.58	2.93
1999	212.97	86.87	9.39	0.71	3.03
2000	249.18	85.08	9.71	0.76	4.44
2001	262.22	86.19	10.11	0.91	2.8
2002	264.03	84.46	11.13	0.89	3.52
2003	258.47	85.12	11.02	0.90	2.95
2003*	214.03	92.04	4.67	0.64	2.65
Year	Exporters (N. of firms)	Manuf	Whol	Retail	Others
			Share (%)		
1998	170264	57.41	25.80	8.11	8.68
1999	169000	56.65	26.03	8.23	9.09
2000	175713	55.87	26.20	8.55	9.38
2001	176674	55.34	26.85	8.86	8.95
2002	180818	54.45	27.07	8.99	9.48
2003	181081	54.25	27.42	8.67	9.66
2003*	35244	76.55	12.30	3.48	7.68

Notes: Table reports the share of export volume and the share of exporters by type of firms (Manufacturers, Wholesalers, Retailers and Others). 2003* refers to 2003 for firms with more than 20 employees. Zeros are due to rounding.

Table 2: Export premia, 2003

Dependent Variable	D^W	D^X	$D^W \cdot D^X$	Observations	R-squared
Ln (Sales)	-0.094***	2.599***	-0.006	985710	0.23
	(0.004)	(0.006)	(0.010)		
Ln (N.of employees)	-0.520***	1.415***	-0.422***	1022424	0.29
	(0.002)	(0.003)	(0.005)		
Ln (Sales/N.of employees)	0.435***	1.174***	0.399***	985710	0.15
	(0.003)	(0.004)	(0.007)		
Ln (Export)	-0.925***			147892	0.03
	(0.014)				
Ln (Export/N.of employees)	0.016			147892	0.001
	(0.013)				

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

Table 3: The Concentration of Exports, 2003

	Exporting Firms	
	Manufacture	Wholesale
Top 1%	57.3	46.5
Top 5%	80.0	73.3
Top 10%	89.1	84.8
Top 25%	97.2	95.7
Top 50%	99.6	99.2
Top 100%	100	100

Table reports the distribution of export value across firm-size percentile by firm type. Percentiles are computed on the distribution of export value of each sector. Data are for 2003.

Table 4: Export premia: geographical and industry diversification, 2003

Exporting firms			
Industry diversification	D^W	Geographical Diversification	D^W
NIE	-0.565***	NCE	-3.871***
	(0.026)		(0.057)
NIE(c1)	0.837***	NCE (c1)	-0.131***
	(0.026)		(0.053)
NIE(c2)	0.353***	NCE (c2)	-1.522***
	(0.023)		(0.045)

Notes: Table reports OLS estimates (only for exporters) of industry (NIE) and geographical (NCE) diversification on dummy for firm type (D^W). (c1) denotes control for size as number of employees; (c2) denotes control for size as export volume. The number of observations is 147892 for all regressions. Robust standard errors are reported below coefficients. Asterisks denote significance levels (***: p< 1%;**: p<5%; *: p<10%). Data are for 2003.

Table 5: Aggregate export by type, 2003

	Aggregate export by type and country ($lnX_{i,c}$)		
	(1)	(2)	(3)
D^W	2.520***	1.315	2.977***
	(0.801)	(0.974)	(0.999)
Log (GDP_c)	0.956***	0.860***	0.898***
	(0.036)	(0.042)	(0.045)
D^W	-0.102***	-0.035	-0.055*
	(0.032)	(0.045)	(0.031)
Log ($Distance_c$)	-1.046***	-1.026***	-0.931***
	(0.068)	(0.069)	(0.081)
D^W	-0.232***	-0.277***	-0.078
	(0.058)	(0.062)	(0.075)
$Market\ Costs_c$		-0.510***	-0.456***
		(0.099)	(0.098)
D^W		0.133*	0.113
		(0.073)	(0.095)
$Governance\ Indicator_c$		-0.033	-0.006
		(0.112)	(0.105)
D^W		-0.237**	-0.229**
		(0.117)	(0.110)
$Tariff_c$		0.015	0.017
		(0.012)	(0.012)
D^W		0.001	-0.005
		(0.008)	(0.009)
$Relation\text{-}Specificity_c$			0.714
			(1.308)
D^W			-4.493***
			(1.018)
Log ($Export\ Elasticity_c$)			-0.155
			(0.124)
D^W			0.261**
			(0.108)
$Mode\ of\ Transport_c$			-1.989**
			(0.855)
D^W			0.873
			(0.628)
R-squared	0.88	0.90	0.91
Observations	330	330	330

Note: Table reports OLS regression of logarithm of aggregate export value by type and country. Robust standard errors clustered at country level are reported in parenthesis below the coefficients. Asterisks denote significance levels (***: p<1%; **: p<5%; *: p<10%). Data are for 2003.

Table 6: Number of firms by type, 2003

	Number of firms by type and country ($lnF_{i,c}$)		
	(1)	(2)	(3)
D^W	3.029***	2.434***	2.538***
	(0.477)	(0.542)	(0.525)
Log (GDP_c)	0.748***	0.656***	0.646***
	(0.028)	(0.029)	(0.033)
D^W	-0.118***	-0.084***	-0.078***
	(0.016)	(0.020)	(0.021)
Log ($Distance_c$)	-0.839***	-0.817***	-0.792***
	(0.062)	(0.061)	(0.084)
D^W	-0.186***	-0.205***	-0.024
	(0.030)	(0.030)	(0.043)
$Market\ Costs_c$		-0.309***	-0.319***
		(0.084)	(0.087)
D^W		0.043	0.056
		(0.051)	(0.046)
$Governance\ Indicator_c$		0.108	0.110
		(0.098)	(0.092)
D^W		-0.124**	-0.110**
		(0.053)	(0.049)
$Tariff_c$		0.026*	0.025
		(0.013)	(0.015)
D^W		-0.005	-0.005
		(0.005)	(0.005)
$Relation\text{-}Specificity_c$			-1.058
			(0.751)
D^W			-1.573**
			(0.490)
Log ($Export\ Elasticity_c$)			0.111
			(0.069)
D^W			0.056
			(0.050)
$Mode\ of\ Transport_c$			0.371
			(0.676)
D^W			-0.044
			(0.305)
R-squared	0.87	0.90	0.90
Observations	330	330	330

Note: Table reports OLS regression of logarithm of number of firms by type and country. Robust standard errors clustered at country level are reported in parenthesis below the coefficients. Asterisks denote significance levels (***: p<1%; **: p<5%; *: p<10%). Data are for 2003.

Table 7: Average exports per firm by type, 2003

	Average exports per firm by type and country ($ln\hat{X}_{i,c}$)		
	(1)	(2)	(3)
D^W	-0.511	-1.120	0.438
	(0.701)	(0.841)	(0.950)
Log (GDP$_c$)	0.208***	0.204***	0.252***
	(0.031)	(0.044)	(0.040)
D^W	0.015	0.049	0.024
	(0.029)	(0.040)	(0.029)
Log (Distance$_c$)	-0.207***	-0.209***	-0.139**
	(0.050)	(0.057)	(0.065)
D^W	-0.047	-0.072	-0.054
	(0.055)	(0.060)	(0.079)
Market Costs$_c$		-0.201**	-0.138*
		(0.078)	(0.081)
D^W		0.089	0.057
		(0.088)	(0.089)
Governance Indicator$_c$		-0.141	-0.116
		(0.103)	(0.094)
D^W		-0.112	-0.119
		(0.114)	(0.108)
Tariff$_c$		-0.011	-0.008
		(0.008)	(0.007)
D^W		0.005	0.001
		(0.008)	(0.008)
Relation-Specificity$_c$			1.773
			(1.367)
D^W			-2.920**
			(1.081)
Log (Export Elasticity$_c$)			-0.266**
			(0.113)
D^W			0.204**
			(0.106)
Mode of Transport$_c$			-2.360***
			(0.699)
D^W			0.916
			(0.635)
R-squared	0.47	0.50	0.57
Observations	330	330	330

Note: Table reports OLS regression of logarithm of average exports per firm by type and country. Robust standard errors clustered at country level are reported in parenthesis below the coefficients. Asterisks denote significance levels (***: p<1%; **: p<5%; *: p<10%). Data are for 2003.

Table 8: Aggregate export by type (2003): robustness check

	Aggregate export by type and country ($lnX_{i,c}$)			
	Baseline	Beta Coeff.	Extra EU15	Without MNFs
	(1)	(2)	(3)	(4)
D^W	2.977***	0.456***	2.980***	2.721***
	(0.999)	(0.153)	(1.049)	(0.965)
Log (GDP$_c$)	0.898***	0.642***	0.908***	0.902***
	(0.045)	(0.032)	(0.050)	(0.045)
D^W	-0.055*	-0.195*	-0.056*	-0.054*
	(0.031)	(0.119)	(0.031)	(0.032)
Log (Distance$_c$)	-0.931***	-0.253***	-0.965***	-0.909***
	(0.081)	(0.022)	(0.078)	(0.086)
D^W	-0.078	-0.130	-0.121	-0.119
	(0.075)	(0.098)	(0.077)	(0.074)
Market Costs$_c$	-0.456***	-0.139***	-0.448***	-0.410***
	(0.098)	(0.030)	(0.098)	(0.100)
D^W	0.113	0.024	0.110	0.059
	(0.095)	(0.021)	(0.097)	(0.103)
Governance Indicator$_c$	-0.006	-0.002	0.058	0.041
	(0.105)	(0.032)	(0.102)	(0.111)
D^W	-0.229**	-0.049**	-0.243**	-0.303**
	(0.110)	(0.024)	(0.109)	(0.119)
Tariff$_c$	0.017	0.031	0.013	0.018
	(0.012)	(0.022)	(0.013)	(0.013)
D^W	-0.005	-0.007	-0.004	-0.008
	(0.009)	(0.014)	(0.010)	(0.009)
Relation-Specificity$_c$	0.714	0.027	0.787	-0.656
	(1.308)	(0.049)	(1.323)	(1.486)
D^W	-4.493***	-0.386***	-4.534***	-3.522***
	(1.018)	(0.087)	(1.024)	(1.201)
Log (Export Elasticity$_c$)	-0.155	-0.055	-0.144	-0.148
	(0.124)	(0.044)	(0.123	(0.132)
D^W	0.261**	0.135**	0.252**	0.261**
	(0.108)	(0.056)	(0.107)	(0.115)
Mode of Transport$_c$	-1.989**	-0.093**	-2.126**	-2.048**
	(0.855)	(0.040)	(0.871)	(0.931)
D^W	0.873	0.021	0.958	1.087
	(0.628)	(0.024)	(0.643)	(0.675)
R-squared	0.91	0.91	0.9	0.91
Observations	330	330	302	330

Note: Table reports OLS regression of logarithm of aggregate export value by type and country. Robust standard errors clustered at country level are reported in parenthesis below the coefficients. Asterisks denote significance levels (***: p<1%; **: p<5%; *: p<10%). Data are for 2003.

Table 9: Firm exports and country characteristics, 2003

	Firm's export value by country		
	(1)	(2)	(3)
Log (GDP_c)	0.368***	0.388***	0.402***
	(0.022)	(0.026)	(0.026)
D^W	-0.185***	-0.158***	-0.165***
	(0.014)	(0.015)	(0.014)
Log ($Distance_c$)	-0.337***	-0.341***	-0.299***
	(0.038)	(0.040)	(0.046)
D^W	0.133***	0.103***	-0.015
		(0.022)	(0.023)
$Market\ Costs_c$		0.102	0.112
		(0.072)	(0.077)
D^W		0.058*	0.049*
		(0.035)	(0.028)
$Governance\ Indicator_c$		-0.059	-0.058
		(0.055)	(0.053)
D^W		-0.084***	-0.089***
		(0.033)	(0.027)
$Tariff_c$		-0.008*	-0.009**
		(0.005)	(0.004)
D^W		0.001	0.001
		(0.002)	(0.002)
$Relation\text{-}Specificity_c$			-2.613***
			(0.714)
D^W			0.223
			(0.376)
Log ($Export\ Elasticity_c$)			-0.019
			(0.054)
D^W			0.018
			(0.028)
$Mode\ of\ Transport_c$			0.025
			(0.474)
D^W			1.168***
			(0.203)
R-squared	0.31	0.31	0.32
Observations	970685	970685	970685
N.of firms	146081	146081	146081
N.of clusters (countries)	165	165	165

Note: Table reports firm fixed-effect regression of logarithm of firm's export value by country. Robust standard errors clustered at country level are reported in parenthesis below the coefficients. Asterisks denote significance levels (***: p<1%; **: p<5%; *: p<10%). Data are for 2003.

Table 10: Firm exports and country characteristics (2003): robustness check

	Firm's export value by country		
	Baseline	Extra EU15	Without MNFs
	(1)	(2)	(3)
Log (GDP_c)	0.402***	0.334***	0.390***
	(0.026)	(0.019)	(0.026)
D^W	-0.165***	-0.138***	-0.158***
	(0.014)	(0.011)	(0.014)
Log ($Distance_c$)	-0.299***	-0.289***	-0.289***
	(0.046)	(0.038)	(0.046)
D^W	-0.015	-0.004	-0.016
	(0.023)	(0.021)	(0.023)
$Market\ Costs_c$	0.112	0.034	0.115
	(0.077)	(0.051)	(0.077)
D^W	0.049*	0.052**	0.027
	(0.028)	(0.029)	(0.029)
$Governance\ Indicator_c$	-0.058	0.033	-0.068
	(0.053)	(0.038)	(0.053)
D^W	-0.089***	-0.061**	-0.086***
	(0.027)	(0.023)	(0.026)
$Tariff_c$	-0.009**	-0.006*	-0.009**
	(0.004)	(0.003)	(0.004)
D^W	0.001	-0.001	0.001
	(0.002)	(0.002)	(0.002)
$Relation\text{-}Specificity_c$	-2.613***	-1.293***	-2.657***
	(0.714)	(0.475)	(0.707)
D^W	0.223	0.050	0.326
	(0.376)	(0.342)	(0.372)
Log ($Export\ Elasticity_c$)	-0.019	-0.074*	-0.026
	(0.054)	(0.044)	(0.055)
D^W	0.018	0.035	0.022
	(0.028)	(0.027)	(0.027)
$Mode\ of\ Transport_c$	0.025	-0.012	0.101
	(0.474)	(0.395)	(0.459)
D^W	1.168***	0.916***	1.121***
	(0.203)	(0.194)	(0.198)
R-squared	0.32	0.27	0.31
Observations	970685	586151	916126
N.of firms	146081	111321	143082
N.of clusters (countries)	165	151	165

Note: Table reports firm fixed-effect regression of logarithm of firm's export value by country. Robust standard errors clustered at country level are reported in parenthesis below the coefficients. Asterisks denote significance levels (***: p<1%; **: p<5%; *: p<10%). Data are for 2003.

Appendix

Data

As specified 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.

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 5000 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 (DB). The World Bank compiles procedural requirements for importing a standardized cargo of goods by ocean transport. All 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 completion (for details, see Djankov et al.; 2006). For the purpose of our analysis we use three variables: *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 container of standard goods from a factory in the largest business city to a ship in the most accessible port. Data are available from 2004 to 2010, while the last year of the Italian firm-level database is 2003. However, given the low variability of these indicators, we take the average value over the available years.

In addition to country characteristics we examine the role of product and industry characteristics. We aggregate several product-level measures to the country level.

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, we follow several steps. First, using information from Lawson et al. (2002) we construct a concordance between I-O industry classification and NAICS1997 code. Second, we convert data 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. These product-level measures of relationship specificity are then weighted by the share of Italian exports in the HS6 product-country.

Principal Components

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

Because principal component is intended to study correlation patterns, the analysis has to be based on standardized variables to avoid confusion introduced by differing variances among variables. In fact, without standardization, the principal component method will favor the variables with large variances at the expenses of those with smaller ones.

Results support what one might have expected. The upper parts of both Table A1 and A2 show 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 explains respectively the 77 percent and the 86 percent of the sum of all observed variances. The lower parts of the two tables reports the factor loadings, which are in the specific vocabulary of factor analysis the parameters of the linear function that relates the observed variables and the factors (here, only one factor is retained). The higher the load the more relevant 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 other variables. Again all variables, in both tables, seem to 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

Industry and countries

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

Table A3: Industry and country extensive margins and the share of exports, 2003. Manufacturers vs. Wholesale

Manufacture						
		NCE				
		1-5	6-10	11-20	21+	Total
% of exporting firms						
NIE	1-5	61.9	10.55	7.29	3.17	82.91
	6-10	1.95	2.16	3.43	3.39	10.93
	11-20	0.41	0.46	1.18	2.73	4.78
	21+	0.06	0.05	0.19	1.08	1.38
	Total	64.32	13.22	12.09	10.37	100
% of export value						
NIE	1-5	4.37	4.07	6.5	11.19	26.14
	6-10	0.79	1.99	4.07	12.83	19.69
	11-20	0.25	0.79	3.18	18.63	22.85
	21+	0.12	0.19	1.5	29.51	31.33
	Total	5.53	7.05	15.26	72.17	100
Wholesale						
		NCE				
		1-5	6-10	11-20	21+	Total
% of exporting firms						
NIE	1-5	75.49	6.79	2.83	0.81	85.92
	6-10	3.8	2.02	1.76	0.82	8.4
	11-20	1.54	0.86	0.95	0.77	4.11
	21+	0.62	0.28	0.28	0.4	1.57
	Total	81.45	9.94	5.82	2.79	100
% of export value						
NIE	1-5	19.45	9.78	12.46	7.67	49.35
	6-10	3.54	2.87	4.49	8.31	19.21
	11-20	2.69	2.41	3.39	7.36	15.85
	21+	2.21	1.93	3.11	8.34	15.59
	Total	27.88	16.98	23.45	31.68	100

Data are for 2003.

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