Indirect exports and wholesalers: Evidence from interfirm transaction network data☆

Daisuke Fujii[a,*], Yukako Ono[b], Yukiko Umeno Saito[c]

[a] UCLA, United States
[b] Keio University, Japan
[c] RIETI, Japan

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ABSTRACT

A substantial fraction of international trade is facilitated by wholesalers, who enable manufacturers to indirectly export their products to foreign markets. Using large-scale Japanese interfirm transaction network data, this paper investigates the features of both direct and indirect exporters as well as international wholesalers. As predicted by a simple Melitz-type trade model with indirect export alternative, the sorting pattern is confirmed in our data, and the distributions of sales and labor productivity are ordered for direct, indirect, and non-exporters in terms of first order stochastic dominance. Multinomial logit analysis is also consistent with the model, which assumes lower fixed cost and higher marginal cost for indirect exporters compared to direct exporters. We also find that the number of suppliers raises the probability of direct exporting implying a cost sharing mechanism of firms with more suppliers. On the other hand, the number of customers raises the probability of exporting in general (both indirect and direct) implying a higher product appeal and broader demand base for firms who have more customers.

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1. Introduction

An important fraction of international trade is facilitated by wholesalers. In 2014, wholesalers account for 24% of exporting firms and 25% of total export value in Japan.[1] They act as international intermediaries enabling manufacturers to indirectly export their products to foreign markets. Despite their importance in value-added exports, little empirical evidence has been documented on the determinants of the mode of exports and characteristics of indirect exporters. Using large-scale interfirm transaction network data in Japan, this paper identifies indirect exporters who supply their products to international wholesalers, and unveils the features of both indirect and direct exporters.

There are several papers that examine the role of intermediaries and the resulting patterns of firms both theoretically and empirically. The paper most closely related to ours is the work by Ahn et al. (2011). They modify a multi-destination trade model with heterogeneous firms to allow for indirect exporting via intermediaries and confirm a number of theoretical implications in the data including the productivity sorting pattern of firms and the positive correlation of the indirect export share with the difficulty of market penetration. We consider a simpler version of their

model to guide our empirical analysis and focus on the discrete choice problem of export mode for manufacturers. Unlike their data, we observe the actual interfirm transaction network, which enables us to identify the different types of exporters. We contribute to the literature by presenting additional empirical evidence using the new data on transaction networks and multinomial logit analysis and investigating its sectoral heterogeneity.

As noted above, we base our empirical analyses on a simple Melitz-type trade model, in which each firm chooses its export status from three alternatives: direct export, indirect export through wholesalers, and no export. As in standard trade models, direct exporting requires both fixed costs and iceberg trade costs. The examples of the fixed costs would include the costs of marketing research, developing distribution channels in foreign countries, or preparing documents for customs, and those of the iceberg trade cost include tariffs and transportation costs. In the model, indirect trade is assumed to require lower fixed cost than direct trade due to the cost sharing with other firms through a wholesaler but to incur higher marginal cost because of the double marginalization by wholesalers. As a result, direct exporting is suitable for more productive firms since their foreign sales will be larger, and so is their net export profit compared to indirect exporting. The model implies sorting of firm productivity into different export status; the most productive firms export directly, the next group only export indirectly through wholesalers, and the least productive firms do not export.

For empirical analyses, we use the transaction network data of Japanese firms compiled by the Tokyo Shoko Research Ltd. (TSR). The dataset contains information on domestic customers and suppliers of each firm, and thus allows us to observe whether a manufacturer sells its products to exporting wholesalers. Also, each firm reports whether it exports to foreign markets. We use this information to identify each manufacturer's export status.

In our empirical implementation, we first focus on testing the implication of the above model. The distributions of sales and labor productivity by three export status are ordered in the sense of the first order stochastic dominance (FOSD). Also, the shares of indirect and direct exporters are higher among larger firms. We perform multinomial logit analyses on the above three export status using sales and sales per employee as measures of firm productivity. The estimated results show strong evidence of larger fixed cost but lower variable cost of direct exporting compared to the alternative of indirect exporting via intermediaries as predicted by the model. This is consistent with a view that the indirect exporting through wholesalers incurs an additional marginal cost due to double marginalization.

We also perform our analyses for each of 24 manufacturing industries separately and find the same empirical patterns. The industries of highly processed products or a high degree of product differentiation such as chemical product have smaller fixed costs but larger variable costs of exporting. Compared to the industries located upstream in supply chains, these industries have larger shares of exporters, and disproportionately larger shares of direct exporters.

Although we restrict our attention to a manufacturing-wholesale pair for the path of indirect exporting, our data show that many manufacturers are also connected to other manufacturers that export. It is possible that manufacturing exporters play a role similar to international wholesalers, because their goods contain many parts produced by small non-exporting manufacturers.[2] If a manufacturer has many upstream suppliers and can share the fixed cost of exporting with them, it is likely to engage in direct exporting. While understanding the microstructure of such cost sharing is beyond the scope of this paper, as a first step toward testing whether there is any evidence, we include the number of

domestic suppliers of each manufacturer in our multinomial logit estimation. We find that manufacturing firms with more domestic suppliers are more likely to export directly, controlling their size and other firm characteristics. Thus, it is possible that exporting manufacturers split the fixed costs and charge them to their suppliers.

Besides Ahn et al. (2011), other researchers also report that wholesalers play an important role in international trade especially for medium-sized firms as they would otherwise transact only domestically along with less productive firms. Akerman (2014) develops a trade model where wholesalers can export goods on behalf of manufacturers and handle more than one good. The model leads to productivity sorting of firms and exhibits economies of scope for wholesalers. These predictions of the model are supported by Swedish firm-level data. Bernard et al. (2010) find that exporters and importers that specialize in wholesale/retail are smaller in terms of employment and operate fewer establishments in the U.S. On the other hand, firms that are not specialized trade more products and trade with more countries.[3]

This paper is organized as follows. The next section presents a theoretical framework, which allows firms to export indirectly via wholesalers. Section 3 describes our data in detail along with summary statistics and figures. Section 4 performs empirical analysis using a multinomial logit model. We also investigate industry heterogeneity in the propensity of both modes of export. Section 5 concludes.

2. Model

To guide the empirical analysis, we use a simpler version of the theoretical framework in Ahn et al. (2011), which is based on Melitz (2003). In the model, two modes of exporting (direct and indirect exporting via intermediaries) are available for manufacturers. Direct exporting requires a fixed cost and a variable iceberg trade cost. Indirect exporting via wholesalers requires a smaller fixed cost due to cost sharing, but higher marginal cost due to an additional intermediary markup. Direct exporting is suitable for more productive firms since their foreign sales will be larger, and so is their net export profit compared to indirect exporting. The model implies sorting of firm productivity into different export status; the most productive firms export directly, the firms of intermediate productivity only export indirectly through wholesalers, and the least productive firms do not export. To focus on this sorting pattern, we only consider a partial equilibrium where firms in home country take foreign variables as given, and there is no entry or exit of firms in Home.

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[2] Bernard et al. (2014a) present empirical evidence on this type of indirect exporting, so called carry-along trade (CAT). They report that three quarters of the exported products from Belgian manufacturers are in goods that are not produced by the firm and the number of CAT products is strongly increasing in firm productivity.

[3] Bernard et al. (2014b) report that export intermediaries and direct exporters respond differently to exchange rate fluctuations both in terms of the total value of shipments and the number of products exported as well as in terms of prices and quantities. Aggregate exports to countries with high shares of indirect exports are less responsive to real exchange rate fluctuations. The model considered by Crozet et al. (2013) predicts that wholesalers alleviate the difficulty of reaching less-accessible markets and help less-efficient firms to supply foreign markets, thus increasing the number of exported varieties at the aggregate level. These predictions are supported by empirical evidence using French firm-level export data. We provide additional empirical evidence on the role of international wholesalers and the sorting patterns of firms using large-scale interfirm transaction network data.