Learning about demand abroad from wholesalers: a B2B analysis

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Abstract

This paper uses Business to Business (B2B) transaction level data. It shows that manufacturing firms that initially export via a wholesaler are much more likely to become direct exporters to the same destination in subsequent periods. Theoretically, we rationalise this finding by demonstrating how a connection to a wholesaler reduces uncertainty about the foreign demand. In the data we isolate the channel for demand learning from productivity spillovers. Non-exporting manufacturing firms, previously serving a foreign destination through an exporting wholesaler, have a much higher probability of becoming direct exporters to the same export market in subsequent periods. A connection to an exporting wholesaler results in a probability of exporting to the same destination that is six times higher than a comparable firm without any exposure to the foreign destination.

JEL classification: F14, L14

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1. Introduction

Why do manufacturing firms export via an intermediary firm? The traditional answer given by the literature is that an intermediary wholesaler typically reduces and avoids the fixed cost of exporting compared to direct exporting (Crozet et al. (2013),Bernard et al. (2015),Akerman (2018)). This paper aims to contribute to the literature by putting forward a new and complementary reason for indirect exporting via a wholesaler. For this purpose, we use a unique Business-to-Business (B2B) transaction level dataset that documents all the firms' connections that any firm has in their network. Using this data, we can provide new answers to existing questions, since previously, connections of firms to other firms were not available and consequently, could not be studied. Analysing the firms' exporting activity across foreign destination markets using B2B data reveals that firms without prior direct export experience to a specific foreign destination, which export via an intermediary wholesaler, are much more likely to become direct exporters to the foreign destination in later years than other comparable non-exporting firms. We rationalise this empirical finding through a simple theoretical model highlighting a new channel for the use of wholesalers. From the model, we show that firms can reduce the uncertainty about their foreign demand by exporting via an intermediary. This "learning about foreign demand" results in a better assessment of their expected profitability of exporting, which can trigger firms into switching their mode of exporting from indirectly to directly serving the foreign destination. Empirically the use of B2B transaction level data between domestic firms allows us to verify whether indirect exporting via a pure wholesaler is an intermediate step in the internationalisation process of firms, which helps them to become direct exporters.

The number of firms serving foreign markets through direct exports is relatively small compared to the number of firms that are connected to an exporting firm. Dhyne et al. (2015) observe that about 5% of the population of Belgian firms is exporting directly, while about 82% of firms are exporting indirectly through the network, i.e. by being connected directly or indirectly to an exporting firm. One third of the total exporting Belgian firms in 2014 are pure wholesalers, and these account for about 40% of total exports in value terms. Therefore it is important to highlight the role of wholesalers when evaluating

indirect exports. [2]

Earlier literature dealing with firm level internationalisation strategies has focused on the supply side aspects involved and on the cost side of exporting Melitz (2003),Helpman et al. (2004), Bernard et al. (2003)). This early literature on exporting does not consider the role of intermediaries. In other words, depending on their productivity and size, firms either sell domestically, export directly or engage in FDI. More recent literature by Crozet et al. (2013), Bernard et al. (2015), Akerman (2018), Ahn et al. (2011) argue that wholesalers lead to an additional stage in the internationalisation of firms. These papers show that a range of firms with intermediate productivity levels will export indirectly through wholesalers instead of covering the fixed costs of exporting themselves. When the fixed costs of direct exporting varies across foreign destinations, trade intermediaries are more important when entry into markets is more difficult. A common feature of all the aforementioned papers is that they see the internationalisation sorting as a static process affected by supply factors, determined mainly by firm productivity. The stance that we take in this paper is a complementary one to the supply side view. We document that in addition to cost saving, wholesalers also provide a channel of learning about demand that helps manufacturing firms to become direct exporters. This paper shows both theoretically and empirically that without using wholesalers as a vehicle for exporting first, many firms would not become direct exporters.

Another but parallel strand of literature has focused more on the dynamic process that underlies the choice of internationalisation strategies. Roberts and Tybout (1997) use data on Colombian companies to study starters to export. They show that firms with a recent exporting history have an export advantage compared to new exporters. This finding is consistent with the idea that firms already familiar with local demand conditions have an advantage over new exporters. Aw et al. (2011) see the export decision as a dynamic process, affected by the firm's endogenous productivity, export demand, company size, prior

[2]The importance of wholesalers in Belgium is consistent with evidence from other countries. In the case of the US, Bernard et al. (2010) found that 34% of exporting firms are pure wholesalers. In France, Crozet et al. (2013) found that wholesalers account for 32% of the total number of exporting firms, capturing 20% of French exports in value terms and 31% in volume terms.

export activity, R&D experience and the fixed and sunk costs of exporting. Conconi et al. (2016) study the dynamic process of direct exporting and Foreign Direct Investment (FDI) in individual destinations. Using trade and investment data, they show that uncertainty induces manufacturing firms to follow a gradual internationalisation process, starting with direct exports. Direct exporting enables firms to collect information about the demand in the foreign market as an intermediate step before engaging in FDI in the destination market in subsequent periods. This alternative strand of literature points at the importance of the demand side in internationalisation strategies of firms. Our B2B data allow us to dig deeper, by exploring the the connections of firms over time. Consequently, we can ask the following questions: How do firms become direct exporters? What do the business connections characteristics tell us about the probability of firms becoming direct exporters?

While other papers such as Kranton and Minehart (2001) have looked at the role of business connections, they do not link business networks with exports. Kranton and Minehart (2001) provide a theoretical contribution on how firms can reduce uncertainty by establishing links with buyers and sellers, but do not explore linkages to export markets. Our approach is different as by merging the B2B data for Belgian firms with firm-level customs data, we can explore buyer-seller linkages with an international dimension. Thus, our paper contributes to the small but growing literature that suggests that demand related issues in the destination affects trade. Papers on demand related issues such as Hottman et al. (2016) decompose firm-level revenues and find that demand related factors explain about fifty percent of sales variation across firms. The importance of the demand side in the export success of firms is also confirmed by Aw-Roberts et al. (2018).

In this paper, we purposely analyse the connections of manufacturing firms to wholesalers rather than connections to other manufacturing intermediaries. Pure wholesalers typically do not engage in a physical transformation of the manufacturing products that they buy from suppliers. This is one way to isolate a demand spillover from a productivity spillover. When the intermediary exporting firm is a manufacturing firm, it becomes more difficult to distinguish productivity spillovers from "learning about demand". By restricting intermediaries to wholesalers, this raises the likelihood that what we are picking up in the data are truly demand spillovers. Typically, a wholesaler selling a good to a particular

destination will initially have more information about local demand conditions than the non-exporting manufacturing firm that exports its product via the wholesaler. But as a result of the B2B connection the manufacturing supplier will learn about the strength of its demand in the foreign market through its contacts with the wholesaler. In the theoretical framework, we show that once the non-exporting manufacturing firm to a specific foreign destination realises that its demand abroad is sufficiently high to cover the fixed cost of exporting, it is optimal for the manufacturer to change its exporting mode by becoming a direct exporter to the foreign destination, which raises its profits on foreign sales. Therefore, empirically we expect to observe that non-exporting firms, that are initially connected to a wholesaler exporting to a particular destination, have a higher probability of switching their export mode and to start serving the destination directly themselves through direct exports in subsequent periods.

Our theoretical framework builds on Conconi et al. (2016) and Jovanovic (1982) but adds an earlier trade-off in the the gradual internationalisation process of firms, i.e. serving the foreign market through an exporting wholesaler. We assume that direct exports require a one-off investment in the form of sunk costs and a lower variable cost than exporting via a wholesaler. Thus, serving the foreign market is not a static decision as suggested in the literature on costs. In contrast, when considering the demand side, it becomes a dynamic inter-temporal decision depending on learning economies. Contrary to the existing literature, the novelty arising from this paper is to show that the learning process about the foreign demand starts béfore firms decide to engage in direct exports.

We rely on a unique dataset built using the Belgian Business-to-Business (B2B) transaction database, the Central Balance Sheet Office of the National Bank of Belgium (NBB) and the Belgian customs trade data. Our dataset contains information on the direct and indirect participation of Belgian firms in international trade and it has firm characteristics to control for other determinants in the internationalisation process. Our main hypothesis is that manufacturing firms learn about their foreign demand through their trade intermediaries. Our empirical strategy consists of comparing two groups of firms of similar firm characteristics, such as productivity and size, but either with or without a link to wholesalers. We use an ordered probit model to determine whether the probability of

engaging in the different internationalisation strategies differs between these two groups. We pay particular attention to separating demand spillovers from productivity sorting. Special attention goes to the "initial condition problem" inherent to the modeling of a dynamic internationalisation process. When analysed across foreign destination markets, we find strong evidence that non-exporting firms connected to wholesalers are much more likely to continue supplying through wholesalers and to enter export markets directly. Our findings also show that the importance of wholesalers is stronger for destination markets that are further away. This may confirm the idea that firms face higher uncertainty about their demand in foreign destination markets that are located further away.

It is important to contrast our results from previous literature catalogued under "learning-by-direct exporting", i.e. Aw et al. (2000), Van Biesebroeck (2005), De Loecker (2007) and Bai et al. (2017) or more recently Atkin et al. (2017) who provided evidence of this hypothesis through a randomized controlled experiment that generated exogenous variation in the foreign access to foreign markets for rug producers in Egypt. All these papers found evidence of the "learning-by-direct exporting" hypothesis, where firms observed increases in their productivity àfter exporting to foreign markets. This paper complements this previous literature by highlighting the potential benefit of "learning-from-indirect-exporting" where the learning is on the demand side.

The remainder of this paper is organised as follows. In Section 2, we present the theoretical framework. In Section 3, we describe the data sources, a section that is complemented by some descriptive statistics presented in Section 4. In Section 5, we describe the empirical strategy. Section 6 presents the results supported by some robustness analysis presented in Section 7. Section 8 concludes.

2. Theoretical Framework

For the theory, we build on Conconi et al. (2016) and Jovanovic (1982) as these papers study different entry decisions of firms, i.e. entry in the domestic market, decision to export directly and conduct Foreign Direct Investment (FDI). But here we we pay particular attention to the role of wholesalers. In our setting, firms collect information about their

individual demand in the foreign country through wholesalers before engaging in direct exports. This results in an additional trade-off in their gradual interationalisation process, which results in an additional stage before the direct exporting decision.

2.1. Theoretical setup

In this simple theoretical framework, firms are identical before entering a foreign market but heterogeneous in terms of their foreign market profitability once they decide to enter the foreign market. A representative risk-neutral firm can choose between two potential alternative strategies of serving a foreign market j.[3] The first option involves the use of a wholesaler as an intermediate step of supplying the foreign market, whereas the second option involves exporting directly without the intermediate firm. Under these assumptions, we show that uncertainty in the foreign demand can encourage the representative firm to use a wholesaler to serve the foreign market as an intermediary step before engaging in direct exports.[4]

The use of wholesalers as an internationalisation strategy requires a payment of a fixed cost f^w and a variable fee charged by wholesalers for their trade intermediary service, given by ω.[5] If the firm decides to enter a foreign market through direct exports, it faces a variable cost in the form of transport costs, labelled as τ. Transport costs are assumed to be lower than the fee charged by wholesalers. The relation between the variable costs of the two methods of supplying the foreign market is given by $\tau = \gamma\omega$, where $0 < \gamma < 1$.[6]

[3] Assuming that firms are risk neutral behaviour is a simplification of reality. We acknowledge that authors such as De Sousa et al. (2016) have evaluated uncertainty assuming different profiles of risk aversion across firms. However, evaluating export decisions taking into account the risk profile of each firm is outside the scope of this paper.

[4] In this paper, we do not focus on the activity of wholesalers, but we treat wholesalers as an intermediary technology of exporting.

[5] In reality, the fixed costs of supplying a foreign market indirectly through wholesalers can include the cost of searching for an exporting wholesaler in the domestic market supplying to a foreign market among other costs.

[6] The relation between transport costs and the fees of wholesalers is based on the idea that the wholesaler imposes a mark-up over the transport cost as a payment for their services. However, we acknowledge that wholesalers can exploit economies of scope in exporting, as described by Akerman (2018) and Ahn et al. (2011). While this could potentially affect the relation between transport costs and wholesalers' fees, the assumption that transport costs are lower than the wholesalers' fees is justified by the empirical observation that capable firms find profitable to export directly, despite the higher fixed cost attached.

In addition, a firm that chooses to export directly to a foreign destination j for the first time must pay a higher one-off sunk fixed costs, i.e. $f^e > f^w$.[7]

The representative firm is uncertain about their profitability in a foreign market. Once it starts operating in the foreign country using any of the two internationalisation strategies described above, more information will become available. The firm faces a linear demand in the foreign market: $q_j = \delta_j - p_j$, where q_j denotes the output sold in the foreign market j and p_j denotes the respective price. δ_j is an unknown intercept, which is destination specific and captures the strength of the firm's foreign demand unknown to the firm. We assume the cost of production to be zero and common to all firms. The firm knows the cumulative distribution function $P(\delta_j)$ and its support $[\overline{\delta_j}, \underline{\delta_j}]$ before entering a foreign market, but firm profitability and the exact demand parameter δ_j can only be discovered once the firm has entered the foreign market either by using a wholesaler as a trade intermediary or by direct exports. Only through these two internationalisation modes, is there is an information spillover to the manufacturing firm, whereby its demand in the foreign market is learned.

To show the main mechanism of the model, we use a simple two period framework, defined throughout the paper as t and $t+1$, assuming for simplicity that the firm does not discount profits in the future. In the first period t, a firm chooses whether to serve a specific foreign destination. Once the firm has decided to enter the foreign market, it must decide the strategy it will follow to serve it. In this framework, the firm can either serve the foreign market using a wholesaler as a trade intermediary or decide to export directly taking into account the costs associated with each internationalisation strategy. At the end of the first period, if the amount sold in the foreign market is positive $q_j > 0$, the firm's individual foreign demand in market j is revealed from its foreign profits.

In the second period $t+1$, we distinguish two scenarios. The first scenario occurs when the firm has not served the foreign market in period t and it must decide what to do without

[7] In reality, the fixed costs of exporting include, among other costs, the cost of establishing an international distribution system, the search cost of finding transport companies or the understanding of foreign regulation.

any additional information on its foreign demand δ_j in market j. An alternative scenario occurs when the firm has previously served the foreign market in period t, and now has to decide between continuing to supply the foreign market in a similar way as in period t, to alter its internationalisation mode, or to leave the foreign market altogether, depending on its foreign demand. For instance, if the firm supplied the foreign market j in period t through a wholesaler, the firm has learned more about the strength or weakness of its foreign demand for period $t+1$. The firm may decide either to continue supplying the foreign market through wholesalers, switch to direct exporting or exit the foreign market.

A firm that was already a direct exporter in the first period t, has already paid the fixed costs of exporting specific to the foreign market. In the second period $t+1$, based on its foreign demand, this firm can decide to remain a direct exporter or exit the foreign market. Once the firm has exported directly in period t, it would not be optimal to switch to the use of a wholesaler.

We derive the firm's optimal strategy of serving the foreign market j by backward induction, starting with the decision in the second period $t+1$, depending on the choices made in the first period t. Below, we only highlight the parts most relevant for obtaining an empirically testable hypothesis, i.e. a situation when it is optimal for the firm to enter the foreign market first using a wholesaler and then switching to direct exporting if their demand is high enough. A complete derivation of the other scenarios can be found in the Appendix.

2.2. Firm's optimal strategy in period $t+1$

We start by analysing the situation where the firm has supplied the foreign market using a wholesaler in period t. Given that the firm has been exposed to the foreign market in the previous period, uncertainty regarding the foreign demand has been resolved. In period $t+1$, the firm can decide whether to continue using a wholesaler, export directly or exit the foreign market.

If the firm continues using a wholesaler and assuming that the firm's cost of production to

be zero and common to all firms,[8] we find that the maximum profits in $t+1$ of a firm that continues using a wholesaler in the second period are given by:

$$\Pi^{ww*} = \left[\frac{\delta_j - \omega_j}{2}\right]^2 \tag{1}$$

where the firm obtains positive profits from continuing using a wholesaler as a trade intermediary as long as the foreign demand exceeds the variable cost of wholesalers:

$$\delta_j^* = \omega_j \tag{2}$$

Alternatively, if the firm discovers that its foreign demand in the foreign country is well above ω_j, it could find it profitable to pay the fixed costs of exporting directly in order to avoid paying the higher variable costs in the form of wholesalers' fees.

In this case, the maximum profits in $t+1$ of a firm that starts exporting directly in the second period are given by:

$$\Pi^{we*} = \left[\frac{\delta_j - \gamma_j\omega_j}{2}\right]^2 - f_j^e \tag{3}$$

where the firm obtains positive profits as a result of changing to direct exports as long as the foreign demand exceeds the following threshold:

$$\delta_j^{**} = 2\sqrt{f_j^e} + \omega_j\gamma_j \tag{4}$$

Although the firm obtains positive profits from changing to direct exports, it might not find it optimal to switch the method of supplying the foreign country. Using Equation 1 and Equation 3, we can obtain the specific threshold above which firms will switch from supplying through wholesalers as trade intermediaries to direct exports.

The threshold δ_j^{***} above which firms supplying through wholesalers in period t will find

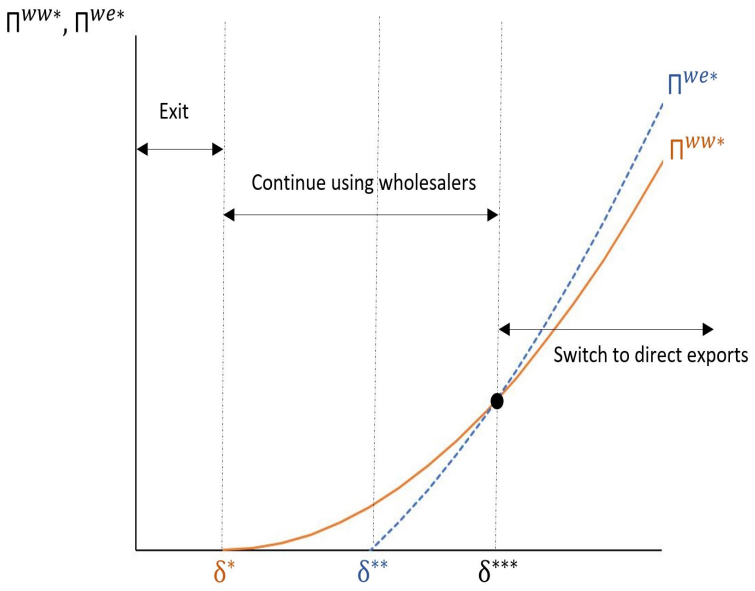
[8] This is a simplification of reality given that it excludes the idea of firm heterogeneity in terms of productivity. While this assumption is unrealistic, it allows us to identify the role of learning about the foreign demand in the internationalisation process of firms.

it optimal to switch to direct exports is given by the following term:

$$\delta_j^{***} = \frac{2f_j^e}{\omega_j\left(1-\gamma_j\right)} + \frac{\omega_j\left(1-\gamma_j^2\right)}{2\left(1-\gamma_j\right)} \tag{5}$$

Figure 1 summarises the firm's potential profits and strategies in the second period $t+1$, based on the assumption that the firm has supplied the foreign market j using a wholesaler in the first period t. Depending on the demand intercept, the manufacturing firm will choose its optimal strategy in period $t+1$. If the foreign demand is weak and below the cost of wholesalers $\delta_j < \delta_j^*$, the firm will exit the foreign market in period $t+1$. Alternatively, when the foreign demand is stronger and found to be between the cost of wholesalers and the threshold of exporting directly $\delta_j^* \leq \delta_j \leq \delta_j^{***}$, the optimal firm's strategy is to continue operating the foreign market through wholesalers as trade intermediaries. Finally, when the foreign demand is very strong and higher than the optimal threshold for exporting directly $\delta_j > \delta_j^{***}$, the firm is willing to pay the one-off fixed costs of exporting directly in $t+1$, in order to benefit from lower variable transport costs.

Figure 1: Firm's strategies in $t+1$ after a foreign exposure via wholesalers



Notes: Π^{ww*} refers to the maximum profits in $t+1$ of a firm that decides to continue using a wholesaler in $t+1$. Π^{we*} refers to the maximum profits in $t+1$ of a firm that decides to change to direct exports. δ_j is the demand intercept, which is destination specific and captures the firm's foreign demand. It is known to the firm as in this scenario, the firm has supplied the foreign market through intermediaries in period t. The chosen firm's strategy will depend on the observed foreign demand. The exact expressions of the cutoffs on δ_j are given in the Appendix.

From Figure 1, it is clear that direct exporting can be chosen in period $t+1$, provided the manufacturing exporter learns that its foreign demand is sufficiently high. The learning about demand occurs via the contacts with the wholesaler in period t. Alternatively, we can also consider the firm's optimal strategy considering other period t scenarios, i.e. where it has entered the foreign market using direct exports or where the firm has not entered the foreign market at all. However, these scenarios are less interesting for our purpose since we are mainly interested in switchers from the wholesaler mode to the direct exporting model. All other scenarios will be considered in the Appendix for completeness.

2.3. Firms' optimal strategy in period t

Following the backward induction procedure used, we can then evaluate the firm's decision in period t. Again, we focus on the wholesaler mode and we start from the ex-ante profits

from using a wholesaler as a method of supplying the foreign market in period t as given by the following expression:

$$E\left(\Pi^{w}\right) =$$

$$\underbrace{\int_{\underline{\delta_j}}^{\overline{\delta_j}} \left(\delta_j - q_j - w_j\right) q_j dP\left(\delta_j\right) - f^{w}}_{\text{First Period}} + \underbrace{\int_{\delta_j^{*}}^{\delta_j^{***}} \left(\frac{\delta_j - \omega_j}{2}\right)^{2} dP\left(\delta_j\right)}_{\text{Second Period: Wholesaler}} + \underbrace{\int_{\delta_j^{***}}^{\overline{\delta_j}} \left(\left(\frac{\delta_j - \gamma_j \omega_j}{2}\right)^{2} - f_j^{e}\right) dP\left(\delta_j\right)}_{\text{Second Period: Direct Export}} \tag{6}$$

where the first term in the expression shows the first period profits from supplying the foreign market using a wholesaler as a trade intermediary in period t, i.e. the firm knows that its demand is within the support of the distribution function. The second term captures the option value of serving the foreign market using wholesalers in period $t+1$, and the third term captures the option value of switching to direct exports in the second period. Therefore, the second and third expressions show the profits after the firm has learnt its individual foreign demand, obtained from their exposure to the foreign market through wholesalers as an intermediate step in the first period.

It can be shown that a manufacturing firm will have positive expected profits of entering the foreign market in period t with a wholesaler as a trade intermediary, provided demand exceeds a particular threshold, noted by $\tilde{\delta_j^{w}}$. It can also be shown that the manufacturing firm will have positive expected profits from serving the foreign market with direct exports as long as the expected foreign demand is above a critical foreign demand threshold, defined as $\tilde{\delta_j^{e}}$. A third option is found where $\tilde{\delta_j^{w}} \leq E\left(\delta_j\right) \leq \tilde{\delta_j^{e}}$. In this case, the expected profits from entering a foreign market using a wholesaler are found to be positive and these exceed the expected profits obtained from exporting directly. Hence, the firm will serve the foreign market using a wholesaler as a trade intermediary.

If the firm does not enter in the foreign market in the first period, then it will earn zero profits as the foreign demand remains unknown.[9]

[9]See Appendix for more details on each of the scenarios.

2.4. Wholesalers matter

The idea that the firm can test their individual foreign demand using a wholesaler is important in our framework. To show this idea, we consider a limit scenario in which the expected demand is equal to the particular threshold where using a wholesaler for the first time results in positive profits plus an arbitrary small amount, defined by $E(\delta_j) = 2(f^w)^{\frac{1}{2}} + \omega_j + \epsilon$. In addition, the fixed cost of exporting satisfies the following condition $f_j^e > \frac{1}{2}\left(2(f^w)^{\frac{1}{2}} + \omega_j(1-\gamma_j) + \epsilon\right)^2$.

Under this scenario, the overall profits from using a wholesaler in the first period evaluated at the expected demand are positive and equal to:

$$\Pi^{w*} = \frac{(E(\delta_j) - \omega_j)^2}{2} - f^w > 0 \tag{7}$$

Contrary, the overall profits from exporting directly in the first period evaluated at the expected demand are negative and given by:

$$\Pi^{e*} = \frac{(E(\delta_j) - \gamma_j\omega_j)^2}{2} - f_j^e < 0 \tag{8}$$

This particular scenario clearly highlights that supplying the foreign market through wholesalers can be an important intermediate step in the internationalisation process of manufacturing firms. Without wholesalers, expected profits from exporting would be negative and the firm would not serve the foreign market, as in the example above. However, by connecting to an exporting wholesaler to reach foreign consumers, the non-exporting firm can learn whether its demand abroad in the foreign market is high enough (see Figure 1), in which case it eventually becomes a direct exporter. Therefore, exporting wholesalers in the model serve as agents that reduce the uncertainty that non-exporting manufacturing firms face when considering supplying to a foreign market. Without a connection to an exporting wholesaler, fewer non-exporting firms start exporting directly. The insights obtained from the model result in the following proposition that we can take to the data.

***Proposition**: Exporting wholesalers serve as agents that alleviate the uncertainty that manufacturing firms face when considering supplying a foreign market. Consequently, empirically we expect that non-exporting firms that are connected to a wholesaler serving a foreign market are more likely to become direct exporters to that destination market compared to comparable non-exporting firms without any indirect connection to the specific foreign market.*

3. Data

The first database used in the construction of our dataset is the Business-to-Business (B2B) transaction database, constructed by the National Bank of Belgium (NBB) for the years 2002 to 2014. This database provides information on almost all commercial transactions between Belgian firms, allowing to identify the buyers and suppliers of firms.[10] The entire database contains around 88.5 million yearly firm-to-firm transactions in euros.[11] We combine this information with the Belgian customs records and the intra-EU trade declarations to determine the export status of the different firms, reported at a firm-destination-year level. We complement this information with the Central Balance Sheet Office of the NBB that contains balance sheet information of all Belgian firms allowing us to control for important firm characteristics.[12] [13]

Using the Business-to-Business (B2B) transaction database, we consider only transactions between manufacturing firms and exporting wholesalers.[14] Firms with exporting interme-

[10]This database takes advantage of the Belgian law that states that it is compulsory for all Belgian firms to record annual sales exceeding 250 euros to each buyer.

[11]Dhyne et al. (2015) describe in great detail the procedure that was followed in the construction of the Belgian Business-to-Business (B2B) transaction database.

[12]Uncommon ownership forms such as partnerships or firms with unlimited liabilities are excluded from this database. Furthermore, in a few cases accounts are also excluded from the official database as they do not pass the quality standards.

[13]The construction of our dataset is done by merging these three databases using the common official firm ID, which uniquely identifies Belgian firms across the different data sources.

[14]Manufacturing firms are defined as firms whose main economic activity are within NACE Rev.2 "Manufacturing- C" excluding "Manufacture of coke and refined petroleum products-C19". Wholesalers are defined as those firms whose main activities is within the "Wholesale trade, except of motor vehicles and motorcycles-G46".

diaries other than wholesalers are not taken into account since our primary objective is to identify the learning process through the demand channel. Thus, we do not consider firms connected to other exporting manufacturing firms, even though other manufacturing firms can also act as an intermediary. We purposely exclude any B2B connection to a manufacturing firm. Even though such connections may also increase the probability of exporting in later years, for such connections it is much more difficult to separate the demand learning from a productivity spillover. When a manufacturing firm acts as an intermediary, we cannot exclude that some value is added to the product that is being shipped and therefore some productivity spillover occurs to the original domestic supplier of the product. We want to exclude any knowledge spillover on the production side between one manufacturing firm to another For example, Bai et al. (2017) argue that Chinese firms exporting indirectly, including through carry-along trade (CAT), increase their productivity as a result. To avoid any such productivity spillovers, in this paper, we only consider intermediary wholesalers that do not have any production activity of their own and that do not alter the value added of the product coming from the supplying manufacturing firm. Any spillover that we pick up between the exporting wholesaler and the supplying manufacturer is therefore more likely to be a demand spillover, i.e. information about the specific foreign demand abroad. Also, we consider manufacturing firms that do not have prior export experience in a particular destination market as we want to evaluate their connection to wholesalers in the extensive margin of the internationalisation of firms.

Non-exporting firms to a particular foreign market are defined as those firms that have not exported directly to a particular destination in any of the two precedent years $(t-1,\ t-2)$.[15] The choice of restricting to a two year lag is justified by Roberts and Tybout (1997) findings. They observe that once the firm has not been exporting for two years, the exporting costs are not significantly different from the costs of a firm that is considering exporting for the first time.

Firms that do not serve the foreign market either directly nor indirectly through wholesalers

[15] As a robustness check, we will use different lags in the definition of "non-exporting" firms. It is important to note that we find that the conclusions are robust to alternative definitions.

in period t are indexed in the data as 0, firms who supply the foreign market indirectly through wholesalers in period t are indexed as 1, and firms that serve the foreign market exporting directly in period t are indexed as 2.[16] Firms are removed from the sample after they enter the foreign market through direct exports as no new information about their internationalisation is tracked after this event in line with the objective of this paper.

Throughout this paper, we refer to non-exporting manufacturing firms connected to at least one wholesaler exporting to a country j in at least one of the preceding two years of the observation $(t-1,\ t-2)$, as "indirect exporters" towards country j.[17][18] As stated above, we exclude all non-exporting firms connected to other intermediary firms other than wholesalers that could potentially affect the value added of the manufactured product.

Table 2 shows the descriptive statistics of the resulting dataset as a result of merging the different administrative databases from Belgium as previously described. Our sample includes 9,190,377 observations with 57,206 different firms exposed in a different way to 39 different foreign destinations over the period 2004-2014.[19] The resulting sample distinguishes between two groups of firms, i.e. those firms who are identified as supplying the foreign market only through exporting wholesalers "indirect-exporters", and those firms that are not connected to the foreign market through any intermediaries, defined as "non-exposed".

[16] In cases where firms supply the foreign market through exporting wholesalers and direct exports, we classify those firms as direct exporters.

[17] As a robustness check, we will use different lags in the definition of "indirect" exporters. It is important to note that we find that the conclusions are robust to alternative definitions.

[18] We are the first to empirically identify indirect exporters in a B2B dataset. In contrast to Bai et al. (2017) we can therefore separate direct exports and indirect exports from all kinds of processing and assembling exports. However, we lack information on whether the wholesaler is exporting the specific product of the manufacturing firms. In the worst case, we may be classifying as indirect exporters, firms that in reality are non-exporters. Consequently, the effects found in this paper can be seen as lower bound estimates since the real effects of wholesalers are likely to be stronger.

[19] We observe 56,703 and 24,716 different firms depending on the group of firms considered. In this analysis, we exclude "Rest of the World" as a foreign destination market.

4. A First look at Results

Table 1 shows the observed unconditional probabilities of engaging in indirect and direct export activity in the subsequent period for the different sub-samples of firms classified using different foreign exposures. When analysed across destination markets, we observe that indirect exporters that have supplied a foreign market j through exporting wholesalers to market j, have between 4 and 9 times (15-31 times) higher probabilities of exporting directly to market j (relative to continuing supplying the foreign market j indirectly through wholesalers) in period t than firms characterised by not having any intermediary firm in their direct network exporting to a particular foreign destination j. These differences in unconditional probabilities between these two groups of firms are consistent across destination markets. While the unconditional probabilities may appear as relatively small in both groups, it is important to note that these statistics refer to the export status of firms towards destination j in the subsequent period. Considering that only 5% of total firms in Belgium are classified as exporters to at least one destination market (see Dhyne et al. (2015)), we expect the number of new exporters to different destination markets to be quite limited in both groups. The low number of firms that are observed to choose direct exports confirms the existence of important sunk costs of exports across destination markets, as highlighted by Roberts and Tybout (1997).[20] However, at this point we cannot draw strong conclusions from these unconditional probabilities since a possible explanation for the differences in the unconditional probabilities could be associated to firms' self-selection into exporting through a wholesaler based on some other underlying firm characteristics. For instance, Akerman (2018) argues that the existence of wholesalers leads to an additional firm productivity sorting in the internationalisation process of firms. As a consequence, we need to control for firm productivity among other firm characteristics.

[20] It is important to consider that the difference in probabilities between the two groups of firms, characterised by the heterogeneous foreign exposure, could be an underestimation of the real difference in probabilities. This is due to the fact that we cannot track explicitly the flow of products within the Belgian market. This means that we are considering potentially "non-exposed" firms in the group of "indirect exporters", which could potentially lead to an underestimation of the probabilities found in this group of firms. Even if we introduce noise in our definition of indirect exporters, we find an important difference in the probability of direct exporting for indirect exporters compared to "non-exposed" firms.

Next to productivity, we also control for other firm characteristics that have been shown to affect the probability of firms of engaging in the different internationalisation strategies in previous literature.[21]These include firm size measured by full-time equivalent employees, foreign ownership, the primary sector of activity at a 2-digit NACE sectoral level and measured Total-Factor Productivity (TFP). We use different measures of TFP and estimate production function coefficients at a NACE 2-digit level.[22] We then apply the estimated coefficients of the production function to obtain firm measured-TFP. In doing so, we apply the estimated coefficients to all manufacturing firms in Belgium so as to maximise the sample size and avoid selection bias.

Additionally we also want to control for alternative sources of foreign demand learning that may affect the probability to export to a given destination, independently of the foreign market exposure of firms through wholesalers. Suppose that a firm does not export directly to destination j, but does export directly to a neighbouring country k that is similar to j. The firm may then learn about market j through its exports to market k, rather than through its connection to the wholesaler. For this purpose, we collect information on the direct export status of firms towards the neighbouring countries to the foreign destination j, in order to control for that such that we can isolate the demand spillover channel coming from the connection of the non-exporting firm to the wholesaler exporting to country j.

5. Empirical Strategy

To test the main proposition of this paper, i.e that non-exporting manufacturing firms serving a foreign market via a wholesaler, are more likely to become direct exporters in subsequent periods than comparable non-exporting firms without an indirect connection to the foreign market, we use an ordered probit model. This takes into account the discrete, ordinal nature of the internationalisation process of manufacturing firms as assumed in the

[21]Among others studies, see Helpman et al. (2004),Engel et al. (2013),Conconi et al. (2016) , Broocks and Van Biesebroeck (2017)

[22]Different measures of TFP are obtained using the STATA code "prodest" developed by Mollisi and Rovigatti (2017).

theory.[23]

To isolate the importance of having an indirect market connection through exporting wholesalers, we condition the probability of foreign market entry on a set of observable firm characteristics using the assumption of unconfoundedness. After controlling for a set of firm characteristics both groups of firms are equivalent in their remaining firm characteristics, except that some firms are connected to an exporting wholesaler to a specific destination j and others are not. Consequently, we argue that the difference in the probability of foreign market entry is attributed to the fact that some firms were connected to an exporting wholesaler in the previous time periods. This can be expressed in the latent variable setting where the empirical model is as follows:

$$y^*_{ijt} = \underbrace{\sum_{h=1}^{4} \delta_h X_{hit} + \delta_5 W_{ijt-1} + \delta_6 D_j + \gamma_t + \gamma_s}_{F(\Psi)} + \epsilon_{ijt} \tag{9}$$

where y^*_{ijt} is an unobserved latent variable measuring the firm's i expected profits in the foreign market j in time t. The different controls, denoted by $F(\Psi)$ for simplicity of exposition, include X_{hit},W_{ijt-1}, D_j, γ_j and γ_s. The vector of firm characteristics, X_{hit}, used throughout this analysis to include the log of size of the firm in terms of employment, the foreign ownership, the export status to the neighbouring countries to the destination being considered and the log of measured-TFP.[24] The choice of these variables is based on previous economic literature describing firm characteristics that affect the internationalisation strategies of firms. In addition, $W_{ijt-1} = max\left(W_{ij(t-1)}, W_{ij(t-2)}\right)$ which is a binary variable indicating whether firm i has been connected to a wholesaler exporting to market j in any of the two periods prior to the year of decision, which makes δ_5 the main coefficient of interest. D_j controls market attractiveness of the destination

[23] As opposed to multinomial probit, ordered probit can deal with ordering of steps.

[24] While the firm measured-TFP is obtained following the procedure developed by Levinsohn and Petrin (2003), the results are consistent to other measures of productivity. This includes labour productivity, measured by the firm's total value added per firm's total employment, and other measures of firm TFP. The resulting tables can be obtained from the authors upon request.

country j, which is defined as the log of the ratio between GDP of the destination market and geographical distance to the particular destination market.[25] In addition, we include year dummies γ_t to control for temporal variations in export profitability, sectoral dummies γ_s controlling for the primary sector of the firm at a NACE 2-digit level, in order to control for sectoral differences among firms. ϵ_{ijt} is a random disturbance term drawn from a standardised normal distribution.

The observed categorical outcome y_{ijt}, which in our case is the strategy of internationalisation chosen by the firm in time t, is observed and relates to the unobserved latent variable y^*_{ijt} in the following way:

$$y_{ijt} = \begin{cases} 0 & if \quad y^*_{ijt} < \tau_0 \\ 1 & if \quad \tau_0 \leq y^*_{ijt} < \tau_1 \\ 2 & if \quad \tau_1 \leq y^*_{ijt} \end{cases} \tag{10}$$

where y_{ijt} is the ordered dependent variable that in our setting is indexed with the value 0 if the firm decides not to supply the foreign market neither directly nor indirectly. It takes the value 1 if the firm decides to use a wholesaler to supply the foreign market, and it is indexed with the value 2 if the firm decides to engage in direct exports. In addition, $\tau's$ ($\tau_0 < \tau_1$) are the threshold parameters, or cut points, that capture the boundary values between the different internationalisation strategies of firms.

From the assumption that in an ordered probit model ϵ_{ijt} follows a standard normal cumulative distribution function Φ, we obtain the probability of observing the different optimal internationalisation strategies of firms as follows:

[25] GDP is measured as the average annual GDP in current US$ over the time period 2002-2014 (ref. World Bank Database) and distance is measured as the simple distance between the most populated cities in km (obtained from CEPII database, Mayer and Zignago (2011)).

$$Pr\left(y_{ijt}=0\right)=\Phi\left(\tau_0-F(\Psi)\right) \tag{11}$$

$$Pr\left(y_{ijt}=1\right)=\Phi\left(\tau_1-F(\Psi)\right)-\Phi\left(\tau_0-F(\Psi)\right)$$

$$Pr\left(y_{ijt}=2\right)=1-\Phi\left(\tau_1-F(\Psi)\right)$$

where $F(\Psi)$ refers to the different controls of Equation 9. As is standard in these models, the cumulative normal distribution function is standardized with $Var\left(\epsilon\right)=1$. In a linear regression model, we can estimate $Var\left(\epsilon\right)$ since we observe the dependent variable. However, in an ordered probit model, y_{ij}^{*} is unobserved. Hence, the model is not identified unless we make an assumption about the variance of the errors. The assumption of normally distributed error term with variance equal to 1 results in a standardisation of the model which fixes the residual variation at a value of 1, affecting the sets of coefficients. Consequently, the coefficients that will be estimated are not the same as the true underlying coefficients in the latent variable model. Furthermore, we have not included a constant term as we do not know the underlying scale of y_{ij}^{*}. We have to make an identifying assumption about either one of the thresholds, i.e. by fixing one of the cutoffs or the constant to 0. In this analysis, the constant is normalised to zero and both thresholds (where $\tau_0<\tau_1$) are estimated.[26] The likelihood function of the ordered probit model is estimated using the Maximum Likelihood in the following equation:

$$L\left(\theta\right)=\prod_{ij=1}^{N}\prod_{t=1}^{T}\prod_{z=0}^{2}Pr\left(y_{ijt}=z|F(\Psi)\right)^{I(y_{ijt}=z)}$$

$$=\prod_{ij=1}^{N}\prod_{t=1}^{T}\Big\{\left(\Phi\left(\tau_0-F(\Psi)\right)\right)^{I(y_{ijt}=0)}\times\left(\Phi\left(\tau_1-F(\Psi)\right)-\Phi\left(\tau_0-F(\Psi)\right)\right)^{I(y_{ijt}=1)}$$

$$\times\left(1-\Phi\left(\tau_1-F(\Psi)\right)\right)^{I(y_{ijt}=2)}\Big\} \tag{12}$$

where $F(\Psi)$ refers to the different controls of Equation 9, Φ represents the standard normal cumulative distribution function, θ summarises the parameters to be estimated, i.e. the

[26] The choice between restrictions is arbitrary as it does not affect the estimated probabilities.

coefficients δ_{1-5},γ_t,γ_s and the cutoff points τ_0 ,τ_1. $I(\cdot)$ is the indicator function that evaluates to 1 if its argument is true and 0 if it is false. In this application, the indicator takes the value 1 if the observation y_{ijt} belongs to the particular internationalisation strategy z and it takes the value 0 otherwise.

While we include a vector of observable firm characteristics as a control, it is likely that some firm characteristic such as the destination's taste of a firm's product or the geographical distance to a wholesaler exporting to a destination market, remains unobserved and their presence will cause serial correlation in the error term, ϵ_{ijt}. Contrary to the simple ordered model, in a random effects ordered probit, the error term ($\epsilon_{ijt} = f_{ij} + \mu_{ijt}$) is the sum of two terms. On the one hand, f_{ij} is the unobserved, time-invariant, firm-destination heterogeneity. It is independently and identically distributed normal across firms. On the other hand, μ_{ijt} is independently and identically distributed normal across firms and time. Given that f_{ij} is present in the error term ϵ_{ijt} in each time interval, the error term ϵ_{ijt} is serially correlated across time. To deal with this potential issue, we use random effects. Under the random effects assumptions, we see that $var(\epsilon_{ijt}) = \sigma_\epsilon^2 = \sigma_f^2 + \sigma_\mu^2$ and $\rho = corr(\epsilon_{ijt}, \epsilon_{ijq}) = \frac{\sigma_f^2}{\sigma_f^2+\sigma_\mu^2}$ where $t \neq q$.[27] In a random effect model, ρ is estimated and it is defined as the proportion of the panel-level variance component as a share of the total residual variance. In order to evaluate whether controlling for ρ is a significant improvement to the simple ordered probit, we will use the likelihood (LR) statistics. Given that the null hypothesis is $\rho = 0$, when ρ is not equal to zero, the panel variance component should be included, as including it represents an important improvement to the simple ordered probit model.

There remains an additional potential problem referred to as the "initial-condition problem". Our ordered probit specification relates to dynamic response models where the status of a firm i in destination j at time t depends not only on the values taken by the exogenous firm characteristics X_{it}, but also on the firm status at time $t-1$. In our particular application, this indicates whether the manufacturing firm has been previously

[27] In an ordered probit model, the error variance is modeled as a standard normal distribution, so its variance is 1. Consequently, we obtain $\rho = \frac{\sigma_f^2}{\sigma_f^2+1}$.

connected to an exporting wholesaler W_{ijt-1}. However, W_{ijt-1} and W_{ijt_0}, corresponding to the first year of observation $t = 0$, cannot be treated as exogenous determinants of y_{ijt}, as both status depend on f_{ij}, which are correlated with ϵ_{ijt}.

Considering that f_{ij} is introduced, we can write the likelihood function associated with the model as:

$$L(\theta) = \prod_{ij=1}^{N} \prod_{t=1}^{T} \Big\{ \left(\Phi\left(\tau_0 - \left(F(\Psi) + f_{ij}\right)\right)\right)^{I(y_{ijt}=0)} \times \left(\Phi\left(\tau_1 - \left(F(\Psi) + f_{ij}\right)\right) - \Phi\left(\tau_0 - \left(F(\Psi) + f_{ij}\right)\right)\right)^{I(y_{ijt}=1)} \times \left(1 - \Phi\left(\tau_1 - \left(F(\Psi) + f_{ij}\right)\right)\right)^{I(y_{ijt}=2)} \Big\} \tag{13}$$

where once again, $F(\Psi)$ refers to the different controls of Equation 9, Φ represents the standard normal cumulative distribution function, θ summarises the parameters to be estimated and $I(\cdot)$ is the indicator function that evaluates to 1 if its argument is true and 0 if it is false.

Similarly to the application in Aucremanne and Dhyne (2005), our likelihood depends on the status of the firm in the initial year $y_{ij(t=0)}$, which in this application is restricted to two state of firm status, wholesaler-connected and non-wholesaler-connected, $W_{ij(t=0)}$. If the time-span of our dataset T is fixed, the direct estimation of this likelihood function leads to inconsistent estimates of the vector of θ coefficients given the presence of the random effect f_{ij}. To estimate the different parameters consistently, the integration over f_{ij} is needed. Wooldridge (2005) argues that the need to integrate f_{ij} raises the issue of the treatment of the initial conditions.

On the one hand, the initial conditions can be treated as non-random, but this is not desirable as it would indicate that the status of firms in the initial year, $W_{ij(t=0)}$, is independent from the unobserved, time-invariant, firm-destination heterogeneity f_{ij}. Alternatively, we may consider $W_{ij(t=0)}$ as random and the conditional distribution of $W_{ij(t=0)}$ on f_{ij} and all future values of the exogenous firm characteristics as given by $h\left(W_{ij(t=0)}|f_{ij}, X_i, \theta\right)$. Estimating this conditional distribution jointly with the main model allows to estimate the vector of θ coefficients. However, finding the conditional distribution of $W_{ij(t=0)}$ on f_{ij} and all future values of the exogenous variables is not realistic in our

setting.

A third approach, proposed by Wooldridge (2005), is based on the specification of the conditional distribution of the unobserved effect. This approach assumes that specifying the conditional distributions of the unobserved effects on the initial values is as valid as specifying the conditional distribution of the initial conditions on the unobserved effects. Consequently, he argues that specifying the conditional density in a certain way, allows us to use the standard random effects ordered probit software for estimation.

As in Wooldridge (2005) we use $f_{ij} = \alpha_0 + \alpha_1 W_{ij(t=0)} + \sum_{h=2}^{5} \alpha_h X_{hi} + a_{ij}$ where $a_{ij} | \left(W_{ij(t=0)}, X_{hi} \right) \sim N\left(0, \sigma_a^2\right)$, which enable us to write the latent variable setting in the empirical model as:

$$y_{ijt}^{*} = F\left(\Psi\right) + \underbrace{\left(\alpha_0 + \alpha_1 W_{ij(t=0)} + \sum_{h=2}^{5} \alpha_h X_{hi} + a_{ij} \right)}_{f_{ij}} + \epsilon_{ijt}$$

where $\epsilon_{ijt} | \left(F\left(\Psi\right), W_{ij(t=0)}, X_{hi} \right) \sim N\left(0,1\right)$.
Consequently, using the likelihood function associated with this new latent variable and integrating against the $N \sim \left(0, \sigma_a^2\right)$ density makes the likelihood as follows:

$$L\left(\theta\right) =$$

$$= \int_{-\infty}^{+\infty} \prod_{ij=1}^{N} \prod_{t=1}^{T} \left\{ \left(\Phi\left(\tau_0 - \left(F\left(\Psi\right) + \alpha_0 + \alpha_1 W_{ij(t=0)} + \sum_{h=2}^{5} \alpha_h X_{hi} + a_{ij} \right) \right) \right)^{I\left(y_{ijt}=0\right)} \right.$$

$$\left(\Phi\left(\tau_1 - (F(\Psi) + f_{ij})\right) - \Phi\left(\tau_0 - \left(F\left(\Psi\right) + \alpha_0 + \alpha_1 W_{ij(t=0)} + \sum_{h=2}^{5} \alpha_h X_{hi} + a_{ij} \right) \right) \right)^{I\left(y_{ijt}=1\right)} \tag{14}$$

$$\left. \left(1 - \Phi\left(\tau_1 - \left(F\left(\Psi\right) + \alpha_0 + \alpha_1 W_{ij(t=0)} + \sum_{h=2}^{5} \alpha_h X_{hi} + a_{ij} \right) \right) \right)^{I\left(y_{ijt}=2\right)} \right\} \left(1/\sigma_{a_{ij}}\right) \phi\left(a_{ij}/\sigma_{a_{ij}}\right) da_{ij}$$

This likelihood has the same structure as in the standard random effects ordered probit with random effects, with the exception that we have now included to each time period two additional explanatory variables, i.e. $W_{ij(t=0)}$ capturing the firm status in the initial year of observation and X_{hi}, which controls for all the past, present and future values observed in X_{hit}. However, given the unbalanced structure of our dataset, we will use a simple functional form for the expression of the conditional distribution of the unobserved effect,

which assumes that the various exogenous X_{hi}, capturing all the time values of X_{hi} at time t, do not affect the distribution of f_{ij}. Consequently, we can use standard random effects ordered probit software to estimate the different parameters $\left(\tau_o, \tau_1, \alpha_1, \delta_{1-5}, \gamma_t, \gamma_s, \sigma_a^2, \rho\right)$.[28]

6. Results

Table 3 shows the conditional coefficients for an ordered probit (Column 1), an ordered probit with random effects (Column 2), and an ordered probit with random effects controlling for the initial values of the firm status (Column 3).

In all specifications, our main variable of interest, "Wholesaler Connected, W_{ijt-1}", used to control whether firms have been previously supplying to the foreign market through exporting wholesalers, is positive and significant at the 1% level. Column (2) and (3) include random effects with the likelihood ratio (LR) statistics where the null hypothesis is $\rho = 0$. Given that $\chi^2(\rho)$ test for the significance of the random effects, we can reject the null hypothesis and observe that adding random effects represents a significant improvement to the simple ordered probit model. Moreover, given that in our dataset the firm status is not observed from years prior to 2003, Column (3) includes an initial value of the firm status $W_{ij(t=0)}$ and unobserved heterogeneity. Once again, the coefficient on the connection to a wholesaler W_{ijt-1} is statistically significant, suggesting that connection to a wholesaler raises the probability of direct exporting in later years.[29]

It can also be noted from the same Table that firms characterised by having a bigger size, being more productive and that are already exporting to neighbouring countries to the destination being considered, are more likely to choose a deeper internationalisation strategy, i.e. supply the destination through a wholesaler or engage in direct exporting. Market attractiveness is also significant at the 1% level suggesting that firms are more

[28] See Wooldridge (2005) for more details on the initial conditions problem in dynamic, nonlinear unobserved effects models.

[29] The initial value is statistical significant, suggesting that there is substantial correlation between the unobserved heterogeneity and the initial condition.

likely to supply a foreign destination, the higher the GDP and the closer the distance to the destination market.[30]

The negative coefficient on Foreign Ownership seems counter-intuitive since it suggests that domestic firms may be more likely to supply foreign markets than foreign firms. But this result should be understood as follows. Foreign owned firms are firms that have engaged in FDI and typically have higher productivity than domestic firms Helpman et al. (2004) and can already have subsidiaries in other countries and may therefore be less in need to use wholesalers in the market to reach foreign destinations.

Next, to give an interpretation to the coefficient on our variable of interest, we obtain the predicted probabilities of each of the three internationalisation categories that we defined, i.e. firms that do not supply a foreign market in t (value 0 in the ordered probit), firms that supply a foreign market indirectly in t (value 1 in the ordered probit) and firms that serve a foreign market through direct exports (value 2 in the ordered probit).We do so by applying a hypothetical change to the firm's previous foreign exposure to the destination market. Given that our variable of interest is a categorical variable, we take the predicted probability of choosing a given internationalisation strategy when firms are neither supplying indirectly nor directly to the destination market, indexed as 0, and we compare it with a situation where firms are supplying to the foreign market through exporting wholesalers, indexed as 1. To control for the other independent variables used in the empirical model, we use the approach described as Average Adjusted Predictions (AAPs). In doing so, we compare two hypothetical groups of firms, one group where all firms have an exporting wholesaler connection and one group of firms without wholesaler connection. But both groups are characterised by the same values on the other independent variables included in the empirical model. Since the only difference between these two hypothetical groups of firms is their exposure to the foreign market, foreign exposure through exporting wholesalers can be argued to be the main reason for the differences in

[30]Our results are robust to including country dummies variables instead of the market attractiveness variable.

the probability of engaging in the different internationalisation strategies.[31]

Based on the specification in Column (3) of Table 3, we find that that previous foreign exposure to foreign markets via exporting wholesalers increases the probability of supplying the foreign market either directly or indirectly in subsequent periods. We find that firms that have not supplied a foreign market before, have a 6.41% probability of choosing to supply the foreign market through exporting wholesalers in the subsequent period. But this probability increases to 17.72% for firms that were already indirectly supplying to foreign markets through exporting wholesalers in precedent time periods. Additionally, firms in our sample that previously supply a foreign market through an exporting wholesaler, have a probability of 0.51% to export directly to the specific destination market as opposed to a probability of only 0.08% for firms that did not supply the destination market neither directly nor indirectly.[32] To summarise, controlling for similar firm characteristics, we find that firms with foreign exposure via wholesalers have about 3 times higher probability of supplying the foreign market through wholesalers and more than 6 times higher probability of engaging in direct exports in the subsequent time period, relative to comparable firms that did not supply directly nor indirectly the foreign destination market.

In Table 4we again estimate the benchmark specification but instead of ordered probit we now use a simple probit. The dependent variable thus becomes a binary variable. It takes the value 0 if the firms do not serve the foreign market neither directly nor indirectly through wholesalers and value 1 if the firms serve the foreign market through direct exports in the period t. In this binary setting, we do not have an "initial-condition problem" since our specification is not a dynamic response model as continuing being connected to a wholesaler is not included as an option in the dependent variable. Consequently, Column (1) of this table uses a probit and Column (2) uses a probit with random effects (R.E). It can be noted that results are robust to making the internationalisation choice of firms a

[31] An alternative approach to understand the magnitude of the impact of our variable of interest in the so-called Adjusted Predictions at the Means (APM). The main advantage from using the Average Adjusted Predictions (AAPs) compared to the alternative approach Adjusted Predictions at the Means (APM) is that we use all the firms in our dataset when estimating the predicted probabilities.

[32] The low number of firms that choose direct exports confirms the existence of important sunk costs of exports across destination markets, as highlighted by Roberts and Tybout (1997).

binary problem.

In Columns (3) and (4) we interact the wholesaler variable, W_{ijt-1}, with the geographical distance to a specific foreign destination j. [33] [34] The coefficients on the interaction terms in Columns (3) and (4) of Table 4 are positive and significant. This suggests that the role of wholesalers in facilitating direct exports is more important in distant markets. This may reflect that demand uncertainty faced by non-exporting firms rises with distance to the destination. This supports the finding of Ahn et al. (2011) who argue that trade intermediaries are more important when evaluating foreign entry into markets which are more difficult to enter in the form of direct exports.

7. Robustness Checks

In Table 3, we report results for the ordered probit regressions (with and without random effects and initial conditions) for different sub-samples of firms in order to create more homogeneous samples. We define two different firm size classes. Columns (1)-(3) restricts the sample to firms between 1-20 employees, Columns (4)-(6) restricts the sample to firms with +20 employees. In the last three columns we exclude all firms that do not have any wholesaler connection to any destination market. We then use the specifications in Columns (3), (6) and (9) to assess the predicted probabilities of deeper internationalisation, depending on whether the firm has been previously connected to exporting wholesalers. The results clearly show that small firms with less than 20 employees have 3 times higher probability of supplying the foreign market with wholesalers and 8 times higher probability of engaging in direct exports in the subsequent period than comparable firms that have not supplied directly nor indirectly the foreign destination market. Results are qualitatively similar for firms with more than 20 employees and in the more restricted sample of firms in terms of wholesaler connections in column (9).

[33] See Conconi et al. (2016) for a recent study that uses geographical distance among other indicators as a proxy of demand uncertainty.

[34] Distance is measured as the simple distance between the most populated cities in km (obtained from the CEPII database, Mayer and Zignago (2011))

Another robustness check we perform is by altering the definitions of non-exporting firms. In this paper, we have defined non-exporting firms as those firms that have not exported directly to a particular destination in any of the two precedent years ($t-1$,$t-2$). Although the choice of two precedent years is justified by previous evidence that suggests that after two years, exporting firm loses all the advantages compared to those considering exporting for the first time, we show that our results are robust to alternative time thresholds of one and three years. Table 6 shows that our benchmark estimations of Table 3 are robust to alternative definitions characterising the export status of firms.

One more robustness check that we perform is to control for the fact that in large samples, p-values are typically low easily resulting in statistical significance.[35] To make sure that our results are not just driven by a large sample, we perform additional robustness checks. In Column (1)-(4) we report cross-sectional results for every 3 years in our data. By running the benchmark specification on individual years, we thereby reduce the sample a lot but results on the Wholesaler variable remain positive and significant in every year. Next in Columns (5)-(8) we perform a placebo test, i.e. we use a random variable acting as a placebo instead of the real wholesaler connection variable.[36] It can be noted that the placebo random variable is not statistically significant which is reassuring as it suggests that the statistical significance on our Wholesaler variable in earlier specifications is not driven by the large number of observations in our sample.

And finally, we perform one robustness check to account for the fact that EU regulation on the exporting thresholds in firm-level data went up. After 2006, the reporting threshold for exporters was raised and an exporter only enters the data if its exports to all EU Member States combined sum to at least 1 million euros for the year considered. We want to exclude firms in our data that suddenly appear as direct exporters in the data because they exceed the reporting threshold since that introduces noise in our analysis. For this reason we repeat our benchmark specification but now drop non-exporting firms that became exporters to multiple other EU countries in t and did not previously export

[35] See Lin et al. (2013) for more details.

[36] The generated random variable has the same density as our variable of interest, W_{ijt-1}.

to any EU country in $t-1$. The underlying reason is that firms that do not have any prior exports activity to any EU country in $t-1$, but export to multiple EU destinations in the next year, may be the result of exceeding the reporting threshold. In contrast, if we observe firm exports in at least one EU country in the previous year, the reporting threshold does not affect the results. After dropping potentially problematic firms from our sample, we still observe that our results continue to be robust.

8. Conclusion

This paper uses B2B transaction level data to study how business networks interact with the internationalisation strategies of firms. Our main finding is that a business connection to a wholesaler exporting to a specific destination helps non-exporting manufacturing firms to become direct exporters to the same specific foreign market. The underlying mechanism is that a wholesaler connection reduces the demand uncertainty in the foreign market. Foreign exposure via an exporting wholesaler increases the probability of becoming a direct exporter to a particular destination in subsequent years. We show that non-exporting firms with a previous connection to an exporting wholesaler have more than six times higher probability of engaging in direct exports in the subsequent time period than a comparable manufacturing firm without previous foreign exposure.

Consequently, this paper shows an important complementarity role for wholesalers. While previous literature stressed the cost reducing role of wholesalers as an export mode, this paper stresses a different role of wholesalers, i.e. reducing uncertainty about foreign demand. Based on our findings, we say that the use of a wholesaler can be an intermediary step to help many firms to reach a direct exporting status. This result is not driven by productivity spillovers. Instead the result is due to learning about the demand side, which reduces demand uncertainty and consequently increases firms' participation in foreign markets.

This paper therefore helps to improve the understanding on the functioning of trade intermediaries. This is useful in order to build a public policy aimed at helping firms to achieve the export threshold. This paper demonstrates the broader role that trade intermediaries play in the internationalisation process of firms by offering them a vehicle to learn about their demand.

9. Tables

Table 1: Unconditional Probabilities: Internationalisation Process of Firms

Destination	Indirect-Export (%)	Direct-Export (%)	Indirect-Export (%)	Direct-Export (%)	Ratio of Probabilities Wholesale Connection / No-connection	
	No connection in $(t-1,\ t-2)$		Wholesale Connection $(t-1,\ t-2)$		Indirect-Export	Direct-Export
AT	2.5	0.05	44.51	0.24	17.8	4.9
AU	1.5	0.10	38.77	0.55	26.3	5.6
BG	1.9	0.06	38.65	0.40	20.7	7.0
BR	1.1	0.05	33.53	0.45	30.2	9.0
CA	1.7	0.11	35.54	0.47	21.1	4.2
CN	2.0	0.09	34.48	0.60	17.1	6.3
CY	1.5	0.05	38.78	0.27	25.4	5.9
CZ	2.2	0.04	42.38	0.31	19.3	7.4
DE	3.3	0.03	47.11	0.21	14.2	6.8
DK	2.3	0.04	43.93	0.25	18.9	5.6
EE	1.6	0.05	42.48	0.32	26.6	6.5
ES	2.8	0.04	44.04	0.28	15.8	6.4
FI	2.0	0.05	42.33	0.37	21.0	7.6
FR	3.4	0.04	48.47	0.23	14.4	5.8
GB	2.8	0.04	45.38	0.25	16.4	5.6
GR	2.2	0.05	42.31	0.36	19.4	7.5
HU	1.9	0.05	39.90	0.41	20.6	8.0
ID	1.0	0.05	32.46	0.42	31.0	8.9
IE	2.3	0.05	41.18	0.36	17.9	8.0
IN	1.7	0.08	33.97	0.51	20.1	6.6
IT	2.9	0.04	43.82	0.27	15.0	7.2
JP	1.6	0.09	37.64	0.45	24.1	5.3
KR	1.3	0.07	34.65	0.52	26.6	7.7
LT	1.7	0.06	37.98	0.39	22.1	6.9
LU	3.3	0.03	48.97	0.20	15.0	6.0
LV	1.7	0.05	41.47	0.37	25.0	6.7
MT	1.4	0.04	39.40	0.36	28.9	8.7
MX	1.0	0.07	34.01	0.43	34.5	6.5
NL	3.4	0.03	48.84	0.25	14.2	8.7
PL	2.7	0.05	43.35	0.38	16.3	7.1
PT	2.3	0.05	42.57	0.25	18.4	4.9
RO	2.2	0.06	39.77	0.43	17.7	7.3
RU	1.9	0.08	39.27	0.55	21.0	7.1
SE	2.3	0.04	43.26	0.36	19.0	8.5
SI	1.6	0.05	38.09	0.38	23.7	7.5
SK	1.8	0.04	42.31	0.36	23.0	8.2
TR	2.1	0.09	35.81	0.50	17.1	5.2
TW	1.4	0.07	35.20	0.43	25.5	6.4
US	2.2	0.14	36.93	0.61	17.0	4.4
Total	**2.0**	**0.06**	**41.37**	**0.36**	**21.1**	**6.1**

Notes: Comparison of the unconditional probabilities of supplying the foreign market in t to a specific destination using indirect and direct exports for two subgroups, i.e. manufacturing firms who have supplied a foreign market through an exporting wholesaler and manufacturing firms characterised by having neither a direct nor indirect exposure to the foreign destination.

Table 2: Descriptive Statistics for Wholesaler-Connected vs Non-Connected Firms

	Wholesaler-connected (Indirect-exporters)		Non-connected firms (Non-exporters)	
Number of Observations	595,118		8,585,259	
Number of unique firms	24,716		56,703	
Firms Variables	Mean	Std. dev	Mean	Std. dev
Employment	11	53	5	26
TFP (Levinsohn and Petrin)	58,618	160,510	45,858	107,657
Value Added	836,950	5,590,000	358,052	2,442,866
Dummy variables				
Neighbouring Exporter	0.02		0.004	
Foreign Ownership	0.011		0.006	

Notes: Descriptive statistics for manufacturing firms that have been previously supplying a foreign market through exporting wholesalers compared to manufacturing firms who have not been connected neither directly nor indirectly to the foreign market. Our sample of manufacturing firms covers the time period 2004-2014.

Table 3: Benchmark Estimations: Internationalisation Process of Firms Using Ordered Probits

Dependent Variable: Firm's Export Status in t 2- Direct Exports , 1- Indirect exports, 0- Non-exporter	(1) O. Probit	(2) O.Probit (R.E.)	(3) O.Probit (R.E.) + initial conditions
Wholesaler Connected, W_{ijt-1}	1.531***	1.351***	0.839***
	(0.00317)	(0.00431)	(0.00565)
Wholesaler Connected (initial), $W_{ij(t=0)}$			0.996***
			(0.00800)
Foreign Ownership, X_{2i}	-0.0609***	-0.0685***	-0.101***
	(0.0122)	(0.0153)	(0.0184)
Neighbouring Exporter, X_{3it-1}	0.446***	0.530***	0.543***
	(0.00799)	(0.00975)	(0.0112)
ln Employment, X_{4it}	0.0662***	0.0920***	0.106***
	(0.00122)	(0.00154)	(0.00180)
ln Measured-TFP, X_{5it}	0.120***	0.143***	0.154***
	(0.00241)	(0.00288)	(0.00329)
ln Market Attractiveness, D_j	0.0544***	0.0743***	0.0704***
	(0.000829)	(0.00110)	(0.00131)
Cut 1, τ_0	4.162***	4.957***	5.297***
	(0.0304)	(0.0385)	(0.0446)
Cut 2, τ_1	6.050***	7.072***	7.626***
	(0.0310)	(0.0400)	(0.0462)
Observations	1,912,130	1,912,130	1,912,130
Log Likelihood:	-448,727	-444,562	-433,607
σ^2_{fj}		0.262***	
		(0.00434)	
σ^2_a			0.583***
			(0.00709)
ρ		0.208***	0.368***
$\chi^2(\rho)$		8,332***	20,861***
Year Dummies	X	X	X
Sector Dummies	X	X	X

Notes: In this table, the dependent variable takes the value 0 if the firm does not serve the foreign market neither directly nor indirectly through wholesalers in period t, it takes the value 1 if the firm supplies the foreign market indirectly through wholesalers in period t and it takes the value 2 if the firm serves the foreign market through direct exports. Column (1) uses an ordered probit, Column (2) uses an ordered probit with random effects (R.E) and Column (3) uses an ordered probit with random effects controlling for initial values. All equations include Nace 2-digit sector and year dummies that are not reported; σ^2_{fj} is the estimated variance of the random effects;σ^2_a is the estimated variance of the random effects when we include the initial conditions, ρ is defined as the proportion of the panel-level variance component to the total residual variance; $\chi^2(\rho)$ is the Chi-squared test for the significance of the random effects. τ_0 and τ_1 indicate threshold between stages of internationalisation. Standard errors are indicated in parenthesis. The statistical significance level is at a 1%, 5% and 10% level is indicated using *** , ** and * , respectively.

Table 4: Export Decision of Firms Using Probits

Dependent Variable: Firm's Export Status in t 1- Direct Exports, 0- Non-exporter	(1) Probit	(2) Probit (R.E.)	(3) Probit + Interaction	(4) Probit (R.E.) + Interaction
Wholesaler Connected, W_{ijt-1}	0.256***	0.305***	0.195***	0.238***
	(0.0125)	(0.0161)	(0.0155)	(0.0199)
(Wholesaler Connected, W_{ijt-1})* (Distance to market j)			1.97e-05***	2.10e-05***
			(2.72e-06)	(3.51e-06)
Foreign Ownership, X_{2i}	-0.0947***	-0.1132***	-0.0961***	-0.114***
	(0.0242)	(0.0325)	(0.0243)	(0.0323)
Neighbouring Exporter, X_{3it-1}	0.8900***	1.1194***	0.899***	1.124***
	(0.0138)	(0.0219)	(0.0140)	(0.0219)
ln Employment, X_{4it}	0.1248***	0.1683***	0.124***	0.167***
	(0.0044)	(0.0064)	(0.00450)	(0.00644)
ln Measured-TFP, X_{5it}	0.2589***	0.3233***	0.259***	0.322***
	(0.0093)	(0.0124)	(0.00931)	(0.0124)
ln Market Attractiveness, D_j	0.0526***	0.0678***	0.0547***	0.0696***
	(0.0033)	(0.0044)	(0.00335)	(0.00444)
Constant	-7.098***	-8.9143	-7.133***	-8.911***
	(0.1210)	(0.1888)	(0.121)	(0.188)
Observations	1,912,130	1,912,130	1,912,130	1,912,130
Log Likelihood:	-25,563	-25,311	-25,539	-25,294
σ_{fj}		0.7271***		0.718***
		(0.0243)		(0.0243)
ρ		0.3461***		0.3405***
$\chi^2(\rho)$		505.45***		490.28***
Year Dummies	X	X	X	X
Sector Dummies	X	X	X	X

Notes: In this table, the dependent variable takes the value 0 if the firm does not serve the foreign market neither directly nor indirectly through wholesalers in period t and it takes the value 1 if the firm serves the foreign market through direct exports. Column (1) uses a probit, Column (2) uses a probit with random effects (R.E) controlling for year and sector dummies which are not reported for simplicity. Column (3)-(6) performs a repeated cross-section for every three years in our dataset; Column (7)-(10) repeats the repeated cross-section using a random variable acting as a placebo instead of the real wholesaler connection variable; Standard errors are indicated in parenthesis. The statistical significance level is at a 1%, 5% and 10% level are indicated using *** , ** and * , respectively.

Table 5: Internationalisation Process of Firms Using Ordered Probits (Robustness)

Dependent Variable: Firm's Export Status in t	Sub-sample (1-20 employees)			Sub-sample (20+ employees)			Wholesaler connected at least 1 destination		
2- Direct Exports , 1- Indirect exports, 0- Non-exporter	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
	O. Probit	O.Probit (R.E.)	O.Probit (R.E.) + initial	O. Probit	O.Probit (R.E.)	O.Probit (R.E.) + initial	O. Probit	O.Probit (R.E.)	O.Probit (R.E.) + initial
Wholesaler Connected, W_{ijt-1}	1.555***	1.385***	0.884***	1.316***	1.176***	0.753***	1.353***	1.135***	0.771***
	(0.00385)	(0.00516)	(0.00686)	(0.00787)	(0.0103)	(0.0134)	(0.00326)	(0.00454)	(0.00548)
Wholesaler Connected (initial), $W_{ij(t=0)}$			0.981***			0.813***			0.769***
			(0.00974)			(0.0176)			(0.00723)
Foreign Ownership, X_{2i}	-0.117***	-0.129***	-0.120**	0.0284*	0.0257	0.00272	-0.0219*	-0.0273*	-0.0517***
	(0.0417)	(0.0489)	(0.0568)	(0.0146)	(0.0184)	(0.0210)	(0.0124)	(0.0164)	(0.0184)
Neighbouring Exporter, X_{3it-1}	0.478***	0.564***	0.577***	0.401***	0.476***	0.488***	0.416***	0.499***	0.499***
	(0.0115)	(0.0138)	(0.0158)	(0.0116)	(0.0143)	(0.0159)	(0.00823)	(0.0104)	(0.0113)
ln Employment, X_{4it}	0.0653***	0.0938***	0.106***	0.0622***	0.0883***	0.0928***	0.0451***	0.0696***	0.0754***
	(0.00259)	(0.00319)	(0.00375)	(0.00665)	(0.00842)	(0.00958)	(0.00129)	(0.00168)	(0.00185)
ln Measured-TFP, X_{5it}	0.147***	0.169***	0.182***	0.0747***	0.0857***	0.0893***	0.0991***	0.119***	0.123***
	(0.00334)	(0.00397)	(0.00455)	(0.00851)	(0.0102)	(0.0113)	(0.00255)	(0.00313)	(0.00340)
ln Market Attractiveness, D_j	0.0541***	0.0730***	0.0691***	0.0523***	0.0676***	0.0619***	0.0669***	0.0965***	0.0884***
	(0.00100)	(0.00131)	(0.00157)	(0.00226)	(0.00296)	(0.00339)	(0.000887)	(0.00125)	(0.00139)
Cut 1, τ_0	4.453***	5.217***	5.582***	3.464***	4.032***	4.193***	3.906***	4.804***	4.887***
	(0.0399)	(0.0499)	(0.0580)	(0.0985)	(0.122)	(0.136)	(0.0323)	(0.0423)	(0.0462)
Cut 2, τ_1	6.476***	7.483***	8.082***	4.959***	5.700***	5.992***	5.866***	7.038***	7.268***
	(0.0409)	(0.0519)	(0.0602)	(0.0992)	(0.124)	(0.138)	(0.0330)	(0.0439)	(0.0478)
Observations	1,303,399	1,303,399	1,303,399	207,683	207,683	207,683	1,328,209	1,328,209	1,328,209
Log Likelihood:	-301,697	-298,961	-291,737	-75,736	-75,204	-73,781	-415,420	-410,368	-403,091
σ^2_{fj}		0.257***			0.257***			0.315***	
		(0.00519)			(0.0114)			(0.00491)	
σ^2_a			0.580***			0.483***			0.514***
			(0.00872)			(0.0159)			(0.00648)
ρ		0.20 ***	0.37***		0.20***	0.33***		0.24***	0.34***
$\chi^2(\rho)$		8,332***	13,707***		1,063***	2,386***		10,102***	18,378***
Year Dummies	X	X	X	X	X	X	X	X	X
Sector Dummies	X	X	X	X	X	X	X	X	X

Notes: In this table, the dependent variable takes the value 0 if the firm does not serve the foreign market neither directly nor indirectly through wholesalers in period t, it takes the value 1 if the firm supplies the foreign market indirectly through wholesalers in period t and it takes the value 2 if the firm serves the foreign market through direct exports. As a robustness check, we make both groups of firms more homogeneous. Columns (1)-(3) restricts the sample to firms between 1-20 employees, Columns (4)-(6) restricts the sample to firms with +20 employees and Columns (7)-(9) excludes firms that do not have any connection to a wholesaler to any of their destination markets. All equations include NACE 2-digit sector and year dummies that are not reported; σ^2_{fj} is the estimated variance of the random effects; σ^2_a is the estimated variance of the random effects when we include the initial conditions, ρ is defined as the proportion of the panel-level variance component to the total residual variance; $\chi^2(\rho)$ is the Chi-squared test for the significance of the random effects. τ_0 and τ_1 indicate threshold between stages of internationalisation. Standard errors are indicated in parenthesis. The statistical significance level is at a 1%, 5% and 10% level is indicated using *** , ** and * , respectively.

Table 6: Ordered Probit: Internationalisation Process of Firms Using Alternative Definitions (Robustness)

Dependent Variable: Firm's Export Status in t	Definitions based on $(t-1)$			Definitions based on $(t-3)$		
2- Direct Exports , 1- Indirect exports, 0- Non-exporter	(1)	(2)	(3)	(4)	(5)	(6)
	O. Probit	O.Probit (R.E.)	O.Probit (R.E.) + initial conditions	O. Probit	O.Probit (R.E.)	O.Probit (R.E.) + initial conditions
Wholesaler Connected, W_{ijt-1}	1.622***	1.348***	0.984***	1.461***	1.292***	0.661***
	(0.00276)	(0.00384)	(0.00426)	(0.00368)	(0.00498)	(0.00734)
Wholesaler Connected (initial), $W_{ij(t=0)}$			0.973***			1.136***
			(0.00618)			(0.0108)
Foreign Ownership, X_{2i}	-0.0432***	-0.0360***	-0.0689***	-0.0431***	-0.0443**	-0.0742***
	(0.00902)	(0.0123)	(0.0135)	(0.0154)	(0.0200)	(0.0250)
Neighbouring Exporter, X_{3it-1}	0.501***	0.577***	0.566***	0.416***	0.516***	0.539***
	(0.00586)	(0.00757)	(0.00813)	(0.0103)	(0.0129)	(0.0153)
ln Employment, X_{4it}	0.0782***	0.118***	0.121***	0.0588***	0.0846***	0.105***
	(0.000963)	(0.00131)	(0.00142)	(0.00148)	(0.00191)	(0.00235)
ln Measured-TFP, X_{5it}	0.119***	0.147***	0.148***	0.120***	0.149***	0.161***
	(0.00191)	(0.00239)	(0.00256)	(0.00291)	(0.00357)	(0.00421)
ln Market Attractiveness, D_j	0.0653***	0.0942***	0.0847***	0.0482***	0.0694***	0.0674***
	(0.000658)	(0.000953)	(0.00104)	(0.00100)	(0.00136)	(0.00171)
Cut 1, τ_0	4.286***	5.369***	5.396***	4.087***	5.000***	5.503***
	(0.0240)	(0.0325)	(0.0349)	(0.0365)	(0.0475)	(0.0576)
Cut 2, τ_1	6.169***	7.512***	7.661***	5.966***	7.172***	7.950***
	(0.0245)	(0.0336)	(0.0359)	(0.0374)	(0.0494)	(0.0598)
Observations	2,652,833	2,652,833	2,652,833	1,420,328	1,420,328	1,420,328
Log Likelihood:	-713,174	-703,276	-687,206	-308,694	-304,213	-296,075
σ^2_{fj}		0.360***			0.328***	
		(0.00408)			(0.00559)	
σ^2_a			0.528***			0.804***
			(0.00491)			(0.0109)
ρ		0.265***	0.346***		0.247***	0.446***
$\chi^2(\rho)$		19,796***	34,446***		8,961***	20,669
Year Dummies	X	X	X	X	X	X
Sector Dummies	X	X	X	X	X	X

Notes: As a robustness check, we estimate the benchmark specifications with alternative definitions of the firm export status of firms. In Columns (1), (2) and (3), we define non-exporting firms as those that have not exported directly to a particular destination j in the precedent year. In the same manner, we define firms exporting indirectly through wholesalers as those firms who have only been connected to a destination market through an exporting wholesaler to market j in the precedent year. In the same manner, Columns (4), (5) and (6), we define non-exporting firms as those that have not exported directly to a particular destination j in the three precedent years. In the same manner, we define firms exporting indirectly through wholesalers as those firms who have only been connected to a destination market through an exporting wholesaler to market j in at least one of the three precedent year. Similarly to the benchmark estimations, the dependent variable takes the value 0 if the firm does not serve the foreign market neither directly nor indirectly through wholesalers in period t, it takes the value 1 if the firm supplies the foreign market indirectly through wholesalers in period t and it takes the value 2 if the firm serves the foreign market through direct exports. Columns (1) and (3) use an ordered probit, Columns (2) and (4) use an ordered probit with random effects (R.E) and Columns (3) and (6) use an ordered probit with random effects controlling for initial values. All equations include Nace 2-digit sector and year dummies that are not reported; σ^2_{fj} is the estimated variance of the random effects;σ^2_a is the estimated variance of the random effects when we include the initial conditions, ρ is defined as the proportion of the panel-level variance component to the total residual variance; $\chi^2(\rho)$ is the Chi-squared test for the significance of the random effects. τ_0 and τ_1 indicate threshold between stages of internationalisation. Standard errors are indicated in parenthesis. The statistical significance level is at a 1%, 5% and 10% level is indicated using *** , ** and * , respectively.

Table 7: Yearly Repeated Cross-Sections Using a Placebo Variable (Robustness)

Dependent Variable: Firm's Export Status in t	Probit across years (True variable)				Probit across years (Placebo variable)			
1- Direct Exports, 0- Non-exporter	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Years Covered	2004	2007	2010	2013	2004	2007	2010	2013
Wholesaler Connected, W_{ijt-1}	0.299***	0.259***	0.138***	0.231***				
	(0.0387)	(0.0423)	(0.0441)	(0.0439)				
(random) Wholesaler Connected, RW_{ijt-1}					0.064	-0.0126	0.0594	-0.1049
					(0.0635)	(0.0758)	(0.0721)	(0.0864)
Foreign Ownership, X_{2i}	-0.0181	-0.0340	-0.116	-0.236***	-0.00783	-0.0386	-0.110	-0.251***
	(0.0800)	(0.0806)	(0.0759)	(0.0903)	(0.0795)	(0.0803)	(0.0757)	(0.0902)
Neighbouring Exporter, X_{3it-1}	0.898***	0.860***	0.911***	0.928***	0.917***	0.886***	0.916***	0.946***
	(0.0424)	(0.0477)	(0.0465)	(0.0499)	(0.0423)	(0.0474)	(0.0465)	(0.0497)
ln Employment, X_{4it}	0.0932***	0.106***	0.188***	0.138***	0.0974***	0.109***	0.192***	0.146***
	(0.0137)	(0.0140)	(0.0166)	(0.0165)	(0.0136)	(0.0138)	(0.0166)	(0.0165)
ln Measured-TFP, X_{5it}	0.179***	0.395***	0.152***	0.231***	0.186***	0.399***	0.159***	0.232***
	(0.0278)	(0.0290)	(0.0351)	(0.0315)	(0.0277)	(0.0289)	(0.0351)	(0.0315)
ln Market Attractiveness, D_j	0.0485***	0.0614***	0.0678***	0.0540***	0.0592***	0.0689***	0.0718***	0.0595***
	(0.0102)	(0.0111)	(0.0112)	(0.0114)	(0.0101)	(0.0111)	(0.0111)	(0.0114)
Constant	-6.149***	-8.871***	-6.594***	-6.903***	-6.373***	-8.997***	-6.719***	-6.979***
	(0.363)	(0.395)	(0.442)	(0.411)	(0.362)	(0.393)	(0.441)	(0.410)
Observations	176,667	180,301	186,087	168,934	176,667	180,301	186,087	168,934
Log Likelihood:	-2731	-2319	-2254	-2059	-2757	-2337	-2257	-2071
Sector Dummies	X	X	X	X	X	X	X	X

Notes: In this table, the dependent variable takes the value 0 if the firm does not serve the foreign market neither directly nor indirectly through wholesalers in period t and it takes the value 1 if the firm serves the foreign market through direct exports.Columns (1)-(4) perform a repeated cross-section for every three years in our dataset; Columns (5)-(8) repeat the repeated cross-section using a random variable acting as a placebo instead of the real wholesaler connection variable; Standard errors are indicated in parenthesis. The statistical significance level is at a 1%, 5% and 10% level is indicated using *** , ** and * , respectively.

Appendix

Firm's optimal strategy in period $t+1$

Let's evaluate the firm's optimal strategy in a second scenario where the firm has entered the foreign market using direct exports in period t. In this scenario, it is assumed that the firm has already paid the one-off fixed cost of exporting and consequently, it can serve the foreign market using direct exports by paying the transport costs.

As a result, foreign profits are given by:

$$\Pi^{ee} = p_j q_j - \gamma_j \omega_j q_j \tag{15}$$

where transport costs $\tau_j = \gamma_j \omega_j$ are defined a fraction of the wholesalers' fees.

The maximum profits in $t+1$ of a firm that has exported directly in the first period t is given by:

$$\Pi^{ee*} = \left[\frac{\delta_j - \gamma_j \omega_j}{2}\right]^2 \tag{16}$$

where the firm obtains positive profits, as long as their foreign demand is above the transport costs of exporting directly, given by the following threshold: $\delta_j^{e*} = \omega_j \gamma_j$.

As a result, a firm that has paid the one-off fixed costs of exporting in period t will have only two possible options in period $t+1$, continue exporting directly or exit the foreign market. The second option occurs if the foreign demand is above the transport costs associated with exporting directly to the foreign market, $\delta_j \geq \omega_j \gamma_j$. An important observation is that once the firm has paid the fixed costs of exporting directly, it will not find it optimal to supply the foreign market through wholesalers in period $t+1$.

A third scenario occurs when the firm has not entered the foreign market in the first period t, which indicates that the firm has not observed its individual foreign demand in the foreign market. As a consequence, it will not serve the foreign market in the second period, earning zero foreign profits.

Firms' optimal strategy in period t

Following the backward induction procedure used to evaluate firm's optimal strategies, we can evaluate the firm's decision from the perspective of period t. We start from the ex-ante profits from using a wholesaler as a method of supplying the foreign market as given by the following expression:

$$E\left(\Pi^{w}\right) =$$

$$\underbrace{\int_{\underline{\delta_j}}^{\overline{\delta_j}} \left(\delta_j - q_j - w_j\right) q_j dP\left(\delta_j\right) - f^{w}}_{\text{First Period}} + \underbrace{\int_{\delta_j^{*}}^{\delta_j^{***}} \left(\frac{\delta_j - \omega_j}{2}\right)^{2} dP\left(\delta_j\right)}_{\text{Second Period: Wholesaler}} + \underbrace{\int_{\delta_j^{***}}^{\overline{\delta_j}} \left(\left(\frac{\delta_j - \gamma_j \omega_j}{2}\right)^{2} - f_j^{e}\right) dP\left(\delta_j\right)}_{\text{Second Period: Direct Export}} \tag{17}$$

where the first term in the expression shows the first period profits from supplying the foreign market using a wholesaler as a trade intermediary in period t. The second term captures the option value of serving the foreign market using wholesalers in period $t+1$ and the third term captures the option value of switching to direct exports in the second period. Therefore, the second and third expressions show the profits after the firm has learnt its individual foreign demand, obtained from their exposure to the foreign market through wholesalers as an intermediate step in the first period. The choice of strategy will depend on its demand intercept, δ.

The optimal first period profits depend on the expected demand in the foreign market. In a scenario where $E\left(\delta_j\right) > 2\left(f^{w}\right)^{\frac{1}{2}} + \omega_j$, we expect positive profits in the first period from using a wholesaler as a trade intermediary. Moreover, the optimal quantity sold by the firm in the foreign market will be given by $q_j = \left(\frac{E(\delta_j) - \omega_j}{2}\right)$. On the other hand, if $E\left(\delta_j\right) < 2\left(f^{w}\right)^{\frac{1}{2}} + \omega_j$, the expected profits in the first period are negative.

As a result, the expected profits from entering the foreign market in period t using a wholesaler as a trade intermediary can be rewritten as:

$$E\left(\Pi^{w*}\right) =$$

$$\underbrace{\int_{\underline{\delta_j}}^{\overline{\delta_j}} \left(\frac{\delta_j - \omega_j}{2}\right)^2 dP\left(\delta_j\right) - f^w}_{\text{First Period}} + \underbrace{\int_{\delta_j^*}^{\delta_j^{***}} \left(\frac{\delta_j - \omega_j}{2}\right)^2 dP\left(\delta_j\right)}_{\text{Second Period: Wholesaler}} + \underbrace{\int_{\delta_j^{***}}^{\overline{\delta_j}} \left(\left(\frac{\delta_j - \gamma_j\omega_j}{2}\right)^2 - f_j^e\right) dP\left(\delta_j\right)}_{\text{Second Period: Direct Export}} \tag{18}$$

Using the expected profits from entering the foreign market by means of wholesaler in period t, we define the threshold of the foreign demand where the expected profitability is positive, labelled as $\tilde{\delta_j^w}$. Below this foreign demand threshold, it would not be profitable to serve the foreign market using a wholesaler as a trade intermediary.

Alternatively, the ex-ante profits from exporting directly are as follows:

$$E\left(\Pi^e\right) = \underbrace{\int_{\underline{\delta_j}}^{\overline{\delta_j}} \left(\delta_j - q_j - \gamma_j\omega_j\right) q_j dP\left(\delta_j\right) - f_j^e}_{\text{First Period}} + \underbrace{\int_{\delta_j^{e*}}^{\overline{\delta_j}} \left(\frac{\delta_j - \gamma_j\omega_j}{2}\right)^2 dP\left(\delta_j\right)}_{\text{Second Period: Direct Export}} \tag{19}$$

where the first term shows the first period profits from supplying the foreign market using direct exports in period t. The second term shows the option value of serving the foreign market using direct exports in period $t+1$, once the firm has learnt its individual foreign demand. Note that the second term is positive as long as the individual demand covers the transport costs of exporting directly, $\delta_j > \delta_j^{e*} = \omega_j\gamma_j$.

Once again, the first period profits depend on the expected demand in the foreign market. The expected demand threshold of direct exports is given by $E\left(\delta_j\right) \geq 2\sqrt{f_j^e} + \omega_j\gamma_j$. If the expected demand is strictly above this threshold, the firm will expect positive profits setting its quantity to $q_j = \left(\frac{E(\delta_j) - \gamma_j\omega_j}{2}\right)$.

Consequently, expected profits from exporting directly in the first period are rewritten as follows:

$$E\left(\Pi^{e*}\right) = \underbrace{\int_{\underline{\delta_j}}^{\overline{\delta_j}} \left(\frac{\delta_j - \gamma_j\omega_j}{2}\right)^2 dP\left(\delta_j\right) - f_j^e}_{\text{First Period}} + \underbrace{\int_{\delta_j^{e*}}^{\overline{\delta_j}} \left(\frac{\delta_j - \gamma_j\omega_j}{2}\right)^2 dP\left(\delta_j\right)}_{\text{Second Period: Direct Export}} \tag{20}$$

where the first term represents the profits in period t of serving the foreign market via

direct exports and the second term captures the second-period profits of continuing to export directly. As a result, the firm will serve the foreign market directly using exports as long as the firm expects a positive profitability. This is the case as long as the expected foreign demand is above a critical foreign demand threshold, defined as $\tilde{\delta}_j^e$.

If the firm did not enter in the foreign market in the first period, then it will earn zero profits as the foreign demand remains unknown.

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