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Learning to export from neighbors ☆

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ABSTRACT

This paper studies how learning from neighboring firms affects new exporters' performance. We develop a statistical decision model in which a firm updates its prior belief about demand in a foreign market based on several factors, including the number of neighbors currently selling there, the level and heterogeneity of their export sales, and the firm's own prior knowledge about the market. A positive signal about demand inferred from neighbors' export performance raises the firm's probability of entry and initial sales in the market but, conditional on survival, lowers its post-entry growth. These learning effects are stronger when there are more neighbors to learn from or when the firm is less familiar with the market. We find supporting evidence for the main predictions of the model from transaction-level data for all Chinese exporters over the 2000-2006 period. Our findings are robust to controlling for firms' supply shocks, countries' demand shocks, and city-country fixed effects.

1. Introduction

Recent research has documented that firms' turnover rates (entry and exit) in foreign markets are much higher than those in the domestic market.[2] Moreover, firms often quit exporting to a country after a short spell of selling a small amount of goods there.[3] These findings reflect a considerable amount of uncertainty facing new exporters. To explain these findings, theoretical studies have hypothesized that firms optimally start small in a foreign market, and only after most of the uncertainty is unveiled do they commit substantial resources to fulfill larger orders (e.g., Rauch and Watson, 2003). While self-learning and experimentation are important mechanisms behind these dynamics, in reality, firms usually try hard to obtain information from their neighbors before undertaking risky investments (Hausmann and Rodrik, 2003). This is particularly the case when self-discovery in export markets entails high sunk costs.[4] While development economists have for years studied how learning from neighbors determines firms' technology adoption (e.g., Foster and Rosenzweig, 1995, 2010; Conley and Udry, 2010), it has been a relatively neglected channel to explain exporters' dynamics and performance.

We develop a model of social learning to study how firms learn from their neighbors about foreign market demand. The model delivers several micro-founded hypotheses about how learning from neighbors shapes new exporters' entry decisions, survival, initial sales, and post-entry growth, which we then examine using detailed transaction-level data for Chinese exporters. In addition to the rich information available in the data, the especially high degree of industrial agglomeration in China provides a good setting for such an analysis.

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[2] Bartelsman et al. (2009) found that the average turnover (entry and exit) rate in the domestic market is 5% for developed nations and 10% for transition economies. The turnover rate in the foreign market is several orders of magnitude larger, as shown by Eaton et al. (2008), Albornoz et al. (2012), and Blum et al. (2013). See the literature review below for a more detailed discussion.

[3] For example, Eaton et al. (2008) and Albornoz et al. (2012) find that in Colombia and Argentina respectively, only 40% to half of new exporters continues to export after the first year. Firms that survive the first year of exporting end up driving the bulk of a country's long-run export growth.

[4] Research in international trade has emphasized how high sunk costs of exporting shape export patterns. Das et al., 2007 and Morales et al., 2014, among others, have provided sizeable estimates of those costs. Notice that high sunk costs could explain low export entry rate, but not the majority of small firms among export starters. One notable exception in the literature is Segura-Cayuela and Vilarrubia (2008), who show theoretically that neighbors' export activities, by lowering fixed export cost, can affect new exporters' dynamics. See Section 2 for a comprehensive literature review.

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Our model incorporates social learning pioneered by Jovanovic (1982) into a standard heterogeneous-firm model of trade, starting with Melitz (2003). We think of a firm's export profits in a market as depending on three factors — firm-specific productivity, firm-market-specific product appeal, and market-specific demand. A new exporter knows its productivity before entry, but is uncertain about country-specific demand and its own market-specific product appeal.[5] Based on information inferred from neighbors' export performance in a market, a firm can update its prior about the market's demand that is common across firms. Since observed neighbors' export performance could be affected by their unobserved product appeals, signals about foreign market demand are noisy. Based on a standard learning model, when there are more neighbors revealing information, the observed signal converges to the true state of demand as firm-specific noises tend to average out to zero.

We show that a firm's export decision and post-entry performance depend not only on the prevalence of neighboring export activities, as has been shown in the literature on information and technology spillover in trade, but also on additional (measurable) factors, including the number of neighbors currently selling there, the level and heterogeneity of their export sales, and the firm's own prior knowledge about the market. An increased number of neighbors may not encourage export entries. The relationship depends on the strength of the signal (average neighbors' export sales or growth). An increased number of neighbors will increase the rate of exporters' entry into new markets when the signal is positive, whereas it will deter entry when the signal is negative. Our model proposes the use of an interaction between the signal and the prevalence of neighboring export activities, rather than the prevalence measure only, as a more direct variable to empirically identify information spillover in trade.

Our model yields several predictions. It predicts that a positive signal about foreign market demand from neighbors induces more export entries and larger initial sales among the entrants in the same market. This effect is stronger when the signal is more precise, due to more firms revealing it. Given the positive relationship between the strength of the signal, its precision, and new exporters' initial sales, new exporters' average export growth after entry, conditional on survival, is lower the stronger and more precise the signal is. In other words, a firm is less likely to be surprised and increase exports significantly ex post when the ex ante signal about the foreign market is more precise. The model also shows a weaker response in export entry to a positive signal when observed neighbors' performance is more dispersed (i.e., a lower signal-to-noise ratio), and a stronger response when the firm is less informed about the new market ex ante and needs to rely more on information from neighbors.

Finally, our model shows that conditional on the signal and firm productivity, a new exporter's survival rate in a market is independent of the number of neighbors serving the same market. However, since the number of neighbors revealing a positive signal is correlated with the mass of export entrants, it will also affect the fraction of export survivors. Given sunk entry costs and firm heterogeneity, a more positive or precise signal induces more low-productivity firms to enter. In the presence of per-period fixed export costs, the less productive export entrants are more likely to exit ex post. The fraction of surviving export entrants will be decreasing in the strength of the signal, more so if it is revealed by more neighbors. Thus, our model highlights that existing evidence on the positive information spillover effect on survival can be determined by more low-productivity entrants on the one hand, and a more accurate neighbors' revealed signal on the other.[6]

Using transaction-level trade data for the universe of Chinese exporters over 2000–2006, we find supporting evidence for the main theoretical predictions. In particular, controlling for firm-year fixed effects (firms' supply shocks), country-year fixed effects (countries' demand shocks), and city-country fixed effects, we find that the entry rate and initial sales of new exporters in a market are both positively correlated with the strength of the signal, measured by the average level or growth rate of neighboring firms' exports to the same market.[7] The positive correlation is increasing in the number of neighbors located in the same city.[8] The learning effects on new exporters' entry and initial sales are both quantitatively important. Controlling for firm supply shocks and country demand shocks, the sample mean growth rate of neighbors' exports to a country (20%) is associated with a one-third increase in export entry, evaluated at the median entry rate (0.3%) of the pooled sample. At the sample mean export growth, a one standard-deviation increase in the (log) density of neighboring firms (5 more neighbors per squared mile) exporting to a country is associated with a 10% higher entry rate in the same country, evaluated at the median entry rate. The corresponding positive effect of the interaction between the signal and the prevalence of neighbors on new exporters' initial sales is about 0.5%.

Our regressions show that new exporters' post-entry growth, conditional on survival, is negatively correlated with both the strength of the signal and its interaction with the prevalence of neighbors, as predicted by our model. The survival rate of export entrants, however, does not appear to be correlated with either the prevalence of neighbors' export activities or the strength of their revealed signal, contrasting with part of our prediction and most existing findings in the literature. All empirical findings in the paper remain robust to controlling for the number of firms serving other markets and its interaction with the corresponding signal, including different sets of fixed effects, and in specifications that use alternative measures of the signal and of the prevalence of neighbors.

To further confirm that it is learning rather than other channels through which positive externalities from neighbors are identified, we empirically examine the theoretical predictions regarding the relations between export entry rates, the precision of the signal, and the firm's prior knowledge about the new markets. While our empirical results do not support the specific prediction about the negative effects of a noisier signal on export entry rates, they reveal stronger learning effects for firms exporting to new markets that are farther away from China, which Chinese firms are presumably less familiar with; and weaker learning effects for firms entering new markets that share similar characteristics (e.g., official language) with the firms' previously served markets. Our findings also reveal stronger learning effects in situations when neighbors are domestic rather than foreign, consistent with the hypotheses that foreign firms are more attentive in restricting the leakage of trade secrets, or that there is less information exchange between domestic and foreign exporters. We also find that firms learn from both neighbors in the same city, as well as those outside the city but in the same province. Collectively, these findings confirm that information inferred from neighbors reduces exporters' uncertainty about selling in new foreign markets, which in turn shapes their sales dynamics and performance there.

[5] While our model focuses on learning about demand, the theoretical results can be generalized and the interpretation of our empirical results can be much broader. For example, learning from neighbors can be about foreign importers or about how to adapt the product to the specific tastes or legal requirements of the destination market. We abstract from learning about production, but by no means we think it is unimportant for export. Regarding the supply-side uncertainty, existing producers would have learned about their own capability by producing for the domestic market. It is conceptually difficult to explain why firms would enter a foreign market with a small order and then exit if they are initially uncertain about their production capability.

[6] By using transaction-level data, we address the selection bias in the empirical analysis by focusing on the within-firm variation in performance across markets by controlling for firm-year fixed effects.

[7] In particular, city-country fixed effects capture all path-dependent factors that may simultaneously determine new exporters' sales dynamics and neighbors' export performance, avoiding the common "reflection" problem often encountered in the literature on information or technology spillover.

[8] The prevalence of neighbors is measured by the density, a normalization of the number of firms by the size of the city, or by the number itself. Results remain robust to the use of either measure.