

This is the **Accepted Version** of a paper published in
the Journal of the Asia Pacific Economy:

Anwar, Sajid, and Sun, Sizhong (2016) Foreign direct
investment, domestic sales and exports of local firms: a
regional perspective from China. *Journal of the Asia
Pacific Economy*, 21 (3). pp. 325-338.

<http://dx.doi.org/10.1080/13547860.2016.1176640>

FDI and Domestic Firms' Local Sales and Exporting: A Regional Perspective from China

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[Abstract]

Using a simultaneous equation system, this paper investigate how/whether the presence of FDI affect domestic firms' local sales revenue and export intensity in China's leather shoes manufacturing industry and textile and garment manufacturing industry, focusing on the regional dimension of FDI presence. The paper finds that the presence of FDI generates significantly positive effects on both the local sales revenue and export intensity in both industries, and the finding is robust to alternative measures of FDI presence. The significantly positive impacts from the regional dimension of FDI presence suggests that it is reasonable for policy makers to encourage domestic and FDI-invested firms to locate close to each other, to maximize the benefits of FDI inflow.

[Key Words]

FDI, Domestic Sales, Export, China, Textile Manufacturing

[JEL Classification]

D22, F14, L25, O12

1. Introduction

Foreign direct investment (FDI) plays an important role in economic development in host economies. Due to its importance, researchers have explored the impacts of inward FDI from different aspects. For example, since Caves (1974) a large strand of existing literature is devoted to detecting the productivity spillovers of FDI to domestic firms, with some finding positive results while the others finding negative or insignificant results (for surveys see, among others, Gorg and Greenaway 2004; Saggi 2002; Smeets 2008). The mixed findings even prompt researchers to explore the reason behind. Havranek and Irsova (2011), using a meta-analysis over existing studies, suggest that model misspecification and publication bias play an role in such mixed findings.

In addition to affecting productivity, it is not surprising that FDI can affect domestic firms' other behaviors, such as sales. If an increase in the presence of FDI generates positive spillovers to domestic firms, everything else being equal, a domestic firm's marginal cost of production will decrease, namely the marginal cost is less than marginal revenue now. Subsequently domestic firms respond by increasing their outputs. Researchers have examined FDI's impacts on domestic firms' sales revenue in foreign market, namely export spillovers. For example, Sun (2009, 2010) investigate how the inward FDI in China affects domestic firms' export intensity (share of exporting revenue in total sales revenue). In contrast, it appears that the impact of FDI inflow on firms' sales revenue in domestic market is more or less neglected in that a much smaller body of existing literature explores this issue, not to mention that there are even fewer studies that combine both aspects. Contributing to this strand of research, this paper explores whether/how FDI inflow affects domestic firms' domestic sales and exporting behaviour simultaneously in two four-digit industries in China.

Investigating FDI's impacts on domestic sales and exporting revenue is of significance in two dimensions. First, it enables us to better understand how domestic firms respond to the presence of FDI-invested firms in the industry, from aspects other than productivity, and thus gives a more complete picture regarding the role of FDI in the host economy. Second, firms' sales behavior is part of the competition in the industry, and hence exploring this behavior shall present significant policy implications on industry competition to policy makers. In addition, in this paper, we focus on China, a large and fast growth economy, where the findings are likely to shed light on policy setting not only to China but also to other developing countries.

In addition, this paper also differs from many previous studies in that we focus on two four-digit industries (the leather shoes manufacturing and textile and garment manufacturing industries) and our measures of FDI builds in a regional dimension. Four-digit industries are at lowest level in China's industry classification system, and hence by focusing on four-digit industries, we effectively only utilize the within-industry variations to identify the impact of FDI. Compared with studies that utilize data covering different industries (namely with cross industry variations), the within-industry variations are, not surprisingly, more homogeneous and as such the identification is more robust to misspecification. In addition, China has comparative advantage in these two industries, and firms exporting and domestic sales activities are active. The presence of FDI is significant as well.

We measure the presence of FDI as the share of the output of FDI-invested firms in a province, to which domestic firms belong, in the national total output of FDI-invested firms in each year. Hence the variations of FDI presence lie in the time and province dimensions. Such time-province variation

is different from the time-industry variation of FDI measures used in many previous studies¹. Hence we contribute to the strand of FDI spillover studies by incorporating the regional dimension in the measurement of FDI presence.

The rest of the paper is organized into five sections. Section 2 briefly review the related existing studies, which further highlights the contribution of the current study. In Section 3, we present the conceptual framework that will motivate the subsequent empirical model, by discussing how the presence of FDI in the host economy can affect domestic firms' sales behavior. Section 4 presents the data, and discusses the overall picture of FDI presence and sales in both domestic and foreign markets in the two industries, which gives background knowledge for the subsequent empirical exercises. In Section 5, we report and discuss the results from our empirical exercises. Section 6 concludes the paper.

2. Related Literature

Previous studies have explored how FDI inflow affects domestic firms' exporting behavior, namely export spillovers. Early studies include Aitken, Görg, and Strobl (1997) and Kokko, Zejan, and Tansini (2001). Aitken et al. (1997) investigate how FDI affects domestic firms' export decision in Mexico, using data from 1986 to 1990, where they find that being geographically close to FDI-invested firms in the same industry increases the probability of participating in export by domestic firms. Such positive impact on export likelihood is also observed by Kokko et al. (2001) in Uruguay.

In terms of China, Sun (2009) explores how FDI affects domestic firms' export intensity in China's cultural, educational and sporting product manufacturing industry from 2000 to 2003. It is found that FDI generates significant export spillovers to domestic firms, which however is heterogeneous in that the magnitude of spillovers depends on such firm characteristics as size. This heterogeneous export spillovers from FDI continue to hold when Sun (2010) extends the study to include the whole manufacturing sector in China in the period of 2000-2003. Subsequent studies include Chen, Sheng and Findlay (2013) and Sun (2012). Chen et al. (2013) utilize a same dataset to explore the horizontal and vertical export spillovers of FDI on China's manufacturing sector from 2000 to 2003 and conclude that FDI exerts a positive impact on domestic firms' export performance. In a theoretical model, Sun (2012) shows that domestic firms respond to an increase in FDI presence by increasing their exports, which occurs due to productivity and export information spillovers. Sun's (2012) empirical exercise confirms the existence of such export spillovers.

Other firm level studies include Fu (2011), Mayneris and Poncet (2013), and Claro (2009). Fu (2011) focuses on the export spillovers from the processing trade-related FDI. Using firm level data from 2000 to 2007, Fu (2011) finds the processing trade FDI creates significantly positive information spillovers to domestic firms, which in turn boost domestic firms' export performance. A similar positive impact is also found by Mayneris and Poncet (2013) and Claro (2009). Utilizing a panel dataset from 1997 to 2007, Mayneris and Poncet (2013) find that the FDI presence encourages domestic firms to export. Claro (2009) focuses on China's comparative advantage in the labour intensive products, and suggests FDI liberalization promotes such comparative advantage and subsequently boosts export performance.

¹ Later in our empirical exercises, we also use the time dummy variables to control for the impact of such time-industry variations.

In addition to firm level studies of FDI export spillovers, a related strand of existing literature focus on the aggregate level, for example Gu et al. (2014) at a national level, Zhang and Song (2001) and Sun (2001) at a provincial level, and Liu and Shu (2003) at an industry level. Generally these studies find a significantly positive impact by FDI on exports. The aggregate level studies often utilize time series data to explore the causality between FDI inflow and exports/trade, employing such time series techniques as Granger causality and cointegration/error correction techniques. These studies include Zhang and Felmingham (2001), Liu et al. (2002), and Liu et al. (2001), and detect bidirectional causality between FDI inflow and exports.

Despite of the fact that exporting is just firms' sales behavior in foreign market which essentially is no different from firms' sales behavior in domestic market, there is a lack of study on whether/how the presence of FDI affects domestic firms' sales revenue in the local market. Furthermore, studies that combine these two aspects are rare as well. Bao et al. (2013), by analyzing survey data for year 2002, argue that FDI-invested firms achieve productivity improvement in China and also boost their sales in China market. However they do not find statistically significant change in export by these firms. Utilizing firm level data in the period of 2001-02 and 2005-07, Wang et al. (2014) find that FDI inflow generates significantly positive impact on exports and significantly negative impact on local sales by domestic firms.

One issue in exploring the impact of FDI on domestic firms is the measurement of FDI presence. In the firm level studies reviewed above, the presence of FDI is generally measured as the share of foreign invested firms, frequently output of these foreign firms, in an industry. Such a measure does not account for the regional aspect of FDI presence. Geographical proximity plays an important role in the occurrence of FDI spillovers (see for example Sun, Song, and Drysdale 2011). Therefore, different from many previous studies, in this paper we construct a measure of FDI that account for the regional dimension of FDI presence.

To summarize, by briefly surveying the existing literature, we can find that there are two gaps in existing literature. First, even though there are studies that explore whether/how FDI presence affects domestic firms' exporting behavior, there is a lack of studies on domestic firms' sales behavior in the local market, not to mention studies that combine both aspects simultaneously. Investigating firms' sales behavior in both local and foreign markets, under the influence of FDI presence, is of significance as it allows us to understand domestic firms' response to FDI presence in a more complete way and the findings shall also present significant policy implications. Second, previous studies of FDI spillovers frequently do not accommodate the regional dimension of measuring FDI presence. The regional dimension of FDI presence is likely to be important as geographical proximity has a role in the occurrence of FDI spillovers. This paper thus intends to fill in these two gaps by examining how FDI in China's two four-digit manufacturing industries affect domestic firms' sales in both local and foreign markets, where FDI presence is measured as the province share of FDI-invested firms' outputs.

3. How Can FDI Affect Domestic Firms' Sales Behavior?

Being foreign in the host economy, FDI-invested firms generally possess some strategic advantages that enable them to compete with domestic firms (Buckley and Casson 1976; Dunning, Kogut, and Blomstrom 1990). Such strategic advantages include superior technology and management know-how, in particular for FDI flow from developed countries to developing countries. Nevertheless in the process of market competition, these advantages can spill over to domestic firms, at least to some

extent, resulting in domestic firms to improve their productivity. Researchers have summarized three channels through which such spillovers can occur, namely the backward and forward linkages between FDI invested firms and domestic firms, labour mobility, and demonstration and competition effects (Blomstrom and Kokko 1998).

The first channel is backward and forward linkages, where domestic firms are local suppliers (backward linkage) or customers (forward linkage) to FDI-invested firms. Such business contact is likely to help domestic firms to improve their productivity. Productivity spillovers can also occur through the channel of labour mobility. In order to operate in domestic market, FDI-invested firms need to hire and train employees in domestic labour market, through on-the-job training, overseas education, and training at the parent company. These trained employees can later either move to domestic firms or set up business by themselves, and hence carry over the skills they obtain in FDI-invested firms. The demonstration and competition effects is the third channel of productivity spillovers, where domestic firms can observe FDI-invested firms' business activities and imitate their behaviour, which subsequently improve their productivity. In addition, the competition brought in by FDI-invested firms is also likely to force domestic firms to improve their productivity. Previous studies have examined these three channels both theoretically and empirically, for example among others, theoretically Rodriguez-Clare (1996), Markusen and Venables (1999), and Lin and Saggi (2007) on the forward and backward linkages, Fosfuri, Motta, and Ronde (2001) and Markusen and Trofimenko (2009) on the labour mobility, Das (1987), Wang and Blomstrom (1992) on the demonstration and competition effects; empirically Markusen and Trofimenko (2009), Gorg and Strobl (2005), and Hale and Long (2006) on labour mobility, and Gorg and Strobl (2001) and Gorg and Greenaway (2004) on the demonstration and competition effects.

Given that the presence of FDI in host economy affects the productivity of domestic firms through three channels discussed above, it is not surprising that domestic firms' sales behavior will be subsequently affected. If the presence of FDI generates positive productivity spillovers, domestic firms' marginal cost of production will decrease. Hence a profit-maximizing domestic firm will respond by increasing their sales, both in domestic and foreign markets, *ceteris paribus*. If instead the FDI presence does harm to domestic firms' productivity, for example through attracting more talented workers and driving up the inputs cost in local factor markets, then domestic firms' marginal cost of production will increase, resulting in response of cutting sales in domestic and foreign markets by domestic firms, everything else being equal. Therefore, as long as FDI presence affects domestic firms' productivity, their sales behavior will also be affected.

Empirically detecting such impacts from FDI is likely to yield a sign and magnitude that are unexpected *ex ante*, due to firm heterogeneity (namely firms are endowed with different capability before entering an industry). Since Melitz (2003), firm heterogeneity has been used widely to explain a set of economic phenomena, for example why some firms export while the others not, even in a same industry. Such firm heterogeneity can create a dampening force in the estimation of impacts from FDI. If the presence of FDI indeed generates positive productivity (and sales) spillovers, then the weak domestic firms, which previously will not survive in the market, are now able to enter and compete in the market, and subsequently the average productivity (or sales) in the market will decrease. Similarly if there is negative productivity spillovers from FDI, domestic firms that previously can compete in the market will now have to exit, resulting in an increase in the average productivity (or sales) in the market. Hence, in principle, even though one can be conceptually sure that the presence of FDI is likely to generate impacts on domestic firms, in terms of either

productivity or sales in both domestic and foreign markets, the sign and magnitude of such impacts in empirical estimation are hard to be expected *ex ante*.

The impacts of FDI are likely to be geographically bounded, namely it has a regional dimension, since geographical proximity facilitates the occurrence of spillovers through the three channels discussed above. The direct contacts with suppliers and distributors that are close to each other reduce transportation and communication costs (Girma and Wakelin 2001), which enhance the role of backward and forward linkages in the occurrence of FDI productivity spillovers. Geographical proximity also increases the likelihood of workers moving from FDI-invested firms to domestic firms. Gaelotti (2008) suggests that the low labour mobility, due to geographical distance, can negatively affect FDI spillovers. In the demonstration and competition effects, the importance of geographical proximity is also clear. The closer a domestic firms is to FDI-invested firms, the easier it is to observe and imitate FDI-invested firms, and the stronger the competition is. Sun, Song, and Drysdale (2011) find that domestic firms being geographically close to FDI-invested firms indeed helps them to receive positive productivity spillovers from FDI in China's manufacturing sector. In this study, we will account for this geographical dimension by measuring the presence of FDI from a regional perspective.

4. Empirical Model and Data

Based on the theoretical discussion in Section 3, we set up the following empirical model, in order to estimate the impacts of FDI on domestic firms' sales revenues in both local and foreign markets:

$$\ln(dsales) = \alpha_0 + \alpha_1 eintensity + \alpha_2 FDI + \alpha_3 \ln(firmsize) + \alpha_4 rdint + \alpha_5 \ln(k) + \alpha_6 adint + \alpha_7 dyear + \varepsilon_1 \quad (1)$$

$$eintensity = \beta_0 + \beta_1 \ln(dsales) + \beta_2 FDI + \beta_3 \ln(firmsize) + \beta_4 rdint + \beta_5 \ln(k) + \beta_6 dyear + \varepsilon_2 \quad (2)$$

where *dsales* denote domestic firms' sales revenue in local market; *eintensity* is export intensity, namely export revenue divided by total sales revenue; *firmsize* represents firm size, measured as the number of employees (in thousands); *rdint* is a domestic firm's R&D intensity (the share of R&D expenditure in total sales revenue); *k* is capital intensity, proxied by the ratio of fixed assets annual net average against the number of employees; *adint* denotes advertising intensity, namely the ratio of advertising expenditure against total sales revenue; *dyear* is a set of year dummy variables; FDI is the variable of interest, and is constructed as the share of a province's number of FDI invested firms in the total national number of FDI invested firms, which hence captures the regional dimension of FDI presence; ε_1 and ε_2 are two error terms that are correlated with each other.

Equations (1) and (2) are a simultaneous equation system, where domestic sales and export intensity affect each other. Such simultaneity captures the fact that firms' profit-maximizing decisions on sales in both local and foreign markets are likely to correspond to the same underlying factors that are observed by firms but not by researchers, such as underlying technological opportunities faced with firms. Advertising intensity appears only in the domestic sales equation (equation 1), but not in export intensity equation (equation 2), which helps identify the simultaneous equation system. Firms conduct advertising in the domestic market, which in turn affects its domestic sales revenue. In contrast, generally firms do not advertise overseas, due to either the fact that overseas advertisement is too expensive or exporting market is such big that it resembles a perfectly competitive market.

Firm size is expected to affect both domestic sales and exporting decisions due to economies of scale. Larger firms are likely to have lower marginal cost of production that enable them sell more to both local and foreign markets. R&D activities also play an important role in firms' sales activities. Firms' R&D activities can result in either better technology that reduces marginal cost of production or better quality products that increase the attractiveness/demand for the product. Hence we expect R&D intensity to positively affect sales revenue in both local and exporting markets. A firm's capital intensity also plays a role through its effect on the marginal cost of production. More capital intensive firms can have higher productivity (and lower marginal cost of production), *ceteris paribus*. The set of year dummy variables captures the time-varying effect.

We estimate equations (1) and (2) by the generalized methods of moments (GMM) technique. It can be argued that the presence of FDI is endogenous. On the one hand FDI can promote firm sales revenue in both local and exporting markets, while on the other hand FDI may tend to flow more into industries and provinces where domestic firms' sales activities in local and foreign markets are higher. To address this reverse causality issue, we employ the instrumental variable (IV) approach, using the number of firms, the average sales revenue and exporting revenue in each province as excluded instruments. Since firms operate in a monopolistically competitive market, they do not consider the market aggregate in making their decisions. Therefore the number of firms, the average sales revenue and exporting revenue in each province are expected to be uncorrelated with the error terms.

The dataset is obtained from National Bureau of Statistics (NBS), China, which collects data of firms that are above a pre-set size and collectively account for around 85 per cent of total industry outputs. In the leather shoes manufacturing industry, the sample has 1,402 domestic firms in 2005, 1,706 firms in 2006, and 2,084 firms in 2007. For the textile and garment manufacturing industry, the sample consists of 6,072 domestic firms in 2005, 6,886 in 2006, and 7,966 in 2007. For the variables that are in monetary term, such as sales revenue, we use the producer price index obtained from the China Statistical Yearbook 2008 to deflate them. Table 1 reports the summary statistics of variable in equations (1) and (2) for the two four-digit industries.

Table 1 Summary Statistics					
Variables	Obs	Mean	Std. Dev.	Min	Max
<i>Textile and garment manufacturing industry</i>					
ln(domestic sales)	17088	9.3841	1.5382	-0.0600	16.0760
export intensity	20924	0.3299	0.4361	0	1
FDI	20924	0.0011	0.0017	0	0.0113
ln(firm size)	20924	-1.9028	0.8878	-4.8283	3.1927
R&D intensity	20924	0.0004	0.0035	0	0.2055
Advertising intensity	20924	0.0009	0.0078	0	0.5420
ln(capital intensity)	20924	2.6084	1.2360	-3.7054	8.5127
<i>Leather shoes manufacturing industry</i>					
ln(domestic sales)	3911	9.6576	1.4338	-0.0296	15.3187
export intensity	5192	0.3412	0.4500	0	1
FDI	5192	0.0047	0.0098	0	0.0600
ln(firm size)	5192	-1.7657	0.9293	-4.6052	2.7508
R&D intensity	5192	0.0006	0.0032	0	0.0597
Advertising intensity	5192	0.0012	0.0083	0	0.4787

ln(capital intensity) 5192 2.4659 1.1749 -3.8580 6.7145

Source: NBS, China, 2005-2007.

We can observe two features from Table 1. First, even if we confine ourselves within two four-digit industries, there still exist substantial variations. For example for domestic sales revenue, the standard deviation is around 15 per cent of the mean in both industries. The standard deviation of export intensity is even higher than its mean. Second, the presence of FDI across provinces appears to be low, with the mean being 0.11 per cent and 0.47 per cent in the textile and garment manufacturing industry and leather shoes manufacturing industry respectively. This low level of FDI presence at the regional dimension reflects the diversity of Chinese economy. Given its size, no province can be dominant in terms of attracting the FDI inflow. Despite the low average of FDI presence, it exhibits significant variations in that the standard deviation almost one and two times that of mean in the textile and garment manufacturing industry and leather shoes manufacturing industry respectively.

5. Empirical Results

As discussed in Section 4, we estimate equations (1) and (2) simultaneously, using the GMM technique with instrumental variables that address the possible endogeneity of FDI presence. Table 2 reports the results.

Table 2 Regression Results

	Leather shoes manufacturing industry			Textile and garment manufacturing industry		
	Coef.	Std. Err.	z	Coef.	Std. Err.	z
<i>Domestic sales</i>						
constant	11.5256***	0.0656	175.64	11.1411***	0.0297	374.69
eintensity	-5.6046***	0.0468	-119.76	-4.4990***	0.0335	-134.22
FDI	14.6627***	2.8486	5.15	94.7971***	6.1948	15.3
ln(firmsize)	1.0129***	0.0201	50.28	0.8738***	0.0087	99.95
rdint	5.6633	5.6548	1	8.6973***	2.0272	4.29
adint	-1.9720	3.4277	-0.58	0.0466	0.9285	0.05
ln(k)	0.1799***	0.0157	11.43	0.2126***	0.0063	33.81
<i>Exports</i>						
constant	2.0575***	0.0199	103.17	2.4549***	0.0172	142.83
ln(dsales)	-0.1786***	0.0016	-112.98	-0.2201***	0.0016	-136.3
FDI	2.5914***	0.5056	5.13	21.2149***	1.3625	15.57
ln(firmsize)	0.1804***	0.0037	48.69	0.1929***	0.0021	91.11
rdint	0.8358	0.9582	0.87	1.9205***	0.4511	4.26
ln(k)	0.0319***	0.0028	11.4	0.0468***	0.0014	32.47
Number of obs	3911			17088		

Note: Year dummy variables are included in the regressions; ***, **, and * denote significance at the one, five, and ten per cent respectively.

5.1 The leather shoes manufacturing industry

In the leather shoes manufacturing industry, the presence of FDI, measured as each province's share of the number of FDI-invested firms in the industry in the national total number of firms, appears to

exert significantly positive impacts on both domestic firms' local sales revenue and export intensity. A one per cent increase in the level of FDI presence leads to nearly 15 per cent increase in domestic sales revenue, and around 2.6 per cent increase in export intensity. Therefore FDI presence, in the regional dimension, promotes domestic firms' local sales revenue and export.

Export intensity negatively affects local sales revenue, and at the same time local sales revenue negative affects export intensity. This is not surprising in that sales to local market or foreign market are more or less substitute to each other. Firm size is found to positively affect both local sales revenue and export intensity, suggesting the importance of economies of scale in firms' sales decision. A one per cent increase in firm size results in slightly over one per cent increase local sales revenue and 0.18 per cent increase in export intensity. Similarly, the capital intensity, fixed assets annual net average per employee, also generates positive impacts on both local sales revenue and export intensity, which are significant at the one per cent level, suggesting more capital intensive firms are more capable of selling to both local and foreign markets. R&D intensity and advertising intensity appear not to significantly affect firms' local sales revenue, and R&D intensity also does not significantly affect domestic firms' export intensity.

5.2 The textile and garment manufacturing industry

In the textile and garment manufacturing industry, except for R&D intensity, the sign and significance of coefficients of the other explanatory variables do not change from those of the leather shoes manufacturing industry. The coefficients of FDI presence are positive and significant at the one per cent level in both local sales revenue and export intensity, suggesting positive spillovers from FDI presence to both local sales and exporting decisions. Compared with the estimated coefficients in the leather shoes manufacturing industry, the magnitude here is bigger, and in this sense, FDI generates stronger spillover effect than the leather shoes manufacturing industry.

Firm local sales and export again appear to substitute each other, with the coefficient of export intensity in the local sales revenue equation is estimated to be significantly negative and vice versa. Economies of scale appear to exist in this industry as well as the coefficients of firm size are estimated to be significantly positive in both equations. A one per cent increase in firm size results in 0.87 and 0.19 increase in the local sales revenue and export intensity respectively. The capital intensity plays a similar role in both the local sales and export intensity, as in the leather shoes manufacturing industry. Advertising intensity appears not to significantly affect both local sales revenue and export intensity as well. Different from the leather shoes manufacturing industry, R&D intensity now plays a significant role, with one per cent increase in R&D intensity generating around 8.7 and 1.9 per cent increase in local sales revenue and export intensity. The significantly positive impacts of R&D intensity highlights the importance of R&D activities in the textile and garment manufacturing industry.

5.3 Robustness check

In the previous empirical exercises, we find that the presence of FDI in the regional dimension, which is measured as the share of a province's number of FDI-invested firms in the national total in the industry, generates significantly positive impacts on both local sales revenue and export intensity of domestic firms. Is this finding sensitive to alternative measures of FDI presence? To check this, we re-estimate equations (1) and (2), using two alternative measures of FDI, namely the province's share of outputs of FDI-invested firms in the national total outputs in the industry and the province's share of employees of FDI-invested firms in the national total employees in the industry. In both

industries, the significantly positive impacts of FDI presence continue to hold, even though the magnitude of coefficient estimate changes from regressions to regressions. In this sense, the positive impacts from FDI presence are robust to alternative measures of FDI presence. For example, in the textile and garment manufacturing industry where the presence of FDI is measured as the output share, the coefficient in the local sales revenue equation is estimated to be 123.24 with a standard error of 4.96, and the coefficient in the export intensity equation is estimated to be 27.19 with a standard error of 1.09. We do not report these regression results, in order to save space, which however are available upon request.

6. Concluding Remarks

In this paper, we investigate how the presence of FDI affect domestic firms' local sales revenue and export intensity in two four-digit industries in China, namely the leather shoes manufacturing industry and textile and garment manufacturing industry, focusing on the regional dimension of FDI presence, in a two-equation simultaneous equation system. Our estimation finds that the presence of FDI generates significantly positive effects on both the local sales revenue and export intensity in both industries, which is robust to alternative measures of FDI presence.

The significantly positive impacts on domestic firms' sales in both local and foreign markets from the regional dimension of FDI presence suggest that FDI spillovers are indeed geographically bounded. Hence one important implication of our exercise is that it is reasonable for policy makers to encourage domestic and FDI-invested firms to locate close to each other, in order to maximize the benefits of FDI inflow.

References:

- Aitken, Brian, Gordon H. Hanson, and Ann E. Harrison. 1997. "Spillovers, foreign investment, and export behavior." Review of. *Journal of International Economics* 43 (1–2):103-32. doi: [http://dx.doi.org/10.1016/S0022-1996\(96\)01464-X](http://dx.doi.org/10.1016/S0022-1996(96)01464-X).
- Bao, Q., Y. Wang, and J. Huang. 2013. "Productivity and Firms' Sale Destination: Chinese Characteristics." In. Tianjin: Institute of International Business, Nankai University.
- Blomstrom, M., and A. Kokko. 1998. "Multinational corporations and spillovers." Review of. *Journal of Economic Survey* 12 (2):247-77.
- Buckley, P. J. , and M. Casson. 1976. *The Future of Multinational Enterprise*. London: Macmillan Press.
- Caves, Richard E. 1974. "Multinational Firms, Competition, and Productivity in Host-Country Markets." Review of. *Economica* 41 162:176-93.
- Chen, Chunlai, Yu Sheng, and Christopher Findlay. 2013. "Export Spillovers of FDI on China's Domestic Firms." Review of. *Review of International Economics* 21 (5):841-56. doi: 10.1111/roie.12074.
- Claro, Sebastian. 2009. "FDI Liberalization as a Source of Comparative Advantage in China." Review of. *Review of Development Economics* 13 (4):740-53. doi: 10.1111/j.1467-9361.2009.00513.x.
- Das, S. . 1987. "Externalities, and technology transfer through multinational corporations: a theoretical analysis,." Review of. *Journal of International Economics* 22:171-82.
- Dunning, J.H. , B. Kogut, and M. Blomstrom. 1990. *Globalization of Frms and the Competitiveness of Nations*. Lund: Lund University Press.
- Fosfuri, A., M. Motta, and T. Ronde. 2001. "Foreign direct investment and spillovers through workers' mobility." Review of. *Journal of International Economics* 53 (1):205-22.
- Fu, Xiaolan. 2011. "Processing Trade, FDI and the Exports of Indigenous Firms: Firm-Level Evidence from Technology-Intensive Industries in China." Review of. *Oxford Bulletin of Economics and Statistics* 73 (6):792-817. doi: 10.1111/j.1468-0084.2011.00673.x.
- Gaelotti, E. 2008. "Do domestic firms benefit from geographic proximity with FDI? Evidence from the privatization of the Czech glass industry." In *Working Papers IES*. Charles University Prague, Faculty of Social Sciences, Institute of Economic Studies.
- Girma, S. , and K. Wakelin. 2001. "Regional underdevelopment: is FDI the solution? A semi-parametric analysis." In *GEP Research Paper 2001/11*. University of Nottingham.
- Gorg, H., and D. Greenaway. 2004. "Much ado about nothing? do domestic firms really benefit from foreign direct investment?" Review of. *World Bank Research Observer* 19 (2):171-97.
- Gorg, H., and E. Strobl. 2005. "Spillovers from foreign firms through worker mobility: an empirical investigation." Review of. *Scandinavian Journal of Economics* 107 (4):693-709.
- Gorg, H., and E. Strobl. 2001 "Multinational companies and productivity spillovers: a meta-analysis." Review of. *Economic Journal* 111:F723-F39.
- Gu, Xin, Zhang-Yue Zhou, and A. B. M. Rabiul Alam Beg. 2014. "What determines China's trade balance dynamics: a disaggregate analysis of panel data." Review of. *Journal of the Asia Pacific Economy* 19 (2):353-68. doi: 10.1080/13547860.2014.880284.
- Hale, G., and C. Long. 2006. "What determines technological spillovers of foreign direct investment: evidence from China." In *Yale Economic Growth Center Discussion Paper 934*. New Haven, CT.: Economic Growth Center, Yale University.
- Havranek, Tomas, and Zuzana Irsova. 2011. "Estimating vertical spillovers from FDI: Why results vary and what the true effect is." Review of. *Journal of International Economics* 85 (2):234-44. doi: <http://dx.doi.org/10.1016/j.jinteco.2011.07.004>.
- Kokko, Ari, Mario Zejan, and Ruben Tansini. 2001. "Trade regimes and spillover effects of FDI: Evidence from Uruguay." Review of. *Weltwirtschaftliches Archiv* 137 (1):124-49. doi: 10.1007/BF02707603.
- Lin, P., and K. Saggi. 2007. "Multinational firms, exclusivity and backward linkages." Review of. *Journal of International Economics* 71 (1):206-20.

- Liu, Xiaming, Chengang Wang, and Yingqi Wei. 2001. "Causal links between foreign direct investment and trade in China." Review of. *China Economic Review* 12 (2):190-202. doi: [http://dx.doi.org/10.1016/S1043-951X\(01\)00050-5](http://dx.doi.org/10.1016/S1043-951X(01)00050-5).
- Liu, Xiaohui, Peter Burridge, and P. J. N. Sinclair. 2002. "Relationships between economic growth, foreign direct investment and trade: evidence from China." Review of. *Applied Economics* 34 (11):1433-40. doi: 10.1080/00036840110100835.
- Liu, Xiaohui, and Chang Shu. 2003. "Determinants of Export Performance: Evidence from Chinese Industries." Review of. *Economics of Planning* 36 (1):45-67. doi: 10.1023/B:ECOP.0000005728.05260.5d.
- Markusen, J. R., and N. Trofimenko. 2009. "Teaching locals new tricks: foreign experts as a channel of knowledge transfers." Review of. *Journal of Development Economics* 88 (1):120-31.
- Markusen, J., and A. Venables. 1999. "Foreign direct investment as a catalyst for industrial development." Review of. *European Economic Review* 43 (2):335-56.
- Mayneris, Florian, and Sandra Poncet. 2013. "Chinese Firms' Entry to Export Markets: The Role of Foreign Export Spillovers." Review of. *The World Bank Economic Review*. doi: 10.1093/wber/lht009.
- Melitz, Marc J. 2003. "The Impact of Trade on Intra-Industry Reallocations and Aggregate Industry Productivity." Review of. *Econometrica* 71 (6):1695-725. doi: 10.2307/1555536.
- Rodriguez-Clare, A. 1996. "Multinationals, linkages, and economic development." Review of. *American Economic Review* 86 (4):852-73.
- Saggi, K. 2002. "Trade, Foreign Direct Investment, and international technology transfer: a survey." Review of. *World Bank Research Observer* 17 (2):191-235.
- Smeets, R. 2008. "Collecting the pieces of the FDI knowledge spillovers puzzle." Review of. *World Bank Research Observer* 23 (2):107-38.
- Sun, Haishun. 2001. "Foreign Direct Investment and Regional Export Performance in China." Review of. *Journal of Regional Science* 41 (2):317-36. doi: 10.1111/0022-4146.00219.
- Sun, Sizhong. 2009. "How Does FDI Affect Domestic Firms' Exports? Industrial Evidence." Review of. *World Economy* 32 (8):1203-22. doi: 10.1111/j.1467-9701.2009.01175.x.
- . 2010. "Heterogeneity of FDI Export Spillovers and Its Policy Implications: The Experience of China." Review of. *Asian Economic Journal* 24 (4):289-303. doi: 10.1111/j.1467-8381.2010.02042.x.
- . 2012. "The role of FDI in domestic exporting: Evidence from China." Review of. *Journal of Asian Economics* 23 (4):434-41. doi: <http://dx.doi.org/10.1016/j.asieco.2012.03.004>.
- Sun, Sizhong, Ligang Song, and Peter Drysdale. 2011. "The role of geographical proximity in FDI productivity spillovers in China." In *China's Economy in the Post-WTO Environment: stock markets, FDI and challenges of sustainability*, edited by Lilai Xu, 142-56. Cheltenham, UK: Edwar Elgar Publishing.
- Wang, J., and M. Blomstrom. 1992. "Foreign investment and technology transfer: a simple model." Review of. *European Economic Review* 36:137-55.
- Wang, Jue, Yingqi Wei, Xiaming Liu, Chengang Wang, and Hua Lin. 2014. "Simultaneous Impact of the Presence of Foreign MNEs on Indigenous Firms' Exports and Domestic Sales." Review of. *Management International Review* 54 (2):195-223. doi: 10.1007/s11575-013-0195-y.
- Zhang, Kevin Honglin, and Shunfeng Song. 2001. "Promoting exports: the role of inward FDI in China." Review of. *China Economic Review* 11 (4):385-96. doi: [http://dx.doi.org/10.1016/S1043-951X\(01\)00033-5](http://dx.doi.org/10.1016/S1043-951X(01)00033-5).
- Zhang, Qing, and Bruce Felmingham. 2001. "The relationship between inward direct foreign investment and China's provincial export trade." Review of. *China Economic Review* 12 (1):82-99. doi: [http://dx.doi.org/10.1016/S1043-951X\(01\)00044-X](http://dx.doi.org/10.1016/S1043-951X(01)00044-X).