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Export spillover and location choice☆

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ABSTRACT

This paper investigates how export spillovers influence firms' entry of new destinations. We study four types of city-destination-specific export spillovers: domestic, foreign, inter- and intra-industry spillovers. Using a matched dataset of China's firm level trade and survey data over the period of 2000 to 2006, we run conditional logit model and conclude that neighbor's export activities significantly matter for a firm's entry to new markets. In particular, we find: (1) The probability of local exporters entering a particular destination responds positively to neighboring exporters; (2) Intra-industry spillovers are stronger than inter-industry spillovers; (3) For both intra- and inter-industry, domestic firms generate stronger spillovers than their multinational counterparts; (4) More productive firms rely less on export spillovers when entering less favored destinations; and (5) Ordinary trade activities facilitate stronger spillovers than processing trade regime. These findings remain robust after we control for demand side and supply side shocks.

1. Introduction

Stimulating firms' export activities has been one of the priorities of policy makers. Agglomeration (export spillover) have been studied as an important source of learning to export. Aitken et al. (1997) find the presence of multinational firms in the same state raises the probability of export by local firms in Mexico in 1986 and 1989. Greenaway et al. (2004) show that the proximity to multinational exporters in the UK positively influences the export decisions of domestic firms over the 1993–1996 period. Kneller et al. (2008) confirm that both intensive and extensive margin of trade are positively related to the presence of multinationals in the same region and industry in UK. Branstetter (2008) and Inui et al. (2008) find evidence of agglomeration and spillovers for Japanese firms investing overseas. Evidence is much less clear for Barrios et al. (2003), who find no evidence that Spanish firms benefitted from export spillovers from multinationals between 1990 and 1998. Similarly, Ruane and Sutherland (2005) find a negative impact of foreign exports on entry of Irish domestic firms on export markets. Bernard and Jensen (2004) find no role for export-agglomeration economies in a panel of US manufacturing firms, either from local exporters or from export activity by other firms in the same industry. Konings (2001) further concludes that a rise in FDI has hindered domestic firm productivity in Bulgaria and Romania and has produced no spillover effects in Poland. Aitken and Harrison (1999) find that productivity in domestic plants declines with an increase in foreign investment using census data on Venezuelan firms. As these papers explained, multinational firms may generate negative effects on local firms if the effects of intensified product market competition outweigh the positive export spillover effects on the local firms. The possible negative effects occurs because foreign firms could drive up the local operating costs, labor costs, or cause saturation of transportation infrastructure for local firms (Hale and Long 2011).

Recent studies are more encouraging for the specific case of China. Swenson (2008) finds that increasing foreign exports induces new trade linkages by Chinese domestic firms. Swenson and Chen (2012) show that foreign exports increase the unit value and the durability of new transactions created by domestic firms. Mayneris and Poncet (2013, 2015) investigate the impact of the multinational exporters on the probability of exporting and suggest that export spillovers positively affect the likelihood of export decisions in China. Fernandes and Tang (2014) construct a statistical decision model and empirically show that increasing neighbor's export activities enhances new exporter's performance using firm level export data for China over the 2000–2006 period.

An issue that has received sparse attention in the literature is the potential heterogeneity in the responses of followers to export spillovers from different sources. Previous studies on China focus on spillovers generated by multinational firms, but agglomeration benefits could be stronger when proximate exporters are domestic firms. Due to culture difference and language barriers, firms may find it easier to

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communicate with fellow nationals and more likely to have frequent contacts and opportunity for information exchange. As is found by Belderbos and Carree (2002) and Head et al. (1999), Japanese firms are more sensitive to Japanese agglomeration when choosing overseas FDI locations. Is this the case for China? In this paper we aim to study this relatively neglected channel of domestic firms' spillovers to explain a firm's export decisions. We introduce different firm types into the model by Fernandes and Tang (2014) and predict that domestic firms will generate a stronger positive spillover effect than the multinationals due to their higher prevalence in China. We further follow the literature by Javorcik (2004) and Blalock and Gertler (2008) to disentangle spillover effects into horizontal (intra-industry) and vertical (inter-industry) spillovers. We also exploit the trade regime information in Chinese trade data to study whether trade regimes affect the transmission of export spillovers.

Another contribution of this paper is that we carefully explore the interaction of firm productivity and spillovers by using a matched panel of Chinese firm-level trade and firm-level annual survey data for the period of 2000 to 2006. As a matter of comparison, Fernandes and Tang (2014) use firm-level trade data only. They restrict the sample to ordinary trade regime and do not exploit firm ownership information. By using matched dataset, we are the first to explore how firms with varied levels of productivities self-selected into different destinations. We prove that a firm's total factor productivity (TFP) is positively associated with the odds of entering a new market, which supports the seminal finding of Melitz (2003). Furthermore, instead of assuming that foreign country characteristics exert a homogeneous effect across individual firms as in the majority of the current literature, we explore how the effects of distance, market size and export spillovers on firms' export destination decision vary with firm-level productivity. We use a conditional-logit model in our empirical study, which is adopted by Mayneris and Poncet (2013) and Chen and Moore (2010). Using this methodology allows us to include destination attributes, firm characteristics, and time-invariant attributes simultaneously.

Overall, our results confirm the importance of spillover effect. We reveal several interesting facts of agglomeration effect. Increasing neighbor's export activities significantly increases the probability of other firms' entry to the same destination. The spillover effect are industry-specific: intra-industry spillovers are larger than inter-industry ones. Domestic firms generate a stronger spillover impact than their multinational counterparts. More productive firms rely less on neighboring exporter spillovers when entering distant and low-income markets. Furthermore, export spillovers under processing trade regime are weaker than under ordinary trade or total trade activities. These findings remain robust after we control for demand side and supply side shocks.

The rest of the paper is organized as follows. Section 2 presents a theoretical model which motivates our empirical analysis. Section 3 discusses the empirical methodology. Section 4 introduces data. Section 5 presents our firm-level empirical results, Section 6 conducts robustness check, and Section 7 concludes.

2. Model

We extend the model by Fernandes and Tang (2014) to motivate our empirical analysis on how agglomeration affects a firm's decision to create a new export linkage. Their model considers a simple two-period structure when studying new exporters choose among different foreign markets. Instead of focusing on one type of firms in general, we extend to distinguish domestic firms from multinationals in China, and study if spillover effects vary due to different firm ownerships.

2.1. Set-up

Fernandes and Tang (2014) outline a monopolistic competition framework for modeling firm heterogeneity following Melitz (2003). The preferences each firm faces are assumed to take the Constant Elasticity of Substitution (CES) form. Each firm produces differentiated products and has an initial productivity parameter θ that is randomly drawn from a cumulative distribution function G(θ).

As in Fernandes and Tang (2014), before exporting to a foreign country, a firm has a prior knowledge of that market demand. The firm will update this information and its precision after observing neighbor's export performance in that market. When firm i with productivity θ_i exports to market j, it faces a country j specific demand function: $q_{ij} = D_{ij}p_{ij}^{-\sigma}$, where q_{ij} is the quantity sold by firm i in market j; and p_{ij} is the price firm i charges in market j.[1] D_{ij} is a firm-specific measurement of demand level for market j.[2] $\sigma > 1$ is the elasticity of substitution between varieties. We also note that firm i faces a variable cost of production c_i/θ_i, an iceberg transportation cost τ_{ij}, and a fixed cost of distribution and servicing network in country j: f_j^{ex}. Therefore, the profit function of firm i is:[3]

$$\pi_{ij}^* = D_{ij}\left[\left(\frac{c_i\tau_{ij}}{\theta_i}\right)\left(\frac{\sigma}{\sigma-1}\right)\right]^{1-\sigma} - f_j^{ex} \tag{1}$$

Firm i knows its θ_i before exporting, but is uncertain about the demand it faces in market j: D_{ij}. We assume firm i owns priori knowledge about the demand of foreign market j in logarithm form as:

$$\ln(D_{ij}) = d_j^* + z_{ij}^h, \quad h \in \{dom, \ mne\} \tag{2}$$

where d_j^* is the market-specific demand which is common for all firms; and z_{ij}^h is a firm-country-specific demand parameter. If no firm sells to a market j, none of them knows d_j^*. They will hold a prior belief that d_j^* is distributed normally with mean $\bar{d}_j$ and variance v_{dj}: $d_j^* \sim N(\bar{d}_j, v_{dj})$. A higher v_{dj} means lack of certainty about the destination j. Once a firm enters market j, then there is no more ambiguity about that market. z_{ij}^h is also assumed to be ex-ante unknown to the firm itself and follows a normal distribution with mean zero and variance v_{zj}^h: $z_{ij}^h \sim N(0, \ v_{zj}^h)$. We extend the setup of Fernandes and Tang (2014) to assume that demand parameter varies with firm type: superscript h denotes two types of firms in China: domestic and multinational firms. A larger v_{zj}^h indicates that individual firms have unclear knowledge about destination j, and they can learn more by gathering information from neighbors. For an export pioneer without any information of destination j, firm i expects to obtain an operating profit from exports to j as follows:

$$\begin{aligned} E[\pi_{ij}] &= \left[\left(\tfrac{c_i\tau_{ij}}{\theta_i}\right)\left(\tfrac{\sigma}{\sigma-1}\right)\right]^{1-\sigma} E[D_{ij}] - f_j^{ex} \\ &= \left[\left(\tfrac{c_i\tau_{ij}}{\theta_i}\right)\left(\tfrac{\sigma}{\sigma-1}\right)\right]^{1-\sigma}\left[\exp\left(\bar{d}_j + \tfrac{v_j}{2}\right)\right] - f_j^{ex} \end{aligned} \tag{3}$$

where $v_j = v_{dj} + v_{zj}^h$.

It is clear that firms will start exporting to a foreign market only if $E[\pi_{ij}] > 0$. From this condition we can solve for the cutoff productivity $\underline{\theta}_j$ as follows:

$$\theta_i > \underline{\theta}_j(\bar{d}_j, v_j) = \left[\frac{f_j^{ex}}{\varphi\left[\exp\left(\bar{d}_j + \frac{v_j}{2}\right)\right]}\right]^{\frac{1}{\sigma-1}} \tag{4}$$

where $\varphi = \left[\left(\frac{\sigma c_i\tau_{ij}}{\sigma-1}\right)\right]^{1-\sigma}$. Eq. (4) indicates that all the firms that can export to market j should have a productivity level higher than $\underline{\theta}_j$.

[1] $p_{ij} = (c_i\tau_{ij}/\theta_i)(\sigma/\sigma-1)$, which is markup over the marginal cost. τ_{ij} is an iceberg transportation cost.

[2] Time subscripts will only be added when necessary.

[3] If the model considers entry and exit in a dynamic setting, potential entrants and incumbent firms want to maximize expected discounted profits, as in Hopenhayn (1992) and Clementi and Palazzo (2016). We consider a static model only to motivate empirical analysis, and leave dynamic feature for future research.