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Outward FDI and Domestic Input Distortions: Evidence from Chinese Firms*

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October 31, 2016

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JEL: F13, O11, P51.

Keywords: Outward FDI, Multinational Corporations (MNCs), Institutional Distortion, State-owned Enterprises

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1 Introduction

Foreign direct investment (FDI) and the emergence of multinational corporations (MNCs) are dominant features of the world economy nowadays.[1] In 2013, world FDI inflows reached the level of US$1.47 trillion, and global FDI stock was roughly US$26 trillion, surpassing the gross domestic product of any country in the world (UNCTAD 2015). Moreover, almost all firms listed in Fortune 500 are MNCs, and MNCs are by far the largest firms in the global economy. Therefore, understanding the behavior of MNCs and patterns of FDI is important for the analysis of the aggregate productivity and resource allocation of a modern economy.

The sharp increase in outward FDI from developing countries in the past decade has been phenomenal, and this is especially true for China. The UNCTAD World Investment Report (UNCTAD 2015) shows that outward FDI flows from developing economies have already accounted for more than 33 percent of overall FDI flows, up from 13 percent in 2007. Furthermore, despite the fact that global FDI flows plummeted by 16 percent in 2014, MNCs from developing economies invested almost US$468 billion abroad in 2014, an increase of 23 percent over the previous year.[2] As the largest developing country in the world, China has seen an astonishing increase in its outward FDI flows in the past decade. In 2015, China's outward FDI reached the level of 9.9 percent of the world's total FDI flows, which made China the second largest home country of FDI outflows globally. In addition, there are more than 220200 Chinese MNCs (parent firms), which is comparable to the number of MNCs of any developed economy in the world. Finally, outward FDI flows from China were US$145 billion in 2015, surpassing inward FDI flows to China, which were US$135 billion in the same year. In sum, the behavior of Chinese MNCs and patterns of China's outward FDI flows need to be explored, given their importance for the world economy.

This study investigates the production and investment strategies of Chinese manufacturing MNCs and patterns of China's outward FDI of manufacturing firms, through the lens of domestic input market distortions. It has been documented that discrimination against private firms is a fundamental issue for the Chinese economy. For instance, state-owned enterprises (SOEs) enjoy preferential access to financing from state-owned banks, although SOEs are less efficient than private firms (Dollar and Wei 2007; Song, Storesletten, and Zilibotti 2011; Khandelwal, Schott, and Wei 2013; Manova, Wei, and Zhang, 2015). Moreover, Bai, Krishna, and Ma (2013); Bai, Hsieh, and Song (2015); and Khandelwal, Schott, and Wei (2013) document that private firms have been treated unequally by the Chinese government in the

[1] MNCs refer to firms that own or control production of goods or services in countries other than their home country. FDI includes mergers and acquisitions, building new facilities, reinvesting profits earned from overseas operations and intra-company loans.

[2] The UNCTAD World Investment Report also demonstrates that FDI stock from developing economies to other developing economies grew by two-thirds, from US$1.7 trillion in 2009 to US$2.9 trillion in 2013. It also reports that transition economies now represent nine of the 20 largest investor economies globally (UNCTAD 2015).

exporting market, at least before 2001 when China joined the World Trade Organization (WTO). Unequal treatment comes from the excessive (exporting) quotas granted to SOEs and the tougher requirements for exporting that private firms face. In short, it is natural to link the behavior of Chinese MNCs to domestic distortions in China.

To the best of our knowledge, there is no existing work studying how institutional distortions at home affect firms' investment patterns abroad. The reason is that developed economies have been the home countries of outward FDI for many decades, and their economies are much less likely to be subject to distortions compared with developing economies. By contrast, various distortions are fundamental features of developing countries. For instance, size-dependent policies and red tape have been shown to generate substantial impacts on firm growth and resource allocation in India (Hsieh and Klenow 2009, 2012). The government discriminates against private firms in China (Huang 2003, 2008; Brandt, Tombe, and Zhu 2013). And the Brazilian economy is plagued with problems of difficult business registration, inefficient judicial systems, and rigid labor markets. Moreover, there is already anecdotal evidence documenting how firms circumvent these distortions by doing business abroad. For instance, the key to the success of Hainan Airlines (the fourth largest airline in China and a private firm) was to expand internationally and acquire foreign assets even at the early stage of its development.[3] Thus, distortions in the domestic market do seem to affect firms' decisions concerning going abroad.

We document three sets of stylized facts (on China's MNCs in manufacturing sectors) to motivate our theory. First, although private non-MNCs (and non-exporting firms) are more productive than state-owned non-MNCs (and non-exporting firms) on average, private MNCs are actually *less productive* than state-owned MNCs on average. Second, compared with private firms, the fraction of firms that undertake outward FDI is smaller among SOEs. Finally, the relative size of MNCs (i.e., average size of MNCs divided by average size of non-exporting firms) is *smaller* among private firms than among SOEs.

These findings seem to be counterintuitive. First, SOEs are much larger than private firms in China, and larger firms are more likely to become MNCs. Furthermore, it has been documented that SOEs receive substantial support from the Chinese government for investing abroad. Thus, why are there so few SOEs that actually invested abroad in the data? Second, it has been documented that SOEs are less productive than private firms in China (e.g., Brandt, Van Biesebroeck, and Zhang 2012; Khandelwal, Schott, and Wei 2013). Our data also show this pattern when we look at non-exporting and exporting (but non-multinational) firms. Why is this pattern reversed when we focus on MNCs? Third, if SOEs were more likely to invest abroad, the relative size of state-owned MNCs should be smaller than that of

[3]In China, the commercial aviation industry was heavily regulated for many years. As a result, private firms could not enter this market, although SOEs could. To circumvent this distortion, Hainan Airlines undertook FDI and served the international market first. Interestingly, after the airline grew big enough and had the strength to compete against state-owned airlines (e.g., Air China), it went back to expand in the domestic market substantially. For more details, see http://www.washingtonpost.com/business/for-hainan-airlines-chen-feng-rise-of-resort-in-china-provides-lift-for-a-new-sky-empire/2014/05/22/d4bb7508-d9fb-11e3-b745-87d39690c5c0_story.html.

private MNCs, since the selection into FDI is less stringent for them. However, why do the data suggest the opposite pattern?

To rationalize these puzzling findings, we build a model based on Helpman, Melitz, and Yeaple (2004) (henceforth, HMY) and highlight two economic forces: institutional arbitrage and selection reversal. Two key departures we make from HMY are the addition of capital use in the production process and asymmetric distortions across borders. Specifically, we assume that private firms pay a higher capital rental price (and land price) when *producing* domestically (compared with SOEs), while all firms pay the same input prices (labor and capital) when they produce abroad. The existence of the input price wedge comes from the capital market and the land market, since the banking sector is dominated by state-owned banks and land is largely owned by the government (and the country) in China. In reality, the government charges higher interest rates and unit land price when private firms purchase these resources, which is equivalent to an implicit tax levied on inputs. When firms produce abroad, this input price wedge (at least part of it) ceases to exist, since the capital market and the land market are not controlled by the Chinese government, which is the ultimate owner of Chinese SOEs. In other words, the relative domestic input price (compared with that in a foreign country) private firms face is higher than that of SOEs.[4]

As a result of this asymmetry, there is an extra incentive for private firms to produce abroad, since they can circumvent the input market distortion that exists *only* domestically by becoming MNCs (i.e., institutional arbitrage). Absent the domestic distortion, there should be no difference in the selection into the (domestic and) FDI market, since SOEs and private firms face the same domestic (and foreign) market environment. When there is a domestic distortion, selection into the domestic market is tougher for private firms. However, since they receive an extra benefit from producing abroad (i.e., not just the saving on the variable trade cost), the incentive of becoming an MNC is higher for them. This leads to less tough selection into the FDI market for private firms, which is termed selection reversal in this paper. This reversal rationalizes why there are disproportionately fewer MNCs among SOEs than among private firms and why private MNCs are less productive than state-owned MNCs. In addition, the relative size of private MNCs is smaller than that of state-owned MNCs, as selection into the FDI market is tougher for SOEs than for private firms. In summary, a model with distortion in the domestic capital and land markets rationalizes all three stylized facts.

In addition to explaining the three stylized facts, our model yields several additional empirical predictions. First, conditional on other firm-level characteristics, a private firm sells *disproportionately more* in the foreign market (compared with an SOE) because of the nonexistence of distortion abroad. Sec-

[4]It is plausible that the distortion in the input market shows up as a subsidy to SOEs. Specifically, SOEs receive subsidy for their inputs only when they produce in China, while there is no such a subsidy for private firms wherever they produce. In this scenario, SOEs have *less* of an incentive to undertake FDI, since the relative domestic input price they face is lower, which is the same as in our main model. This situation results in tougher selection into the FDI market for SOEs as well, which leads to the same empirical predictions. In short, the two types of distortions share the same key feature and generate the same empirical predictions.

ond, conditional on other firm-level characteristics, the (overall) size of a private firm increases more than that of an SOE when both of them undertake FDI. This is again because of the nonexistence of distortion abroad. Finally, as the distortion mainly exists in the capital market, the selection reversal and productivity premium for state-owned MNCs are more pronounced in capital intensive industries and in regions with more severe discrimination against private firms. We present supporting evidence for these additional predictions of the model as well.

It is worthwhile to stress that Chinese firms have different motivations to undertake outward FDI. Most manufacturing firms seek international markets whereas firms in the mining industries seek natural resources and firms in the construction sectors invest in foreign infrastructure. In the present paper we focus our scope on manufacturing FDI for two reasons. First, manufacturing firms' investment behavior is more related to firm performance. By contrast, the investment behavior of firms in the mining and construction industries is more or less of politics. Second, even without taking this motivation into account, only data on manufacturing firms are available. Without firm-level data on mining and construction firms, one is not possible to explore the nexus between firm performance and outward FDI.

Although we focus on how a particular type of asymmetric institutional treatment affects economic outcomes, the insights of this study apply to other circumstances as well. For instance, it was reported that a rising number of talented and wealthy French people moved abroad because of the increasing tax rates in France.[5] This serves as a perfect example of institutional arbitrage, which is the key idea of the current study. In India, red tape has forced many talented entrepreneurs to leave the country and start their businesses abroad.[6] Agents, firms, and entrepreneurs can move across countries and regions to circumvent the distortions they face domestically.

2 Literature Review

This study aims to speak to the literature on FDI and MNCs. In research on vertical FDI, Helpman (1984) insightfully points out how the difference in factor prices across countries affects patterns of vertical FDI. Antràs (2003, 2005) and Antràs and Helpman (2004) emphasize the importance of contractual frictions for shaping the pattern of FDI and outsourcing in various industries (e.g., capital intensive versus labor intensive). In research on horizontal FDI, Markusen (1984) postulates the concentration-proximity trade-off, which receives empirical support from Brainard (1997). More recently, HMY (2004) develop a model of trade and FDI with heterogeneous firms. They show that the least productive firms sell in the domestic market only; firms with medium levels of productivity serve the domestic market and export; and the most productive firms sell domestically and undertake FDI. Our study contributes to this literature

[5] See `http://www.france24.com/en/20150808-france-wealthy-flee-high-taxes-les-echos-figures`.

[6] Readers interested in studying anecdotal evidence of this can find it at http://www.thehindu.com/news/national/red-tape-forces-top-indian-entrepreneurs-to-shift-overseas/article7367731.ece.

by pointing out another motive for firms to engage in FDI and showing its impact on patterns of FDI.

This study is also related to the literature that substantiates the existence of resource misallocation in developing economies. Hsieh and Klenow's (2009) pioneering work documents that compared with the United States, there is substantial resource misallocation across firms in China and India. Restuccia and Rogerson (2008) show how size-dependent taxes can generate a quantitatively important impact on aggregate productivity. Following their work, scholars have started to uncover how various types of distortions affect aggregate productivity. Midrigan and Xu (2014) and Moll (2014) study the aggregate impact of financial frictions on the economy. Guner, Ventura, and Xu (2008) and Garicano, Lelarge, and Van Reenen (2013) explore the impact of size-dependent policies on aggregate productivity and firm size distribution.[7] Our work contributes to this research area by showing a link between domestic distortions and firms' behavior in the global market.

The third related strand of the literature is the research on distortions in China and the FDI decisions of Chinese firms. Bai, Hsieh, and Song (2015) find that a key feature of the Chinese economy is crony capitalism, meaning that each local government supports businesses related to itself. Brandt, Tombe, and Zhu (2013) substantiate the existence of distortions between private firms and SOEs in China. Furthermore, they document that the distortions changed between the 1980s and the 2000s. Distortions related to foreign transactions exist in the Chinese economy as well. For instance, Khandelwal, Schott, and Wei (2013) document that private firms in the textile industry had to obtain licenses to export, while SOEs did not. Chen and Tang (2014) study the sorting pattern of Chinese MNCs and how outward FDI from China has enhanced the exporting performance of Chinese firms in the global market. More recently, using the same data set, Tian and Yu (2015) document the sorting pattern of Chinese MNCs among production FDI and non-production FDI, but abstract away from the key difference between state-owned MNCs and private MNCs. Compared with the existing work, the key innovation of our work is to link firms' decisions on outward FDI to domestic distortions, and this link deserves more attention in future research.

3 Data and Stylized Facts

3.1 Data

Our first data set is a production data set of Chinese manufacturing firms from 2000 to 2013, which comes from the Annual Survey of Industrial Firms (ASIF) complied by the National Bureau of Statistics of China. All SOEs and non-SOEs (i.e., private firms) with annual sales of RMB 5 million RMB (or equivalently, about US$830,000) or more are included in the data set. This data set contains more than 100 variables, such as the number of employees, value of capital stock, total sales, and export value.

[7] For a synthesis of work on misallocation and distortion, see Restuccia and Rogerson (2013).

Firms included in this data set contribute to 95 percent of China's total sales in all manufacturing sectors. This data set is particularly useful for identifying the ownership type of the firm (i.e., SOE or not) and other key firm-level characteristics, such as firm size and total factor productivity (TFP).

We use two data sets that report information on Chinese firms' outward FDI decisions.[8] The first is a nationwide data set of firm-level outward FDI from 1980 to 2013, and the second is an outward FDI data set of firms from Zhejiang province during 2006–08.[9] In terms of the time span and regional coverage, the former data set has the advantage. However, the nationwide data set does not contain information on the amount of firms' investment in foreign countries. This information is available in the data set for Zhejiang province (the second data set). Nevertheless, both data sets provide information on the initial year when the firm engages in outward FDI in a foreign country, the type of the investment (wholesale or production FDI), and destination countries for the investment.

Following Tian and Yu (2015), we merge the two FDI data sets with the firm-level production data set by using the Chinese name of the firm. If a firm has the same Chinese firm in different data sets in a particular year,[10] it is considered to be an identical firm.

In addition, we use the Orbis data from Bureau Van Dijk from 2005 to 2014, since they contain detailed financial information on foreign affiliates of Chinese MNCs. For the data before 2011, we merge our ASIF data with the Orbis data by matching the names in Chinese. For the data after 2011, we merge our ASIF data with the Orbis data using (Chinese) parent firms' trade registration number which is contained in both data sets after 2011. We use the merged data set to study how Chinese MNCs allocate their sales across border and how their global size responds to investment liberalization.

Although our firm-level dataset covers 2000-13, we use data for 2000-08 to conduct our main empirical analysis, because the data after 2008 lack information on firm's value-added or materials, which is essential to estimate firm productivity–a key variable in our empirical analysis. We instead use data after 2008 for robustness checks only.

Table 1 provides information on FDI in our matched data sets for 2000-08. Rows (1) and (2) report the numbers of starting and continuing MNCs (including services firms) across years. Each observation accounts for one firm-country-affiliate pair. That is, if firm F invests in countries A and B in a given year, there will be two MNCs recorded by the Ministry of Commerce: firm F-A and firm F-B. The trend is that the number of FDI transactions has surged since 2005. Rows (3) and (4) report the number of manufacturing firms and the number of (matched) manufacturing MNCs (i.e., firm-country-affiliate pairs) in our sample. Row (5) presents the number of (matched) state-owned manufacturing MNCs (i.e., firm-country-affiliate pairs) year by year.

[8] See Tian and Yu (2015) for more details.

[9] Roughly 10 percent of Chinese MNCs are from Zhejiang province.

[10] For firms from Zhejiang province, we use all three date sets. We exclude the data set from Zhejiang province, when the firms are from provinces other than Zhejiang.

Two observations merit special consideration. The first observation is that the number of matched firms decreases dramatically for two reasons. First, not all outward FDI firms are manufacturing firms; some are related to mining and construction. Second and more importantly, it is indeed a rare event for a firm to be an MNC, especially for SOEs. Another observation is that, as shown in column (4) in Table 1, the number of FDI manufacturing firms increase significantly in 2004. This is mainly because the Chinese government began strongly promoting the country's outward FDI in 2004. The FDI share in row (6) is obtained by dividing the number of FDI manufacturing firms by the number of manufacturing firms (i.e., (6) = (4)/(3)). The SOE FDI share in row (7) is obtained by dividing the number of SOE FDI manufacturing firms by the number of FDI manufacturing firms (i.e., (7) = (5)/(4)). Clearly, the state-owned MNC share is decreasing over the years. Rows (8) and (9) instead only allow one record for each firm each year, even if a firm invests in multiple destination countries in a given year. For instance, we only record firm F once, as in the previous example. As a result, (10) = (8)/(3) and (11) = (9)/(8). The overall pattern is that the share of state-owned multinational firms becomes smaller over the years.

[Insert Table 1 Here]

3.2 Measures

The SOE indicator and measured firm productivity are the two key variables used in the paper. This subsection carefully describes how we construct these two measures.

3.2.1 SOE Measures

We define SOEs using two methods. The first is to adopt the official definition of SOEs, as reported in the *China City Statistical Yearbook* (2006), by using information on firm's legal registration. A firm is classified as an SOE if its legal registration identification number belongs to the following categories: state-owned sole enterprises (code in the firm data set: 110), state-owned joint venture enterprises (141), and state-owned and collective joint venture enterprises (143). State-owned limited corporations (151) are excluded as SOEs by this measure. As this is the conventional measure widely used in the literature, we thus adopt such a measure as the default measure to conduct our empirical analysis. Appendix Table 1 provides summary statistics for the SOE dummy used in this study.

Recently, Hsieh and Song (2015) introduce a broader definition of SOEs. They observe that some foreign firms and public listed companies have a controlling stake held by a state-controlled holding company. Thus, they suggest defining a firm as an SOE when its state-owned equity share is greater than or equal to 50 percent. Along this line, we introduce an alternative way to define SOEs. As a result, a firm is defined as an SOE if either (1) it is classified as an SOE using the conventional measure; or (2)

its state-owned equity share is greater than or equal to 50 percent. We use such a broadly defined SOE dummy in our robustness checks.

3.2.2 TFP Measures

First and foremost, we estimate firm TFP using the augmented Olley-Pakes (1996) approach as adopted in Yu (2015). Compared with the standard Olley-Pakes (1996) approach, our approach has several new elements. First, we estimate the production function for exporting firms and non-exporting firms in each industry separately.[11] Second, we use detailed industry-level input and output prices to deflate firm's input use and revenue in our productivity estimation. As the revenue-based TFP may also pick up differences in price-cost markup and prices across firms (De Loecker and Warzynski, 2012), an ideal method is to use firm-specific price deflators to construct quantity-based TFP. However, such data are not available in China. To mitigate this problem, we follow Brandt, Van Biesebroeck, and Zhang (2012) to use four-digit Chinese Industrial Classification (CIC)-level input and output prices to deflate firm's input use and revenue. Once industrial price deflators are well defined and the price-cost markup is positively associated with true efficiency, revenue-based TFP can capture the true efficiency of the firm reasonably well (Bernard et al., 2003). Third, we take the effect of China's accession to the WTO (on firm performance) into account, as Chinese firms may export more or do more outward FDI due to the expansion of foreign markets after 2001. We thus include a WTO dummy in the inversion step of our productivity estimation. Last and most importantly, we also add the SOE indicator to the control function in the first-step Olley-Pakes estimates. In particular, we include the SOE indicator and its interaction terms with log-capital and log-investment to approximate the fourth-order polynomials in the inversion step of the TFP estimates.

As stressed in Arkolakis (2010), firm TFP cannot be directly comparable across industries. We thus calculate the relative TFP ($RTFP$) by normalizing our augmented Olley-Pakes TFP in each industry.

Although we control for the SOE indicator in the productivity estimation described above, it might still be unclear whether the TFP difference between SOE and private firms is caused by input factor distortions (or any other factors). If input factor distortions play an essential role in determining firm sales in different markets, it should be observed that SOEs are more capital intensive even within each narrowly defined industry (after controlling for firm size and other year-variant factors), as SOEs can access working capital at lower cost. Inspired by this intuition and Gandhi, Navarro, and Rivers (2016), who develop a new nonparametric estimator of TFP by examining the firms' first-order condition. We

[11] We chose to do this because firms that are engaged in processing trade may use different technologies compared with other firms (Feenstra and Hanson 2005), and processing trade accounted for around half of China's foreign trade before 2008. As a robustness check, we also pool exporters and non-exporters together and, in the inversion step of the productivity estimation, re-estimate the production function by including a dummy variable for exporting status. The results generated by this alternative method do not change our subsequent empirical findings.

first regress the capital-labor ratio of the firm on its size (proxied by firm sales), industry fixed effects (at the finest four-digit CIC level), and year fixed effects, to obtain the firm-level clustered residuals. We then interact the residuals with log-capital and log-investment as additional variables in the fourth-order polynomials used in the inversion step of the TFP estimates. We thus re-estimate our augmented relative TFP, taking into consideration the input distortions ($RTFP^{Distort}$). Finally, we also consider another specification ($RTFP^{Distort}_{SOE}$) by including the input distortion residuals and the SOE indicator (with interactions with log-capital and log investment) in the inversion step of the TFP estimates for robustness checks.

3.3 Stylized Facts

The main purpose of this subsection is to document three stylized facts using the merged data sets. As our interest is to explore how resource misallocation (across firm type) at home affects Chinese firms' outward FDI behavior, we compare state-owned MNCs with private MNCs when stating these stylized patterns.

3.3.1 Stylized Fact One: Productivity Premium for State-Owned MNCs

Table 2 reports the difference in our augmented Olley-Pakes TFP estimates between SOEs and private firms. Simple *t*-tests in columns (1) and (3) show that, among non-MNCs and non-exporting firms, private firms are more productive than SOEs. To confirm this finding, we perform nearest-neighbor propensity score matching, by choosing firm sales and the number of employees as covariates.[12] Columns (2) and (4) present the estimates for average treatment for the treated for private firms. Again, the coefficients of the productivity difference between SOEs and private firms are highly significant, suggesting that non-multinational (and non-exporting) SOEs are less productive than non-multinational (and non-exporting) private firms. The findings for non-MNCs are consistent with other studies, such as Hsieh and Song (2015).

By contrast, a *selection reversal* is found when we focus on MNCs only. That is, private MNCs (i.e., *private* parent firms) are on average *less productive* than state-owned MNCs (i.e., state-owned parent firms), which is shown in column (5) in Table 2. To confirm this finding, we focus on the productivity difference between private and state-owned MNCs that are engaged in FDI and exporting as well.[13] Column (6) reveals the same pattern. Namely, private MNCs are less productive than state-owned MNCs on average.

[12] To avoid the case in which multiple observations have the same propensity score, we perform a random sorting before matching.

[13] In reality, some Chinese MNCs engage in outward FDI and exporting. This is especially true for firms that undertake distribution FDI by setting up trade office abroad to promote exports. See Tian and Yu (2015) for detailed discussions.

The lower module of Table 2 presents evidence of the selection reversal using a broadly defined SOE indicator à la Hsieh and Song (2015). Compared with the numbers of MNCs and SOEs shown in the upper module, there are more SOEs engaged in outward FDI and more firms classified as SOEs when we use the broadly defined SOE dummy. Still, the evidence shows that private MNCs are less productive than state-owned MNCs, although private non-MNCs are more productive than state-owned MNCs.

[Insert Table 2 Here]

Our first stylized fact is robust to different TFP measures as shown in Table 3. Columns (1), (4) and (7) report relative TFP for all firms, non-MNC firms, and MNC firms, respectively. Firm's relative TFP is obtained by scaling down firm TFP in each industry after normalizing the TFP of the most productive firm in that industry to one (see Arkolakis 2010; Groizard, Ranjan, and Rodriguez-Lopez. 2015). After normalization, we calculate the relative TFP of firms in each industry. The TFP measure used in columns (2), (5) and (8), $RTFP^{distort}$, takes firm's input factor distortions into account when we estimate firm relative TFP. The alternative firm TFP measure, $RTFP_{soe}^{distort}$, reported in columns (3), (6) and (9), puts the SOE dummy, distortion residuals and their interaction terms with other firm-level key variables into TFP measures, as discussed above. Again, our findings are robust to the different TFP measures we use. Our data clearly exhibit selection reversal in the sense that private MNCs are less productive than state-owned MNCs.

Equally interesting, we then look at the productivity difference between state-owned and private MNCs industry by industry. To do so, we separate all industries into two categories: capital-intensive and labor-intensive industries, according to the official definition adopted by the National Statistical Bureau of China.[14] The lower module of Table 3 shows that a productivity premium for state-owned MNCs exists in capital-intensive industries. This finding is important, as it shows that selection reversal exists in industries with more severe distortions in the input market[15]

[Insert Table 3 Here]

Finally, as all of the TFP estimates are essentially based on the Olley-Pakes approach, which uses investment as a proxy for TFP, there may be a concern that the missing value of investment may cause some estimation bias. However, this is not a problem as discussed in Yu (2015). In particular, we have already dropped those bizarre observations in our sample following the General Accepted Accounting Principle (GAAP) criteria. However, for the sake of completeness, we report simple labor productivity (defined as value-added per employee) and Levinsohn-Petrin (2003) TFP in Appendix Table 2. Once

[14] In particular, among the 28 CIC two-digit industries, the following industries are classified as labor-intensive sectors: processing of foods (code: 13), manufacture of foods (14), beverages (15), textiles (17), apparel (18), leather (19), and timber (20).

[15] Section 5 shows that the input price wedge mainly exists in the credit (i.e., capital) market.

again, we see that state-owned non-MNCs are less productive than private non-MNCs. But the opposite is true for MNCs: state-owned MNCs are more productive than private MNCs. In short, our first empirical finding is robust.

3.3.2 Stylized Fact Two: Smaller Fraction of State-Owned MNCs

Column (9) in Table 2 presents our second stylized fact, which shows that the fraction of MNCs is larger among private firms than among SOEs. Again, the findings are robust to the different definitions we use to construct the SOE indicator. When using a broadly defined SOE indicator, we find that more firms are classified as SOEs whereas the number of state-owned MNCs does not change much. As a result, the proportion of state-owned MNCs becomes smaller. On the one hand, this finding is puzzling, since SOEs are larger firms that should be more likely to invest abroad. Furthermore, the Chinese government has supported its SOEs investing abroad for many years, known as the Going-Out strategy. On the other hand, such an observation is consistent with our first finding. Namely, as state-owned MNCs are more productive than private MNCs, the fraction of SOEs engaged in FDI should be smaller (i.e., tougher selection).

3.3.3 Stylized Fact Three: Larger Relative Size Premium for State-Owned MNCs

Our last stylized fact is related to the relative size premium of state-owned MNCs. The conventional view is that SOEs are usually larger in size, which is usually measured by log employment or log sales. Our data also exhibit such features. As shown in Appendix Table 3, SOEs are larger than private firms irrespective of their FDI or exporting status.[16]

More Important, the size premium for state-owned MNCs holds in the relative sense as well. Table 4 shows that the ratio of average log employment of multinational parent firms to that of non-exporting firms is larger among SOEs than among private firms. The first module in Table 4 reports the result obtained from the comparison between the relative size of state-owned MNCs (compared with non-exporting firms) and that of private MNCs. The relative size is measured by l_o^j/l_d^j where l_o^j and l_d^j are log employment of MNCs and that of non-exporting firms for firm type j (i.e., private or state-owned). The year-average ratio in the first column shows that the relative size of private MNCs is significantly smaller than that of SOEs. As few SOEs were engaged in outward FDI before 2004 (see Table 1), we report the year-average ratio up to a particular year in Table 4 as well. All columns suggest larger relative size for state-owned MNCs. To sum up, our third stylized fact states that the absolute and relative sizes (compared with non-exporting firms) of private MNCs are smaller than those of state-owned MNCs.

[16]Firm size (i.e., log employment and sales) of state-owned exporting (but non-multinational) firms is larger than that of private exporting (but non-multinational) firms, as shown in columns (1) and (2) in Appendix Table 3. Next, this property also holds for state-owned MNCs and private MNCs, as shown in columns (3) to (6) in Appendix Table 3.

[Insert Table 4 Here]

Thus far, we have established three interesting empirical findings. In what follows, we will present a theoretical model to rationalize these findings. Furthermore, the model yields several additional empirical predictions, which will be shown to be consistent with the data.

4 Model

We modify the standard FDI model proposed by HMY (2004) to rationalize the empirical findings documented so far. We study how discrimination against private firms in the input market affects the sorting pattern of MNCs and their size premium at the intensive margin. At the same time, we investigate how the difference in foreign investment costs impacts the investment behavior of private MNCs and state-owned MNCs at the extensive margin.

4.1 Setup

There is one industry populated by firms that produce differentiated products under conditions of monopolistic competition à la Dixit and Stiglitz (1977). Each variety is indexed by ω, and Ω is the set of all varieties. Consumers derive utility from consuming these differentiated goods according to

$$U = \Big[\int_{\omega \in \Omega} q(\omega)^{\frac{\sigma-1}{\sigma}} d\omega \Big]^{\frac{\sigma}{\sigma-1}}, \tag{1}$$

where $q(\omega)$ is the consumption of variety ω, and σ is the constant elasticity of substitution between differentiated goods.

Entrepreneurs can enter the industry by paying a fixed cost, f_e, in terms of the unit of goods produced by the firm.[17] After paying the entry cost, the entrepreneur receives a random draw of productivity, φ, for her firm. The cumulative density function of this draw is assumed to be $F(\varphi)$. Once the entrepreneur observes the productivity draw, she decides whether or not to stay in the market as there is a fixed cost to produce, f_D (in terms of the units of the goods produced by the firm). In equilibrium, entrepreneurs in the monopolistically competitive sector earn an expected payoff that is equal to zero due to free entry.

After entering and choosing to stay in the domestic market, each entrepreneur also chooses whether to serve the foreign market. There are two options for doing this, the first of which is exporting. Exporting entails a variable trade cost, $\tau(\geq 1)$, and a fixed exporting cost, f_X. The second way is to set up a plant in the foreign country and produce there directly. The cost of doing this is fixed and denoted by f_I. Both

[17] We follow Bernard, Redding, and Schott (2007) to choose this specification in order to make various fixed costs have the same capital intensity as the variable cost.

fixed costs of serving the foreign market are in terms of the units of the goods produced by the firm. In short, we consider horizontal FDI here as in HMY (2004).

Similar to Bernard, Redding, and Schott (2007), there are two factors of production, capital and labor, and the production function takes the following constant-elasticity-of-substitution form:

$$q(k,l) = \varphi\Big(k^{\frac{\mu-1}{\mu}} + l^{\frac{\mu-1}{\mu}}\Big)^{\frac{\mu}{\mu-1}}, \tag{2}$$

where k and l are capital and labor inputs respectively, and φ is the productivity draw the firm receives. Parameter $\mu(\geq 1)$ is the elasticity of substitution between capital and labor.

We assume that there are two types of firms in the economy: private firms and SOEs. Without loss of generality, both types of firms are presumed to draw from an identical distribution. We do not take a stance on why some firms become SOEs (or private enterprises), since the predictions of the model do not depend on this. The key innovation of the model is to introduce a wedge between the input price paid by SOEs and that paid by private enterprises when they produce *domestically*. Specifically, it is assumed that private firms pay a capital rental price $c(> 1)$ times as high as what SOEs pay when they *produce* domestically. However, (state-owned and private) firms pay the same wage and capital rental price when producing abroad.[18] In short, the two departures we make from HMY (2004) are the addition of capital in production and the existence of a wedge in capital rental price.

Based on equation (2), we derive total variable cost as

$$TVC(q,\varphi) = \frac{qr}{\varphi(1+\omega^{\mu-1})^{\frac{1}{\mu-1}}}, \tag{3}$$

where r and w are the capital rental price and wage rate respectively. To simplify our notation, $\omega = \frac{r}{w}$ is relative price of capital. Since the fixed costs have the same capital intensity as the variable cost and the efficiency of covering the fixed costs is normalized to one (i.e., no difference in the efficiency of covering the fixed costs between firms), their value is given by

$$FC(r,w) = \frac{f_i r}{(1+\omega^{\mu-1})^{\frac{1}{\mu-1}}}, \tag{4}$$

where $i \in \{e, D, X, I\}$. Capital intensity in equilibrium is given by

$$\frac{l(w,r)w}{k(w,r)r} = \omega^{\mu-1}.$$

[18] We will show that there is evidence for the existence of an input price wedge in the credit market and in the land market, but not in the labor market. Since buying capital usually requires a substantial amount of borrowing, we assume that private firms pay a higher capital rental price than SOEs.

As long as $\mu > 1$, a higher relative price of capital leads to lower capital intensity. This property is utilized in our productivity estimation discussed above.

4.2 Domestic Production, Exporting, and FDI

We derive firm profit and revenue as follows. Based on equation (1), the demand function for variety ω can be derived as

$$q(\omega) = \frac{p(\omega)^{-\sigma}}{P^{1-\sigma}} E, \tag{5}$$

where E is the total income of the economy and P is the ideal price index and defined as

$$P \equiv \left[\int_{\Omega(\omega) \in \Omega} p^{1-\sigma}(\omega) M dF(\omega) \right]^{\frac{1}{1-\sigma}},$$

where M is the total mass of varieties in equilibrium. The resulting revenue function is

$$R(q) = q^{\frac{\sigma-1}{\sigma}} E^{\frac{1}{\sigma}} P^{\beta}, \tag{6}$$

where $\beta \equiv \frac{\sigma-1}{\sigma}$.

We derive SOE's operating profit earned from domestic production and exporting first. Since both types of production use domestic factors only, their operating profits are given by

$$\pi_{SD}(\varphi) = \frac{D_H}{\sigma} \Big(\frac{\beta \varphi}{r_H} \Big)^{\sigma-1} (1 + \omega_H^{\mu-1})^{\frac{\sigma-1}{\mu-1}} \tag{7}$$

and

$$\pi_{SX}(\varphi) = \pi_{SD}(\varphi) + \frac{D_F}{\sigma} \Big(\frac{\beta \varphi}{\tau r_H} \Big)^{\sigma-1} (1 + \omega_H^{\mu-1})^{\frac{\sigma-1}{\mu-1}}, \tag{8}$$

where $D_i \equiv P_i^{\sigma-1} E_i$ and $i \in \{H, F\}$. Subscripts S, D, X, H and F refer to SOE, domestic production, exporting, home country and foreign country respectively. For private firms, the operating profits are

$$\pi_{PD}(\varphi) = \frac{D_H}{\sigma} \Big(\frac{\beta \varphi}{c r_H} \Big)^{\sigma-1} (1 + (c\omega_H)^{\mu-1})^{\frac{\sigma-1}{\mu-1}} \tag{9}$$

and

$$\pi_{PX}(\varphi) = \pi_{PD}(\varphi) + \frac{D_F}{\sigma} \Big(\frac{\beta \varphi}{\tau c r_H} \Big)^{\sigma-1} (1 + (c\omega_H)^{\mu-1})^{\frac{\sigma-1}{\mu-1}}. \tag{10}$$

Private firms face a higher capital rental price when producing domestically. Since revenue is σ times as high as the operating profit, it can be derived as

$$R_{ij}(\varphi) = \sigma \pi_{ij}(\varphi)$$

where $i \in \{S, P\}$ and $j \in \{D, X\}$.

We can derive the exit cutoff and the exporting cutoff for SOEs and private firms respectively:

$$\bar{\varphi}_{SD} = \frac{r_H(\sigma r_H f_D / D_H)^{\frac{1}{\sigma-1}}}{\beta\Big(1+\omega_H^{\mu-1}\Big)^{\frac{\sigma}{(\sigma-1)\mu-1)}}}; \quad \bar{\varphi}_{SX} = \tau\frac{r_H(\sigma r_H f_X / D_F)^{\frac{1}{\sigma-1}}}{\beta\Big(1+\omega_H^{\mu-1}\Big)^{\frac{\sigma}{(\sigma-1)\mu-1)}}};$$

$$\bar{\varphi}_{PD} = \frac{cr_H(\sigma c r_H f_D / D_H)^{\frac{1}{\sigma-1}}}{\beta\Big(1+(c\omega_H)^{\mu-1}\Big)^{\frac{\sigma}{(\sigma-1)\mu-1)}}}; \quad \bar{\varphi}_{PX} = \tau\frac{cr_H(\sigma c r_H f_X / D_F)^{\frac{1}{\sigma-1}}}{\beta\Big(1+(c\omega_H)^{\mu-1}\Big)^{\frac{\sigma}{(\sigma-1)\mu-1)}}}.$$

Note that $\bar{\varphi}_{PD} > \bar{\varphi}_{SD}$ and $\frac{\bar{\varphi}_{PX}}{\bar{\varphi}_{PD}} = \frac{\bar{\varphi}_{SX}}{\bar{\varphi}_{SD}}$.

Here we discuss the case of FDI. Following HMY, we assume that the firm uses foreign factors to produce after setting up a plant in the foreign country.[19] In addition, foreign factors are used to pay for the fixed FDI cost. It is worth stressing that our theoretical predictions will hold well independent of this assumption. In Appendix C, we allow for FDI fixed cost to be paid using domestic factors, and private firms do not face discrimination when they pay the FDI fixed cost using domestic firms. In both cases, our theoretical results are still preserved. Based on the above assumptions, the operating profit of firms that engage in FDI can be derived as follows:

$$\pi_{SO}(\varphi) = \pi_{SD}(\varphi) + \frac{D_F}{\sigma}\Big(\frac{\beta\varphi}{r_F}\Big)^{\sigma-1}(1+\omega_F^{\mu-1})^{\frac{\sigma-1}{\mu-1}}; \tag{11}$$

$$\pi_{PO}(\varphi) = \pi_{PD}(\varphi) + \frac{D_F}{\sigma}\Big(\frac{\beta\varphi}{r_F}\Big)^{\sigma-1}(1+\omega_F^{\mu-1})^{\frac{\sigma-1}{\mu-1}}. \tag{12}$$

When both SOEs and private firms produce abroad, they face the same factor prices. The FDI cutoffs are pinned down by the following indifference conditions (between exporting and engaging in FDI):

$$\frac{f_I r_F}{(1+\omega_F^{\mu-1})^{\frac{1}{\mu-1}}} - \frac{f_X r_H}{(1+\omega_H^{\mu-1})^{\frac{1}{\mu-1}}} = \frac{D_F}{\sigma}\Big(\beta\bar{\varphi}_{SO}\Big)^{\sigma-1}\left[\frac{(1+\omega_F^{\mu-1})^{\frac{\sigma-1}{\mu-1}}}{r_F^{\sigma-1}} - \frac{(1+\omega_H^{\mu-1})^{\frac{\sigma-1}{\mu-1}}}{(\tau r_H)^{\sigma-1}}\right] \tag{13}$$

and

$$\frac{f_I r_F}{(1+\omega_F^{\mu-1})^{\frac{1}{\mu-1}}} - \frac{f_X c r_H}{(1+(c\omega_H)^{\mu-1})^{\frac{1}{\mu-1}}} = \frac{D_F}{\sigma}\Big(\beta\bar{\varphi}_{PO}\Big)^{\sigma-1}\left[\frac{(1+\omega_F^{\mu-1})^{\frac{\sigma-1}{\mu-1}}}{r_F^{\sigma-1}} - \frac{(1+(c\omega_H)^{\mu-1})^{\frac{\sigma-1}{\mu-1}}}{(c\tau r_H)^{\sigma-1}}\right]. \tag{14}$$

It is evident that selection into FDI is tougher for *SOEs* than for private firms (i.e., $\bar{\varphi}_{SO} > \bar{\varphi}_{PO}$), as

[19] In our Zhejiang dataset, we checked whether firms increased their foreign investment after the initial investment and ended up with few cases. The finding is evidence that at least a substantial fraction of factors used in foreign production (including capital and land) is sourced from the foreign country.

the opportunity cost of engaging in FDI is smaller for private firms than for SOEs. Specifically, private firms have lower opportunity cost of engaging in FDI (compared with exporting), as both the variable cost of exporting and the fixed cost of exporting are higher for them.

4.3 Domestic Distortion and Patterns of Outward FDI

In this subsection, we discuss how the existence of domestic distortions in the capital and land markets affects the patterns of outward FDI at the extensive and intensive margins.

Proposition 1 ***Sorting Patterns of Private Firms and SOEs (Extensive Margin)****:*

1. *The exit cutoff and exporting cutoff are higher for private firms than for SOEs. However, the cutoff for becoming an MNC is lower for private firms than for SOEs (i.e., selection reversal).*

2. *Conditional on the initial productivity draw (and other firm-level characteristics), private firms are more likely to become MNCs.*

3. *Assume that the truncated distribution of the productivity draw for private firms (weakly) first order stochastically dominates (FOSD) that of SOEs, or the two conditional probability density functions (PDFs) satisfy the (weak) monotone likelihood ratio property (MLRP) with:*

$$\frac{\partial}{\partial \varphi}\left(\frac{f_P(\varphi|\varphi \geq \varphi_0)}{f_S(\varphi|\varphi \geq \varphi_0)}\right) \geq 0 \qquad \forall \varphi \geq \varphi_0,$$

   where $f_P(\varphi|\varphi \geq \varphi_0)$ and $f_S(\varphi|\varphi \geq \varphi_0)$ are the truncated PDFs of the productivity draw for private firms and SOEs respectively. Then, the fraction of MNCs is larger among private firms than among SOEs. Furthermore, the average productivity of private firms is greater than that of SOEs overall.

4. *Assume that both types of firms draw productivities from the same distribution (which trivially satisfies weak FOSD property). Then the (simple) average productivity of private MNCs is smaller than that of state-owned MNCs (i.e., productivity premium for state-owned MNCs).*

Proof. See Appendix B. ■

The intuition for the above proposition is as follows. First, since there is discrimination against private firms at home, it is more difficult for private firms to survive and export. As a result, the exit cutoff and the exporting cutoff are higher for these firms. Absent the choice of exporting (i.e., firms only choose between engaging in FDI or not), the FDI cutoff would be the same for SOEs and for private firms, as they face the same FDI costs and the same market environment in the foreign country. However, since the firm at the FDI cutoff compares exporting with FDI, the (opportunity) cost of engaging in FDI

is smaller for private firms than for SOEs.[20] As a result, the FDI cutoff is lower for private firms than for SOEs. This selection reversal, which is graphed in Figure 1, leads to a productivity premium for state-owned MNCs, and the above theoretical results rationalize the first two stylized facts. Table 5 in the next section shows the lower probability of becoming an MNC for SOEs in the next section.[21]

We next discuss how a variation in the level of domestic distortion affects the sorting pattern of private MNCs and state-owned MNCs differently using the following proposition.

Proposition 2 ***Cross-Industry Variations****:*

1. *In industries with more severe distortion (i.e., $c \uparrow$), the productivity premium of state owned MNCs is larger, and SOEs are much less likely to produce abroad in these industries.*

2. *Assume that the production function is Cobb-Douglas with capital and labor (i.e., $\mu = 1$ in equation (2)). Then, the productivity premium of state owned MNCs is more pronounced in capital intensive industries. Furthermore, SOEs are much less likely to engage in FDI (compared with private firms) in capital intensive industries.*

Proof. See Appendix B. ■

The intuition for the above proposition is straightforward. Since the asymmetric distortion disincentives SOEs to produce abroad, the selection into the FDI market becomes more stringent for SOEs (than for private firms) in industries with more severe discrimination against private firms. Furthermore, as the distortion only exists in the capital market, we expect a more stringent selection into the FDI market for SOEs (than for private firms) in capital intensive industries. We will provide empirical evidence for the two predictions of Proposition 2 in what follows.

Finally, we discuss how domestic distortion affects the sorting patterns of MNCs at the intensive margin.

Proposition 3 ***Sorting Pattern of Private Firms and SOEs (Intensive Margin)****:*

1. *Suppose the initial productivity draw follows a Pareto distribution with the same shape parameter for private firms and SOEs. Then, the relative size of private MNCs in the domestic market (i.e., compared with private non-exporting firms) is smaller than that of state-owned MNCs.*

2. *Conditional on productivity and other firm-level characteristics, the ratio of foreign sales to domestic sales is higher for private MNCs than for state-owned MNCs.*

[20] Exporting does not eliminate the distortion private firms face in the domestic market.

[21] The selection reversal holds irrespective of the distribution of the initial productivity draw. In addition, the productivity premium for state-owned MNCs exists, even if the two types of firms draw productivities from the Pareto distribution with different minimum productivity draws. Finally, the Pareto distribution with the shape parameter's being larger for private firms satisfies the FOSD property and MLRP after the truncation.

3. *After a reduction in the fixed FDI cost, f_I, the increase in overall firm size is larger for the new private MNCs than for the new state-owned MNCs, conditioning on productivity and other firm-level characteristics.*

Proof. See Appendix B. ■

The intuition for Proposition 3 is straightforward. Since there is an extra benefit for private firms to produce abroad, they produce and sell more in the foreign market. Similarly, when private firms *become* MNCs, they produce and sell disproportionately more in the foreign market, thanks to the non-existence of discrimination in that market. This effect is another key result of our model, for which we provide empirical support in the next section. The first part of Proposition 3 receives strong statistical support from Table 4. As the table shows, the relative size of private MNCs is smaller than that of state-owned multinational firms. We will provide evidence for the last two parts of the above proposition in what follows.

5 Evidence

Our theoretical model yields three empirical propositions. Some of the predictions of the propositions have already been shown to be consistent with the stylized facts presented in Section 3, others are still waiting for empirical examination, which is the purpose of this section.

5.1 FDI Decision and Firm Ownership

Most of the predictions of Proposition 1 have been shown to be consistent with the empirical results in Tables 2 to 4. Only part 2 of Proposition 1 needs further empirical examination. As discussed in Tian and Yu (2015), our nationwide FDI data are pooled, cross-sectional data, as we only know the first year when firms began to undertake FDI in a given country (i.e., no information on whether firms continued to engage in FDI in a given country or whether they exited from FDI after entry). Therefore, the estimations in Table 5 and the other tables only include non-MNCs and FDI starters.

Table 5 reports the estimation results starting from a linear probability model (LPM) in which the regressand is an indicator of outward FDI. This indicator equals one if a firm engages in FDI and zero otherwise. To explore whether SOEs are less likely to engage in FDI, we include an SOE indicator in the regression, as well as several key firm characteristics, such as firm size (i.e., log employment), firm-level TFP, and exporting status. Equally important, we include firm-specific fixed effects and year-specific fixed effects to control for unobservable firm-invariant and time-invariant factors. The SOE indicator is shown to be negative and statistically significant in column (1), suggesting that SOEs are indeed less

likely to engage in outward FDI. The magnitude of the SOE indicator is too small, which is probably due to a well-known pitfall of LPM: the predicted probability could be greater than one or less than zero.

To overcome this drawback, we report the logit estimates in column (2) by controlling for a rich set of fixed effects with interactions of (two-digit level) industry and year dummies, which yield qualitatively the same results as for the LPM model. That is, compared with private firms, SOEs are less likely to engage in outward FDI. For such a nonlinear probability model, firm-specific fixed effects cannot be included in the regression. Instead, we control for year-specific and industry-specific fixed effects in all the rest of the regressions.

Our estimates include foreign-invested enterprises (FIEs), which are firms that receive direct investment from foreign countries (regions). However, if an FIE has a dominant share of foreign stakes, it is directly controlled by its foreign headquarters. Our model does not consider such firms, as the FIE headquarters are not located in China. Thus, we drop FIEs from the sample in all regressions, and columns (3) to (10) in Table 5 report the results. After dropping the FIE sample, the logit estimates in column (3) still show that SOEs are less likely to engage in outward FDI, conditioning on other firm-level characteristics.

There are two important caveats here. First, as shown in Table 1, less than 1 percent of manufacturing firms undertook FDI each year until 2008. Within MNCs, a small fraction of them are SOEs. As highlighted by King and Zeng (2001), standard binary nonlinear models, such as logit or probit models, underestimate the probability of rare events. To address this concern, King and Zeng recommend using the rare-event logit approach, which corrects for possible downward bias.[22] Column (4) in Table 5 reports the logit estimates with rare-event corrections. The key coefficient of the SOE indicator is much larger than its counterparts in columns (2) and (3) in absolute value. Equally important, the coefficient is still negative and statistically significant, ascertaining that SOEs are less likely to engage in outward FDI.

The rare-event feature of our FDI data also generates another problem, that the probability distribution of state-owned MNCs engaging in FDI exhibits faster convergence toward the true probability that SOEs engage in foreign investment. Standard logit or probit estimates cannot deal with this problem. We thus run complementary log-log regressions in the rest of Table 5, which allows for faster convergence toward rare events. Column (5) in Table 5 reports the complementary log-log regression by dropping foreign firms. Column (6) adopts the broadly defined SOE indicator in the regression. Clearly, our key results are robust regardless of different SOE definitions.

There may be a worry that some Chinese firms may invest in tax haven destinations, such as Hong Kong and the Cayman Islands, due to the motive of tax evasion. Consequently, our model and its underlying story cannot be applied to those firms. Column (7) in Table 5 thus drops observations of outward

[22] Rare-events estimation bias can be corrected as follows. We first estimate the finite sample bias of the coefficients, $bias(\hat{\boldsymbol{\beta}})$, to obtain the bias-corrected estimates $\hat{\boldsymbol{\beta}}$–$bias(\hat{\boldsymbol{\beta}})$, where $\hat{\boldsymbol{\beta}}$ denotes the coefficients obtained from the conventional logistic estimates.

FDI in tax haven destinations.[23] Similarly, it is also possible that some Chinese firms may establish trading offices in their exporting destinations to promote market-specific exports (Tian and Yu 2015). Such distribution-oriented outward FDI is essentially vertical, and our theory does not apply to this type of FDI. Column (8) thus drops the sample of distribution-oriented FDI.

Finally, as shown in row (2) in Table 1, China's outward FDI increases rapidly after 2004, when the government adopted policies to encourage firms to go abroad. It is also true that a large wave of privatization of SOEs took place after 1998, when Premier Zhu Rongji was in office (Hsieh and Song 2015). We thus drop SOE switching firms from the sample and focus on observations from 2004 to 2008 in columns (9) and (10) in Table 5. The coefficient of the SOE indicator in column (9) is much larger than its counterpart in column (8), suggesting that private firms were more likely to go abroad after 2004. Still, there may be a worry that our story works better for greenfield FDI rather than merger and acquisition (M&A)–type FDI, as the latter usually targets better technology or seeks famous brand names of the targeted firms. We thus drop the M&A–type FDI in column (10), which still yields the same results: SOEs are less likely to engage in outward FDI.[24] In short, our underlying findings are robust to different estimation methods, various specifications, and different time spans.

[Insert Table 5 Here]

5.2 Input Market Distortions

Our theoretical model is built on the premise that, compared with SOEs, private firms have to bear higher input costs in the domestic market. Although this assumption seems to be widely accepted, we provide direct evidence for it in this subsection.

Previous work suggests that Chinese SOEs access working capital by paying a lower interest rate than what private firms pay (Feenstra, Li, and Yu 2014). Similarly, SOEs acquire land at a lower market price than private firms do, which is especially true in the manufacturing sector (Tian, Sheng, and Zhang 2015). To see whether these conjectures are supported by the data, we first construct a measure of the firm-level interest rate by dividing the firm's interest expenses by its current liability (in each year), both of which are obtained from the ASIF data set. We then regress this measure on the narrowly defined SOE indicator in columns (1) to (3) in Table 6. Our underlying assumption is that SOEs access external working capital at a lower cost than private firms do.[25] If so, it should be observed that the SOE indicator has a negatively significant coefficient.

[23] The tax haven regions include the Bahamas, Bermuda, the Cayman Islands, Hong Kong, Luxembourg, Macao, Monaco, Panama, the Virgin Islands, and Switzerland.

[24] To identify M&A–type FDI, we manually merge the outward FDI data set with the M&A–type FDI data compiled by Thomson Reuters, by using the identical names of Chinese parent firms.

[25] We find similar results when SOEs are measured in a broad way à la Hsieh and Song (2015).

This outcome is exactly what we observe in Table 6. The estimates in column (1) abstract away other control variables, whereas those in column (2) include year-specific and industry-specific fixed effects. In addition, column (3) controls for prefectural city fixed effects and other key firm characteristics, such as firm TFP and log employment of the firm.[26] It turns out that the key coefficient, the SOE indicator, is always negative and statistically significant. Its magnitudes in absolute value vary in the range of 0.12 to 0.15, suggesting that private firms pay 12 to 15 percent higher annual interest rates, and hence bear higher capital costs than SOEs do.[27]

Columns (4) to (7) in Table 6 check whether SOEs acquire land at lower cost. As data on each firm's cost of acquiring land are unavailable, we use data on prices of land sales (conversion) at the prefectural city level by year.[28] We thus construct a variable of SOE intensity, which is defined as the number of SOEs divided by the number of total manufacturing firms in the city. If our hypothesis is supported by the data, a city with a higher SOE intensity is expected to have a lower average price of land. The estimations reported in columns (4) to (7) regress average land price at the prefecture city level on SOE intensity and find support for the hypothesis.[29] Specifically, the coefficient of SOE intensity is negatively significant. Column (4) only controls for year-specific fixed effects, whereas column (5) controls for year-specific and industry-specific fixed effects. In addition, it is possible that aggregate demand for land acquisition in each city affects the price of land in the city; column (6) thus controls for city-specific total sales as well as city-specific, year-specific, and industry-specific fixed effects. Finally, there may be concern that land market discrimination could reversely induce firm churning (from private firms to SOEs or vice versa). Thus, column (7) regresses prefecture city-level land price on the one-year lag of SOE intensity to mitigate any possible simultaneous bias. In all cases, the coefficient of SOE intensity is negative and statistically significant, suggesting that SOEs pay lower land prices on average and hence bear lower land costs than private firms do.

[Insert Table 6 Here]

[26] There is a huge decrease in the number of observations in column (3), as many firms do not have information on their prefectural city.

[27] The relative interest rate differential between SOEs and private firms is plausible if the firms' informal finance is taken into account. Private firms usually have to finance their working capital from unofficial and gray financial markets due to severe credit constraints (see Lardy 2014).

[28] Data are from China's *Land and Resources Statistical Yearbook* (various years). As in Tian, Sheng, and Zhang (2015), we only use data on land sales for land that is sold or granted by market channels, including agreement, auction, bidding, and listing. We exclude land transfers to SOEs through direct government leasing and allocation. Thus, the coefficients in the estimates in Table 6 shall be understood as the lower bound of the measured distortion.

[29] Cities with zero SOEs or all SOEs are dropped from the sample.

5.3 Heterogeneous Effects across Sectors

Part 1 of Proposition 2 hints that the selection reversal is heterogeneous across sectors. Specifically, the productivity premium of state-owned MNCs will be more pronounced in industries with severe distortions. Similarly, we should observe that SOEs are less likely to produce abroad in these sectors. To verify these predictions, we regress the firm outward FDI indicator on the SOE indicator and its interaction with the industry-level interest rate differential, which is defined as the difference between the (high-level) average interest rate paid by private firms and the (low-level) average interest rate paid by SOEs in the same industry level. We also add other firm-level key variables and industry-specific and year-specific fixed effects to the regression. For this difference-in-differences regression, our model predicts a negatively significant coefficient of the SOE dummy and its interaction with the (positive) industry-level interest rate differential. The economic rationale is evident: compared with other industries, firms in industries with more severe credit or capital market distortions (captured by interest rate differentials) are less likely to undertake outward FDI. It is worthwhile to stress that the interaction between SOE and industrial interest rate differential is crucial to test our story, as it shows the effect of credit market distortions on the likelihood of SOEs investing abroad directly.

Column (1) in Table 7 reports the benchmark estimation results. After controlling for industry and year fixed effects and other key firm-level variables, the SOE indicator and its interaction term with the industry-level interest rate differential are negative and statistically significant. These results suggest that credit market distortion is an important reason why SOEs are less likely to go abroad. This key finding is robust to the different specifications explored in the rest of the table. For instance, we drop the sample of FIEs in column (2) and the sample of outward FDI to tax haven destinations in column (3). In addition, we drop the sample of distribution-oriented FDI in column (4) and narrow the time window to 2004–08 in column (5). Correspondingly, columns (6) to (10) report empirical specifications similar to columns (1) to (5), by using a broadly defined SOE indicator, and yield the same results. That is, SOEs are less likely to engage in outward FDI. Moreover, SOEs in industries with more severe input distortions are less likely to undertake outward FDI.

[Insert Table 7 Here]

5.4 Capital Intensity and Pattern of Outward FDI

Part 2 of Proposition 2 implies that, compared with private firms, SOEs are less likely to engage in outward FDI in capital-intensive industries. This subsection provides evidence for this prediction. By definition, firms in capital-intensive industries have higher demand for working capital. Accordingly, domestic input distortions against private firms will favor SOEs more in such industries. If domestic input distortions are the fundamental driving force for explaining the behavior of Chinese firms' outward

FDI, SOEs in capital-intensive industries should be unlikely to undertake outward FDI. By contrast, such a phenomenon may not exist in labor-intensive industries.

To check this out, we first separate the sample into two groups: firms in capital-intensive industries and firms in labor-intensive industries.[30] Column (1) in Table 8 shows that SOEs are less likely to engage in outward FDI in capital-intensive industries. By contrast, the SOE indicator is insignificant for the sample using firms in labor-intensive sectors, as shown in column (5). This finding is robust to different specifications, such as dropping foreign firms, dropping FDI to tax haven destinations, or using a shorter time period (2004–08).

It is worth discussing why the key coefficient of the SOE indicator is insignificant in labor-intensive sectors. In China, the cost of labor increased dramatically after 2004. Accordingly, some firms in labor-intensive sectors established foreign affiliates in other least-cost, labor-abundant countries, such as Bangladesh, Ethiopia, and Vietnam. Such firms sought global sourcing instead of global markets (Antràs 2016), which eventually deviates from our model.

[Insert Table 8 Here]

5.5 Estimates at the Intensive Margin

We now provide evidence for Proposition 3. Table 4 provides evidence for part 1 of the proposition. Part 2 of Proposition 3 states that the ratio of foreign sales to domestic sales is higher for private MNCs than for state-owned MNCs. Data on sales of foreign affiliates are unavailable in the Chinese firm-level ASIF data set. Therefore, we merged the ASIF data set with the Orbis data set, which contains information on sales and revenue of (domestic and foreign) affiliates of Chinese MNCs.[31] Columns (1) to (8) in Table 9 regress log($sales$) and log($revenue$) (i.e., firm size) on dummy variables for being a private (parent) firm, being a foreign affiliate, and characteristics of the parent firm. Importantly, we add an interaction term between the two dummy variables: $Private_{i,t} \times Foreign_{j,t}$ where i, j and t refer to parent firm (private or state owned), affiliate and year respectively. As expected, the regression results show that private parent firms have smaller affiliates on average, and foreign affiliates are smaller than domestic affiliates on average. What is interesting is that the size difference between the domestic affiliate and the foreign

[30] The industrial interest rate differential is measured at the three-digit CIC level. Thus, the own coefficient of the industrial interest rate differential is still present even after controlling for two-digit CIC industry fixed effects.

[31] The Orbis data set is a product of Bureau van Dijk and contains financial information on 180 million private firms worldwide. For the data between 2005 and 2008, we merge our ASIF data with the Orbis data by matching firms' names in Chinese. For the data between 2011 and 2013, we merge our ASIF data with the Orbis data using the trade registration number of the (Chinese) parent firms whose information is contained in both data sets after 2011. Unfortunately, the Orbis data do not have good coverage of (domestic and foreign) affiliates of Chinese MNCs. For 2011–13, only 11,000 observations (i.e., affiliate-year pairs) have non-missing values for sales, revenue, and employment in the Orbis data. Among these affiliates, more than half are in service sectors. As a result, the foreign affiliates of around 15 percent of Chinese parent firms show up in the Orbis data set between 2005 and 2008. For the data between 2011 and 2013, we manage to merge roughly 750 affiliate-year observations.

affiliate (of the same parent firm) is smaller among private MNCs than among state-owned MNCs, as the coefficient of $Private_{i,t} \times Foreign_{j,t}$ is positively significant. This is exactly what part 2 of Proposition 3 predicts: The ratio of foreign sales to domestic sales is higher for private MNCs than for state-owned MNCs.

[Insert Table 9 Here]

Furthermore, part 3 of Proposition 3 implies that, in response to investment liberalization (i.e., a reduction in the fixed cost of FDI) in FDI destination countries, the increase in overall firm size is larger for new private MNCs than for new state-owned MNCs. Here we provide empirical support for this prediction. We first construct a variable of total sales of MNCs (i.e., a measure of firm size) by summing parent firm sales and affiliate sales, using the ASIF-Orbis matched data set. Second, we use log license costs to measure the fixed investment cost in the destination country.[32]

To conduct the empirical analysis, we include an interaction term between the log of license costs and the SOE indicator in the regression. Our theory predicts that the coefficient of the log of license costs should be negatively significant. The fixed-effects estimates in column (1) in Table 10 confirm this theoretical prediction, after controlling for a full set of industry-year interaction dummies. Moreover, if our theoretical predictions are supported by the data, the coefficient of the interaction term between the log of license costs and the SOE indicator should be positively significant.[33] The fixed-effects estimates in column (2) confirm this theoretical prediction.

As a robustness check, we use the sum of the parent firm's fixed capital stock and the value of its FDI as an alternative measure of overall firm size. As the nationwide FDI data set does not report the amount of FDI for each MNC, the sample in Table 10 only covers MNCs from Zhejiang province. As there may be a concern that the SOE indicator is too crude to measure the firm's share of state capital, we instead use state capital intensity to measure the firm's ownership. The estimates in column (3) show that higher FDI fixed costs lead to smaller total firm size. Finally, as our model implicitly assumes a substitution between exporting and FDI, we drop distribution FDI (i.e., keeping production FDI only) and rerun the regression. The estimation results are reported in column (4) and support our theoretical predictions.

[Insert Table 10 Here]

5.6 Further Robustness Checks

For our final robustness checks, we expand the time horizon of our sample to 2000–13. The advantage of using such up-to-date data is that it allows us to examine whether our stylized facts still hold during the

[32] Data on country-specific license costs are from the *Doing Business* data set compiled by the World Bank (2009).

[33] These results indicate that a decline in fixed investment costs at the destination country leads to larger firm size, and this effect is more pronounced for private MNCs than for state-owned MNCs.

period during which China experienced a surge of outward FDI, after 2008. However, the drawback of using the longer time-series data set is that we cannot estimate firm productivity accurately. The reason is that China's firm-level production data report neither value added nor purchase of intermediate inputs after 2008. Without knowing these key variables, we cannot precisely estimate TFP or calculate labor productivity (i.e., value added per worker). Because of these substantial restrictions on the data, we do not use the data for 2000–13 as our main data set. Instead, we use the longer time-series data for robustness checks only.

We now use the new sample with the longer time span to check the extensive margin of outward FDI. For 2000–13, the MNC ratio for private firms is 0.83 percent, whereas that for broader-defined SOEs is only 0.20 percent. This finding suggests that the fraction of MNCs is larger among private firms than among SOEs, which is consistent with our theoretical prediction and our finding using data for 2000–08. Since firm productivity cannot be precisely estimated using the new data set, we do not check the productivity premium of state-owned MNCs. Instead, we focus on examining whether SOEs are still less likely to engage in outward FDI, even including data after 2008.

Table 11 picks up this task. Similar to the estimates in Table 5, the regressand is the firm's outward FDI indicator, whereas the SOE indicator is the key regressor. In all estimates, we control for the log of employment and log of firm size as well as the firm's export indicator. Column (1) is the simple linear probability model, and columns (2) and (3) are logit estimates. It turns out that, once again, the coefficient of the SOE indicator is negative and statistically significant, suggesting that SOEs are less likely to undertake outward FDI. Column (4) uses rare-event logit to correct for rare-event bias; the rest of the table uses complementary log-log regressions. In particular, column (6) uses a broadly defined SOE indicator, and column (7) drops observations with outward FDI to tax haven destinations. Column (8) drops observations before 2004, and columns (9) and (10) only include observations after the global financial crisis (2010–13). Finally, column (10) drops the switching SOEs (to private firms) from the sample. In all respects, our previous key finding that SOEs are less likely to engage in outward FDI is shown to be robust.

[Insert Table 11 Here]

5.7 Discussions on Modeling Choices

Here we discuss several modeling choices of our model, based on the empirical patterns we have documented so far. First, it is plausible that the distortion discussed above shows up as a subsidy to SOEs. Specifically, SOEs receive a subsidy for their input use only when they produce in China, while there is no such subsidy for private firms wherever they produce. In this scenario, it is the SOEs that have less incentive to undertake FDI, since the relative domestic input price (compared with the foreign input

price) they face is lower compared with private firms, which is the same as in the case of an implicit tax. This results in *tougher* selection into the FDI market for SOEs, which leads to the same empirical predictions.

Second, it might be true that there is a price wedge in the domestic product market as well. The difference in revenue tax is an example. However, we cannot generate the result of selection reversal with the existence of the output price wedge only. Under this alternative assumption, selection into the domestic market is still tougher for private firms. However, there is no difference in selection into the FDI market. This is because the cost (the increase in the fixed cost: $f_I - f_X$) and benefit (the change in the variable cost) of becoming an MNC are the same for private and state-owned firms, conditioning on the productivity draw of φ. As the data show a pattern of selection reversal, we choose to introduce a wedge in the input price to set up our model.

Finally, we discuss the role played by the fixed FDI cost in our model and relegate the proof of the result to Appendix C. It might be the case that MNCs use domestic factors to pay for the fixed FDI cost. Examples include bringing machinery and equipment purchased domestically to the foreign affiliates. In this case, the fixed cost of engaging in FDI is smaller for SOEs than for private firms, as SOEs pay lower input prices than private firms do. Even in this case, if the marginal cost of production is reasonably lower in China (compared with FDI destination countries on average), we still obtain the result of selection reversal. Economically, the relatively low marginal cost of production in China implies that relative saving on the variable trade cost (coming from producing abroad) is larger for private firms.[34] As a result, the relative incentive to produce abroad is higher for private firms, which again validates our previous theoretical prediction. This condition is likely to hold in the case of China (especially before 2008), as China has enjoyed relatively low production costs compared with most rich countries.

6 Concluding Remarks

In this study, we utilize data on Chinese MNCs to investigate how distortions (i.e., discrimination against private firms) in the domestic market affect firms' FDI decisions. We document three puzzling stylized facts. First, private MNCs are less productive than state-owned MNCs, although private non-MNCs are more productive than state-owned non-MNCs. Second, SOEs are less likely to undertake FDI, although they are larger and receive various supports from the government for investing abroad. Third, the relative size of state-owned MNCs (compared with non-exporting firms) is larger than that of private MNCs.

[34] We can imagine an extreme case in which the marginal cost of production (in China) adjusted by the variable trade cost is too high for private firms. As a result, there is no difference between the marginal cost of production (in the foreign country) and the marginal cost of production (in China) adjusted by the variable trade cost for private firms. Therefore, private firms have no incentive to produce abroad. However, since SOEs face lower input prices when producing in China, the incentive of producing abroad is still positive for SOEs. This extreme case shows that an extremely higher marginal cost of production in China leads to a lower incentive to produce abroad for private firms than for SOEs.

We then build a model to rationalize these findings and highlight a key channel through which distortions affect firms' FDI decisions. Distortions in the domestic market incentives private firms to invest and produce abroad, which results in less tough selection into the FDI market for them. In addition, compared with state-owned MNCs, private MNCs allocate output disproportionately more in the foreign market, and their size increases disproportionately when they become MNCs. Finally, the selection reversal and productivity premium for state-owned MNCs are more pronounced in capital-intensive industries and in regions with more severe discrimination against private firms. All the empirical predictions of the model receive support from the data.

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Table 1: FDI Share in Chinese Manufacturing Firms (2000-08)

Firm type	2000	2001	2002	2003	2004	2005	2006	2007	2008
(1) FDI starting firm-country-affiliates	22	20	69	81	241	1,067	1,212	1,532	1,715
(2) FDI accumulating firm-country-affiliates	155	175	244	325	566	1,633	2,845	4,377	6,092
(3) Mfg. firms	83,579	100,068	110,498	129,448	199,873	198,260	224,807	257,140	191,018
(4) FDI mfg. firm-country-affiliates	14	17	20	30	103	431	761	1,168	1,183
(5) SOE FDI mfg. firm-country-affiliates	3	3	3	4	4	18	22	29	18
(6) FDI share (%)	0.017	0.017	0.018	0.023	0.052	0.22	0.34	0.45	0.62
(7) SOE FDI share (%)	21.4	17.6	15.0	13.3	3.8	4.17	2.89	2.48	1.52
(8) FDI mfg. firms	5	6	9	20	56	276	524	836	761
(9) SOE FDI mfg. firms	1	2	2	2	3	12	19	23	17
(10) FDI share ($\%_{00}$)	0.59	0.60	0.82	1.55	2.80	13.9	23.3	32.5	39.8
(11) SOE FDI share (%)	20.0	33.3	22.2	10.0	5.35	4.34	3.62	2.75	2.23

Note: Data on FDI starting firms were obtained from the Ministry of Commerce of China and authors' calculations. FDI share in row (6) is obtained by dividing the number of FDI manufacturing firms (with many country-regions) by the number of manufacturing firms (i.e., (6) = (4)/(3)). SOE FDI share in row (7) is obtained by dividing the number of SOE FDI manufacturing firm-country-affiliates by the number of FDI manufacturing firm-country-affiliates (i.e., (7) = (5)/(4)). That is, if firm F invests in countries A and B, there will be two MNCs recorded by the Ministry of Commerce: firm F-A and firm F-B. Rows (8) and (9) instead only allow one-firm-one-record each year even if a firm invests in multiple countries in a given year. For example, we only record Firm F once as in the previous example. As a result, (10) = (8)/(3) and (11) = (9)/(8).

Table 2: Selection Reversal: State-Owned MNCs Are More Productive than Private MNCs

Category	Non-MNCs				MNCs		# of	# of	Fraction of
	domestic only		domestic+export		all firms	with exports	MNCs	All firms	MNCs
PSM Matching	unmatched	matched	unmatched	matched	unmatched	unmatched			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(i) Private firms	3.63	3.54	3.62	3.58	4.28	4.28	3,623	1,335,514	0.27%
(ii) SOE	2.99	2.99	3.05	3.05	4.48	4.76	104	40,612	0.25%
Difference=(i)-(ii)	0.63***	0.55***	0.57***	0.53***	-0.20*	-0.48***			
	(93.60)	(41.34)	(95.76)	(46.73)	(-1.67)	(-3.30)			
	Ownership defined by state share								
(iii) Private firms	3.63	3.55	3.62	3.58	4.28	4.28	3,622	1,097,322	0.33%
(iv) SOE	3.00	3.00	3.06	3.06	4.49	4.78	105	43,512	0.24%
Difference=(iii)-(iv)	0.63***	0.55***	0.56***	0.53***	-0.21*	-0.50***			
	(95.52)	(42.81)	(97.92)	(48.72)	(-1.72)	(-3.53)			

Note: Columns (1) and (2) show that private firms have higher TFP than SOEs among non-MNCs with only domestic sales. Columns (3) and (4) show that private firms have higher TFP than SOEs for non-FDI firms with domestic sales and exports. Columns (5) and (6) show that, on average, private MNCs are less productive than state-owned MNCs. These findings are consistent with parts 3 and 4 of Proposition 1. Column (9) reports the fraction of MNCs that is obtained by dividing column (8) by column (7). Clearly, the share of MNCs is smaller among SOEs than among private firms, which is consistent with part 3 of Proposition 1. Firm size (i.e., log employment) and sales are used as covariates to obtain the propensity score. The numbers in parentheses are t-values. *** (**, *) denotes the significance at 1 percent (5 percent, 10 percent). In Rows (iii) and (iv) private firms and SOEs are defined by using the state share in firm's ownership a là Hsieh and Song (2015). Refer to the texts for details.

Table 3: Productivity Premium of State-owned MNC by Different Types of Relative TFP (2000-08)

Category	All Firms			Non-MNC Firms			MNC Firms		
Measures of RTFP	$RTFP^{OP}$	$RTFP^{Distort}$	$RTFP^{Distort}_{soe}$	$RTFP^{OP}$	$RTFP^{Distort}$	$RTFP^{Distort}_{soe}$	$RTFP^{OP}$	$RTFP^{Distort}$	$RTFP^{Distort}_{soe}$
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
(i) Private firms	0.506	0.494	0.497	0.505	0.494	0.497	0.616	0.500	0.503
(ii) SOE	0.412	0.478	0.481	0.411	0.479	0.481	0.650	0.528	0.532
Difference=(i)-(ii)	0.094***	0.016***	0.016***	0.094***	0.015***	0.016***	-0.034*	-0.028***	-0.029***
	(93.95)	(46.42)	(46.29)	(97.07)	(46.53)	(46.40)	(-1.69)	(2.69)	(2.73)
	Capital-Intensive Industries Only								
(iii) Private firms	0.509	0.500	0.503	0.509	0.500	0.503	0.624	0.505	0.509
(iv) SOE	0.422	0.477	0.480	0.422	0.477	0.480	0.676	0.525	0.529
Difference=(iii)-(v)	0.087***	0.023***	0.023***	0.087***	0.023***	0.023***	–0.052***	-0.020*	-0.020***
	(78.03)	(59.05)	(59.54)	(78.28)	(59.14)	(59.62)	(-2.39)	(-1.65)	(-1.64)

Notes: Number in parenthesis are t-value. ***(**,*) denotes the significance at 1(5, 10)%, respectively. Columns (1)-(3) show that private firms have higher relative TFP than SOEs for all firms. Similarly, columns (4)-(6) show that private non-MNC firms have higher relative TFP than SOE non-MNC firms. Columns (7)-(9) show that private MNC firms are *less* productive than state-owned MNCs. Columns (1), (4) and (7) are relative Olley-Pakes TFP . Columns (2), (5) and (8) are relative TFP featured with input factor distortions. Columns (3), (6) and (9) are relative TFP featured with input factor distortions and interacted SOE dummy with other polynomials. The upper module includes all sample whereas the bottom one includes capital-intensive industries only, which account for around three quarters of the entire sample.

Table 4: Relative Size Premium for SOEs

Year coverage	Avg.	≤ 2001	≤ 2002	≤ 2003	≤ 2004	≤ 2005	≤ 2006	≤ 2007	≤ 2008
relative size of MNCs to non-exporting firms (l_o/l_d)									
(1) Private Firms	4.50	4.59	4.59	4.56	4.54	4.53	4.52	4.51	4.50
(2) SOE	5.48	5.65	5.64	5.58	5.55	5.53	5.51	5.49	5.48
Size Difference=(1)-(2)	-0.97***	-1.06***	-1.05***	-1.02***	-1.01***	-1.00***	-0.99***	-0.98***	-0.98***
	(-488.1)	(-234.0)	(-283.5)	(-329.0)	(-374.1)	(-400.1)	(-430.4)	(-445.5)	(-466.6)
relative size of exporting firms to non-exporting firms (l_e/l_d)									
(3) Private Firms	4.70	4.83	4.83	4.79	4.76	4.74	4.73	4.71	4.71
(4) SOE	5.79	5.98	5.96	5.90	5.86	5.85	5.82	5.80	5.79
Size Difference=(3)-(4)	-1.08***	-1.15***	-1.13***	-1.11***	-1.10***	-1.09***	-1.09***	-1.09***	-1.08***
	(-432.0)	(-200.2)	(-239.4)	(-289.4)	(-300.9)	(-365.1)	(-395.9)	(-425.8)	(-441.7)

Note:This table reports the difference in relative firm size between private MNCs and state-owned MNCs. Firm size is measured by log employment. The top module shows that the relative size of FDI firms to non-exporting firms is smaller for private firms than that for SOEs. The bottom module shows that the relative size of exporting firms to non-exporting firms is smaller for private firms than for SOEs as well. These findings are consistent with part 1 of Proposition 3 that relative size of MNCs and exporting firms is smaller for private firms than for SOEs. The numbers in parentheses are *t*-values. *** (**, *) denotes significance at the 1 percent (5 percent, 10 percent) level.

Table 5: Private Firms Are More Likely to Undertake FDI

Regressand: FDI Indicator	LPM	Logit	Logit	Rare Event Logit	Complementary Log-Log					
Year coverage:	2000-2008								2004-2008	
SOE defined:	narrow	narrow	narrow	narrow	narrow	broad	narrow	narrow	narrow	narrow
Variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SOE Indicator	-0.002**	-0.473*	-0.790***	-1.306***	-0.776***	-0.770***	-1.255***	-0.659**	-0.802***	-0.662**
	(-2.41)	(-1.96)	(-3.03)	(-12.63)	(-3.03)	(-3.11)	(-3.37)	(-2.06)	(-2.95)	(-2.56)
Firm TFP	0.009***	2.178***	2.541***	4.237***	2.429***	2.442***	2.105***	2.515***	2.720***	2.500***
	(4.14)	(3.53)	(3.71)	(18.50)	(3.55)	(3.58)	(2.70)	(2.61)	(4.67)	(4.96)
Log Firm Labor	0.003***	0.595***	0.631***	0.588***	0.617***	0.617***	0.594***	0.778***	0.604***	0.567***
	(6.55)	(11.69)	(12.06)	(38.49)	(11.20)	(11.24)	(9.67)	(9.16)	(12.42)	(11.03)
Export Indicator	0.004***	0.899***	1.141***	1.102***	1.132***	1.132***	1.155***	0.715***	1.131***	1.174***
	(7.42)	(4.35)	(5.89)	(26.01)	(5.75)	(5.74)	(5.22)	(3.63)	(5.60)	(6.49)
Foreign Firms Dropped	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tax Haven Dropped	No	No	No	No	No	No	Yes	No	No	No
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Distribution FDI Dropped	No	No	No	No	No	No	No	Yes	No	No
Firm Fixed Effects	Yes	No	No	No	No	No	No	No	No	No
Industry×Year Fixed Effects	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Switching SOE Dropped	No	No	No	No	No	No	No	No	Yes	Yes
M&A Deals Dropped	No	No	No	No	No	No	No	No	No	Yes
Observations	1,136,603	949,700	732,102	896,314	732,102	732,102	706,683	719,309	680,279	701,204

Note: The regressand is the FDI indicator. All columns except column (1) include industry dummies at the 2-digit level and year dummies. The numbers in parentheses are *t*-values clustered at the firm level. *** (**) denotes significance at the 1 percent (5 percent) level. Columns (1)-(2) include foreign-invested firms whereas all other columns drop those firms. Columns (1)-(8) cover data over the period of 2000-2008 whereas Columns (9)-(10) cover data over the period of 2004-2008. Column (6) uses broad-defined SOE. Column (7) drops outward FDI to tax haven destinations. Column (8) drops distribution-oriented FDI. Column (9) drops the switching SOE (i.e.,switch from SOEs to private firms). Column (10) drops both switching SOE and merge & acquisition deals. In all columns, TFP is measured by augmented Olley-Pakes controlling for input price distortions.

Table 6: Distortions in Input Factors Markets

Regressand	Measured Firm Interest Rates			City Land Price			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
SOE Indicator	-0.124***	-0.134*	-0.156***				
	(-2.58)	(-1.90)	(-2.11)				
SOE Intensity				-125.5***	-105.9**	-137.8**	
				(-2.76)	(-2.08)	(-2.09)	
One Lag of SOE Intensity							-164.0***
							(-3.27)
Other Firm Factors Controls	No	No	Yes	No	No	Yes	Yes
Year-specific Fixed Effects	No	Yes	Yes	Yes	Yes	Yes	Yes
Industry-specific Fixed Effects	No	Yes	Yes	No	Yes	Yes	Yes
City-specific Fixed Effects	No	No	Yes	No	No	Yes	Yes
Number of Obs.	1,119,454	1,119,454	106,828	547	547	547	507
R-squared	0.01	0.01	0.01	0.08	0.15	0.11	0.14

Note: The regressand in columns (1) to (3) is the firm-level interest rate calculated as the ratio of firm interest expenses to current liabilities. Column (1) is the simple OLS estimate, whereas column (2) controls for year-specific and industry-specific fixed effects. Column (3) adds other firm-characteristic controls such as firm TFP, log firm labor, foreign indicator, and export dummy as well as industry- and year-specific and prefectural city-specific fixed effects. The SOE indicator is shown to be negative and statistically significant. The regressand in columns (4) to (6) is the city-level average price of land purchased by firms from the government. This is defined as the ratio of government's total land revenue to its land area in each prefectural city. The SOE intensity is defined as the number of SOEs divided by the number of total manufacturing firms within each prefectural city. Cities in which SOE intensity equals zero or one are dropped from the estimation. Column (4) controls for year-specific fixed effects only, while column (5) controls for year-specific and industry-specific fixed effects. Column (6) controls for cities' total land sales as well as city-specific, year-specific, and industry-specific fixed effects. The numbers in parentheses are *t*-values. *** (**, *) denotes significance at the 1 percent (5 percent, 10 percent) level.

Table 7: Logit Estimates on Channels

SOE Defined	Narrow					Broad				
Regressand: FDI Indicator	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SOE Indicator	-0.264**	-0.488***	-0.994***	-0.290**	-0.254**	-0.266**	-0.494***	-0.955***	-0.333**	-0.245**
	(-2.33)	(-4.22)	(-6.36)	(-2.09)	(-2.11)	(-2.42)	(-4.37)	(-6.36)	(-2.43)	(-2.10)
SOE Indicator	-0.638*	-0.886**	-0.948*	-1.033**	-0.767*	-0.590	-0.838**	-0.878*	-0.968**	-0.718*
× Ind. Rates Differential	(-1.69)	(-2.41)	(-1.90)	(-2.19)	(-1.89)	(-1.63)	(-2.36)	(-1.88)	(-2.12)	(-1.85)
Industry Rates Differential	0.019	0.057	0.079*	0.090	0.019	0.020	0.058	0.079*	0.090	0.020
	(0.54)	(1.56)	(1.84)	(1.30)	(0.53)	(0.55)	(1.58)	(1.86)	(1.30)	(0.55)
Firm Relative TFP	0.878***	0.715***	0.585***	1.580***	0.724***	0.851***	0.671***	0.536***	1.483***	0.698***
	(7.26)	(4.95)	(3.76)	(7.63)	(5.92)	(7.06)	(4.66)	(3.45)	(7.22)	(5.73)
Log Firm Labor	0.536***	0.581***	0.553***	0.682***	0.517***	0.537***	0.583***	0.555***	0.686***	0.517***
	(39.40)	(36.25)	(31.78)	(30.73)	(37.48)	(39.52)	(36.40)	(31.91)	(30.98)	(37.58)
Export Indicator	0.937***	1.175***	1.193***	0.794***	0.938***	0.936***	1.177***	1.195***	0.799***	0.937***
	(23.52)	(25.73)	(24.33)	(11.85)	(23.32)	(23.57)	(25.85)	(24.45)	(11.99)	(23.37)
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Foreign Firms Included	Yes	No	No	No	Yes	Yes	No	No	No	Yes
Tax Haven Included	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes	Yes
Distribution FDI Included	Yes	Yes	Yes	No	Yes	Yes	Yes	Yes	No	Yes
Year Coverage		2000-08			2004-08		2000-08			2004-08
Number of Observations	1,121,845	879,003	873,150	829,655	883,712	1,125,402	882,117	876,261	832,741	886,634

Note: The regressand is the FDI indicator. The numbers in parentheses are *t*-values clustered at the firm level. *** (**) denotes significance at the 1 percent (5 percent) level. Columns (1)-(5) use conventional definition of the SOE indicator whereas the SOE indicator in column (6)-(10) is broadly defined as in Hsieh and Song (2015). Industry interest rates differential is measured by the difference between average industry-level interest rate paid by private firms less that paid by SOEs in each 3-digit industry level. Industrial interest rate is the aggregated average firm-level interest rates at CIC 2-digit industry level. Columns (3) and (8) drop FDI to tax haven destinations. Columns (4) and (9) drop distribution FDI. Columns (5) and (10) cover data over 2004-08 whereas the rest of the table covers data over 2000-08. All regressions include 2-digit industry fixed-effects and year fixed-effects.

Table 8: Logit Estimates by Sectors

Sectoral Category:	Capital Intensive Sectors				Labor Intensive Sectors			
Regressand: FDI Indicator	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
SOE Indicator	-0.492*	-0.821***	-0.907**	-0.837**	-0.362	-0.388	-0.739	-0.666
	(-1.77)	(-2.80)	(-2.22)	(-2.20)	(-0.82)	(-0.87)	(-1.30)	(-1.18)
Firm Relative TFP	1.127	1.643	0.989	1.455**	2.635***	2.620**	2.135**	2.164**
	(1.31)	(1.64)	(0.95)	(1.98)	(2.97)	(2.52)	(2.01)	(2.01)
Log Firm Labor	0.611***	0.638***	0.577***	0.554***	0.538***	0.578***	0.511***	0.509***
	(8.87)	(8.22)	(7.39)	(8.96)	(10.80)	(10.35)	(8.94)	(8.88)
Export Indicator	0.786***	1.087***	0.767**	0.773**	1.205***	1.324***	1.142***	1.150***
	(2.96)	(4.53)	(2.52)	(2.51)	(9.77)	(9.16)	(8.56)	(8.64)
Foreign Firms Dropped	No	Yes	No	No	No	Yes	No	No
Tax Haven Destinations Dropped	No	No	Yes	Yes	No	No	Yes	Yes
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year coverage:		2000-08		2004-08		2000-08		2004-08
Observations	827,690	666,901	827,249	650,675	307,777	219,078	307,621	242,296

Note: The regressand is the FDI indicator. All columns except column (1) include industry dummies at the 2-digit level and year dummies. The numbers in parentheses are *t*-values clustered at the firm level. *** (**) denotes significance at the 1 percent (5 percent) level. Columns (1)-(4) cover observations in capital-intensive sectors whereas columns (5)-(8) cover observations in all labor-intensive sectors. Columns (2) and (5) drop foreign invested firms. Columns (3) and (7) drop outward FDI to tax-haven regions. Columns (4) and (8) drop outward FDI to tax-haven regions and cover years after 2004. In all columns, TFP is measured by augmented Olley-Pakes controlling with input distortions.

Table 9: Ratio of Foreign Sales to Domestic Sales is Higher for Private MNCs

	(1) log(sales)	(2) log(revenue)	(3) log(sales)	(4) log(revenue)	(5) log(sales)	(6) log(revenue)	(7) log(sales)	(8) log(revenue)
Private	1.223***	1.103***	1.338***	1.111***	1.213***	1.088***	1.326***	1.088***
*Foreign	(9.92)	(7.91)	(7.51)	(5.78)	(9.72)	(7.57)	(7.65)	(5.58)
Private	-1.546***	-1.405***	-1.567***	-1.380***	-1.496***	-1.356***	-1.541***	-1.342***
	(-7.35)	(-5.48)	(-5.01)	(-3.38)	(-6.97)	(-5.03)	(-5.12)	(-3.30)
Foreign	-2.518***	-2.323***	-4.362***	-4.190***	-2.217***	-2.013***	-4.032***	-3.816***
	(-3.81)	(-2.94)	(-8.95)	(-6.82)	(-3.55)	(-2.64)	(-7.82)	(-5.66)
log(total assets)$_{parent}$	0.855***	0.906***	0.802***	0.901***	0.688***	0.749***	0.670***	0.777***
	(11.39)	(10.05)	(7.48)	(6.25)	(7.76)	(4.82)	(5.84)	(4.34)
log(exports)$_{parent}$			0.181	0.0767			0.133	0.0283
			(1.04)	(0.44)			(0.79)	(0.16)
log(current liability)$_{parent}$					0.168*	0.160	0.131	0.129
					(1.80)	(1.02)	(1.38)	(0.74)
Year-specific Fixed Effects (FEs)	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-specific FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Parental firm-specific FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Industry-specific FEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Obs.	713	733	586	604	678	698	559	577
R-squared	0.938	0.925	0.941	0.923	0.943	0.930	0.944	0.926
adj. R-squared	0.896	0.875	0.897	0.865	0.903	0.881	0.900	0.868

Note: Observation are affiliate-year pairs between 2012 and 2014. Orbis data of affiliates between 2012-2014 are merged to ASIF data of parent firms between 2011-2013 (i.e., one year lag). Specifically, we merge our ASIF data with the ORBIS data using (Chinese) parent firms' trade registration number (in China) whose information is contained by both data sets after 2011. Both MNC starters and incumbents (after 2011) are included into the regression. Standard errors are clustered at the parent firm level. *** (**, *) denotes significance at the 1 percent (5 percent, 10 percent) level, and *t* statistics are reported in parentheses.

Table 10: Change in Firm Size in Response to Investment Liberalization

Regressand:	FDI firms total sales		FDI firm's total capital	
Type of FDI:	(using Orbis data)		FDI firms	Production FDI
	(1)	(2)	(3)	(4)
Log License Costs	-0.004*	-0.005**	-0.002*	-0.002***
	(-1.79)	(-2.11)	(-1.86)	(-3.17)
Log License Costs× SOE Indicator		0.014*		
		(1.79)		
Log License Costs			0.100*	0.098*
× State-capital Intensity			(1.64)	(1.65)
Year-specific Fixed Effects	Yes	Yes	Yes	Yes
Industry-specific Fixed Effects	Yes	Yes	Yes	Yes
Year × Industry Fixed Effects	Yes	Yes	No	No
Observations	229	229	180	32
R-squared	0.45	0.50	0.04	0.05

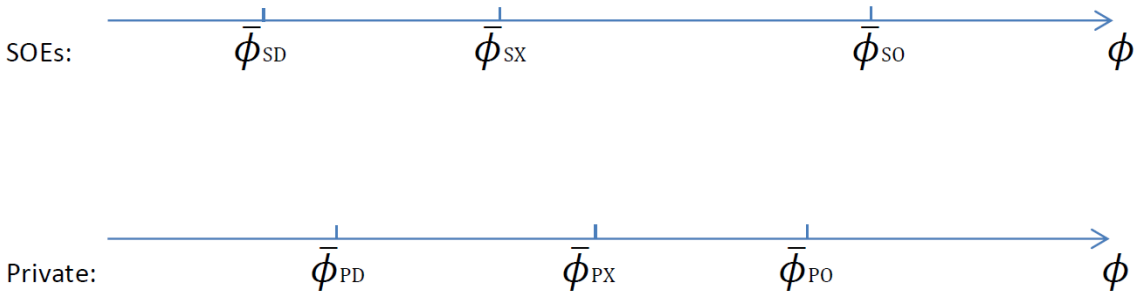
Note: The regressand in columns (1) and (2) is the sum of Chinese parent firm's sales and its foreign affiliate sales. Data on foreign affiliate sales are obtained from the Orbis data set. As the amount of FDI volume is in US dollars, we convert it to Chinese RMB using the average exchange rate ($1 = RMB 8.05) during 2005–08. The estimates in columns (1) and (2) include a full set of industry (2-digit level)-year interacted dummies. The regressand in columns (3) and (4) is FDI firm's total capital stock which is the sum of firm's foreign direct investment and its Chinese parent firm's fixed capital stock. FDI firms from Zhejiang province during 2006–08 are used as observations. License costs in destination countries are used to proxy firm's fixed costs of doing FDI in destination countries. The data were obtained from the Doing Business Project (2008). State-capital intensity is defined by the ratio of firm's state capital divided by its total capital (including capital from state, collective, private, and foreign sources).

Table 11: Private Firms Are More Likely to Undertake FDI (2000-2013)

Regressand:	LPM	Logit	Logit	Rare Event Logit	Complementary Log-Log					
FDI Indicator										
Year coverage:				2000-2013				2004-13	2010-2013	
SOE defined:	narrow	narrow	narrow	narrow	narrow	broad	narrow	narrow	narrow	narrow
Variable:	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
SOE Indicator	-0.002***	-0.541***	-0.699***	-1.413***	-0.695***	-0.756***	-0.951***	-0.692***	-0.399***	-0.425***
	(-6.35)	(-5.23)	(-6.64)	(-16.88)	(-6.63)	(-7.99)	(-6.50)	(-6.58)	(-3.78)	(-3.93)
Log Firm Sales	0.004***	0.431***	0.455***	0.548***	0.443***	0.444***	0.443***	0.442***	0.430***	0.430***
	(37.66)	(44.35)	(39.50)	(71.84)	(39.80)	(39.86)	(28.33)	(39.79)	(35.94)	(35.85)
Log Firm Labor	0.001***	0.216***	0.268***	0.142***	0.258***	0.262***	0.276***	0.258***	0.261***	0.263***
	(10.26)	(16.88)	(17.93)	(14.23)	(17.89)	(18.06)	(13.57)	(17.91)	(15.57)	(15.60)
Export Indicator	0.004***	0.671***	0.721***	1.109***	0.713***	0.712***	1.168***	0.712***	0.367***	0.366***
	(22.24)	(26.63)	(24.50)	(52.99)	(24.45)	(24.42)	(27.23)	(24.42)	(13.18)	(13.12)
Foreign Firms Dropped	No	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Tax Haven Dropped	No	No	No	No	No	No	Yes	No	No	No
Year Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm Fixed Effects	Yes	No	No	No	No	No	No	No	No	No
Industry Fixed Effects	No	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
with Swtiching SOEs	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	No
Observations	2,529,449	2,529,074	2,028,733	1,820,515	2,028,733	2,028,733	2,022,589	1,696,358	547,719	545,306

Note: The regressand is the FDI indicator. All columns except column (1) include industry dummies at the 2-digit level and year dummies. The numbers in parentheses are *t*-values clustered at the firm level. *** (**) denotes significance at the 1 percent (5 percent) level. Columns (1)-(2) include foreign-invested firms whereas all other columns drop those firms. Columns (1)-(7) cover data over the period of 2000-2013, whereas Column (8) cover data from 2004-2013. Columns (9)-(10) cover data over the period of 2010-2013. Column (6) uses broadly defined SOE. Column (7) drops outward FDI to tax haven destinations. Column (10) drops the switching SOEs (i.e.,switchers from SOEs to private firms).

Figure 1: Selection Reversal



7 Appendix: Not For Publication

7.1 Appendix A: Data Description

This appendix draws heavily on Tian and Yu (2015).

FDI Decision Data. The nationwide data set of Chinese firms' FDI decisions was obtained from the Ministry of Commerce of China (MOC). MOC requires every Chinese MNC to report its detailed investment activity since 1980. To invest abroad, every Chinese firm is required by the government to apply to the MOC and its former counterpart, the Ministry of Foreign Trade and Economic Cooperation of China, for approval and registration. MOC requires such firms to provide the following information: the firm's name, the names of the firm's foreign subsidiaries, the type of ownership (i.e., state-owned enterprise (SOE) or private firm), the investment mode (e.g., trading-oriented affiliates, mining-oriented affiliates), and the amount of foreign investment (in U.S. dollars). Once a firm's application is approved by MOC, MOC will release the information mentioned, as well as other information, such as the date of approval and the date of registration abroad, to the public. All such information is available except the amount of the firm's investment, which is considered to be confidential information.

Since 1980, MOC has released information on new MNCs every year. Thus, the nationwide FDI decision data report FDI starters by year. The database even reports specific modes of investment: trading office, wholesale center, production affiliate, foreign resource utilization, processing trade, consulting service, real estate, research and development center, and other unspecified types. Here trading offices and wholesale centers are classified as distribution FDI, whereas the rest are referred to as non-distribution FDI. However, since this data set does not report firms' FDI flows, researchers are not able to explore the intensive margin of firm FDI with this data set.

FDI Flow Data. To explore the intensive margin, we use another data set, which is compiled by the Department of Commerce of Zhejiang province. The most novel aspect of this data set is that it includes data on firms' FDI flows (in current U.S. dollars). The data set covers all firms with headquarters located (and registered) in Zhejiang and is a short, unbalanced panel from 2006 to 2008. In addition to the variables covered in the nationwide FDI data set, the Zhejiang data set provides each firm's name, city where it has its headquarters, type of ownership, industry classification, investment destination countries, and stock share from its Chinese parent company.

Although this data set seems ideal for examining the role of the intensive margin of firm FDI, the disadvantage is also obvious: the data set is for only one province in China.[35] Regrettably, as is the case for many other researchers, we cannot access similar databases from other provinces. Still, as discussed in Appendix C, we believe that Zhejiang's firm-level FDI flow data are a good proxy for understanding the universal Chinese firm's FDI flows. In particular, the FDI flows from Zhejiang province are outstanding in the whole of China; the distribution of both types of ownership and that of Zhejiang's MNCs' destinations and industrial distributions are similar to those for the whole of China.

Firm-Level Production Data. Our last database is the firm-level production data compiled by China's National Bureau of Statistics in an annual survey of manufacturing enterprises. The data set covers around 162,885 firms in 2000 and 410,000 firms in 2008 and, on average, accounts for 95 percent of China's total annual output in all manufacturing sectors. The data set includes two types of manufacturing firms: universal SOEs and non-SOEs whose annual sales are more than RMB 5 million (or equivalently US$830,000 under the current exchange rate). The data set is particularly useful for calculating measured total factor productivity (TFP), since the data set provides more than 100 firm-level variables listed in the main accounting statements, such as sales, capital, labor, and intermediate inputs.

As highlighted by Feenstra, Li and Yu (2014) and Yu (2015), some samples in this firm-level production data set are noisy and somewhat misleading, largely because of mis-reporting by some firms. To guarantee that our estimation sample is reliable and accurate, we screen the sample and omit outliers by adopting the following criteria. First, we eliminate a firm if its number

[35] To our knowledge, almost all previous work was not able to access nationwide universal outward FDI flow data. An outstanding exception is Wang et al. (2012), who use nationwide firm-level outward FDI data to investigate the driving force of the outward FDI of Chinese firms. However, the study uses data only from 2006 to 2007; hence, it cannot explore the possible effects of the financial crisis in 2008.

of employees is less than eight workers, since otherwise such an entity would be identified as self-employed. Second, a firm is included only if its key financial variables (e.g., gross value of industrial output, sales, total assets, and net value of fixed assets) are present. Third, we include firms based on the requirements of the Generally Accepted Accounting Principles.[36]

Data Merge. We then merge the two firm-level FDI data sets (i.e., nationwide FDI decision data and Zhejiang's FDI flow data) with the manufacturing production database. Although the two data sets share a common variable—the firm's identification number—their coding systems are completely different. Hence, we use alternative methods to merge the three data sets. The matching procedure involves three steps. First, we match the three data sets (i.e., firm production data, nationwide FDI decision data, and Zhejiang FDI flow data) by using each firm's Chinese name and year. If a firm has an exact Chinese name in a particular year in all three data sets, it is considered an identical firm. Still, this method could miss some firms since the Chinese name for an identical company may not have the exact Chinese characters in the two data sets, although they share some common strings.[37] Our second step is to decompose a firm name into several strings referring to its location, industry, business type, and specific name. If a company has all identical strings, such a firm in the three data sets is classified as an identical firm.[38] Finally, to avoid possible mistakes, all approximate string-matching procedures are done manually.

7.2 Appendix B: Proofs

7.2.1 Proof of Proposition 1

Proof: The first two parts have already been proved. Here we prove the last two parts. Because the monotone likelihood ratio property (MLRP) implies first-order stochastically dominance (FOSD), we only need to prove the part 3 under the assumption of FOSD.

First, the fraction of MNCs among each type of firm is

$$frac_{i,mnc} = \frac{1 - F_i(\bar{\varphi}_{iO})}{1 - F_i(\bar{\varphi}_{iD})},$$

where $i \in \{P, S\}$ and $F_i(\varphi)$ is the cumulative probability density function (CDF) of the productivity draw. Note that since $\bar{\varphi}_{PD} > \bar{\varphi}_{SD}$, a sufficient condition for $frac_{S,mnc} < frac_{P,mnc}$ to hold is

$$\frac{1 - F_S(\bar{\varphi}_{SO})}{1 - F_S(\bar{\varphi}_{PD})} < \frac{1 - F_P(\bar{\varphi}_{PO})}{1 - F_P(\bar{\varphi}_{PD})}.$$

Since the FOSD property holds for the truncated productivity distributions and $\bar{\varphi}_{SO} > \bar{\varphi}_{PO}$, it must be true that

$$\frac{1 - F_S(\bar{\varphi}_{SO})}{1 - F_S(\bar{\varphi}_{PD})} < \frac{1 - F_S(\bar{\varphi}_{PO})}{1 - F_S(\bar{\varphi}_{PD})} < \frac{1 - F_P(\bar{\varphi}_{PO})}{1 - F_P(\bar{\varphi}_{PD})},$$

which leads to the result that the fraction of MNCs is larger among private firms than among SOEs.

[36] In particular, an observation is included in the sample only if the following observations hold: (1) total assets are greater than liquid assets; (2) total assets are greater than the total fixed assets and the net value of fixed assets; (3) the established time is valid (i.e., the opening month should be between January and December); and (4) the firm's sales must be greater than the required threshold of RMB 5 million.

[37] For example, "Ningbo Hangyuan communication equipment trading company" shown in the FDI data set and "(Zhejiang) Ningbo Hangyuan communication equipment trading company" shown in the National Bureau of Statistics of China production data set are the same company but do not have exactly the same Chinese characters.

[38] In the example, the location fragment is "Ningbo," the industry is "communication equipment," the business type is "trading company," and the specific name is "Hangyuan."

Second, average productivity of active private firms is

$$\begin{aligned}\int_{\bar{\varphi}_{PD}}^{\infty}\frac{\varphi f_P(\varphi)}{1-F_P(\bar{\varphi}_{PD})} &= \bar{\varphi}_{PD}+\int_{\bar{\varphi}_{PD}}^{\infty}\frac{1-F_P(\varphi)}{1-F_P(\bar{\varphi}_{PD})}\\ &> \bar{\varphi}_{SD}+\int_{\bar{\varphi}_{SD}}^{\infty}\frac{1-F_P(\varphi)}{1-F_P(\bar{\varphi}_{SD})}\\ &> \bar{\varphi}_{SD}+\int_{\bar{\varphi}_{SD}}^{\infty}\frac{1-F_S(\varphi)}{1-F_S(\bar{\varphi}_{SD})},\end{aligned}$$

where the first line comes from integration by parts, and the second line is true as $\bar{\varphi}_{SD}<\bar{\varphi}_{PD}$. The last step is true because the truncated distribution of the productivity draw also satisfies the FOSD property. Furthermore, as

$$\int_{\bar{\varphi}_{SD}}^{\infty}\frac{\varphi f_S(\varphi)}{1-F_S(\bar{\varphi}_{SD})}=\bar{\varphi}_{SD}+\int_{\bar{\varphi}_{SD}}^{\infty}\frac{1-F_S(\varphi)}{1-F_S(\bar{\varphi}_{SD})},$$

we have the result that average productivity of private firms is greater than that of SOEs overall.

For the proof of part 4, we have to impose a stronger assumption that both types of firms make productivity draws from the same distribution (i.e., $f(\varphi)=f_P(\varphi)=f_S(\varphi)$), although this is not a necessary condition for the result to hold. Under this assumption, we have

$$\begin{aligned}\int_{\bar{\varphi}_{PO}}^{\infty}\frac{\varphi f(\varphi)}{1-F(\bar{\varphi}_{PO})} &= \bar{\varphi}_{PO}+\int_{\bar{\varphi}_{PO}}^{\infty}\frac{1-F(\varphi)}{1-F(\bar{\varphi}_{PO})}\\ &< \bar{\varphi}_{SO}+\int_{\bar{\varphi}_{SO}}^{\infty}\frac{1-F(\varphi)}{1-F(\bar{\varphi}_{SO})}\\ &= \int_{\bar{\varphi}_{SO}}^{\infty}\frac{\varphi f(\varphi)}{1-F(\bar{\varphi}_{SO})},\end{aligned}$$

which implies that (simple) average productivity of private MNCs is smaller than that of state-owned MNCs.

7.2.2 Proof of Proposition 2

Proof: Comparing equation (13) with equation (14), we know that the productivity premium of state-owned MNCs increases with the level of domestic distortion (i.e., selection into the FDI market becomes much less stringent for private firms compared with SOEs), or $\frac{\bar{\varphi}_{SO}}{\bar{\varphi}_{PO}}\Big(>1\Big)$ increases with c. Furthermore, selection into the domestic market becomes more stringent for private firms compared with SOEs when c increases, as $\frac{\bar{\varphi}_{PD}}{\bar{\varphi}_{SD}}\Big(>1\Big)$ increases with c. Therefore, the first part follows.

For the second part, since we have $\mu=1$ now, the production function becomes

$$q(k,l)=\varphi\Big(\frac{k}{0.5}\Big)^{0.5}\Big(\frac{l}{0.5}\Big)^{0.5}, \tag{15}$$

and TVC and FC (for SOEs) become

$$TVC(q,\varphi) = \frac{qr}{\varphi\omega^{0.5}} \tag{16}$$

and

$$FC(q,\varphi) = \frac{f_i r}{\omega^{0.5}}, \tag{17}$$

where $i \in \{e, D, X, I\}$. Repeating the procedure as before, we obtain

$$\frac{\bar{\varphi}_{PX}}{\bar{\varphi}_{PD}} = \frac{\bar{\varphi}_{SX}}{\bar{\varphi}_{SD}} > 1; \quad \bar{\varphi}_{SO} > \bar{\varphi}_{PO}; \quad \bar{\varphi}_{SD} < \bar{\varphi}_{PD}.$$

Furthermore, it is straightforward to establish that both $\frac{\bar{\varphi}_{SO}}{\bar{\varphi}_{PO}}\Big(>1\Big)$ and $\frac{\bar{\varphi}_{PD}}{\bar{\varphi}_{SD}}\Big(>1\Big)$ increases with c. Therefore, the productivity premium of state owned MNCs is more pronounced in capital intensive industries. And, SOEs are much less likely to engage in FDI (relative to private firms) in capital intensive industries.

7.2.3 Proof for Proposition 3

Proof: For the first part, the relative size of private MNCs (i.e., compared with private non-exporting firms) is

$$\frac{\pi_{PD}(\bar{\varphi}_{PO})\Big[1-\Big(\frac{\bar{\varphi}_{PD}}{\bar{\varphi}_{PX}}\Big)^k\Big]}{\pi_{PD}(\bar{\varphi}_{PD})\Big[1-\Big(\frac{\bar{\varphi}_{PD}}{\bar{\varphi}_{PX}}\Big)^{k-(\sigma-1)}\Big]} = \frac{\bar{\varphi}_{PO}^{\sigma-1}\Big[1-\Big(\frac{\bar{\varphi}_{PD}}{\bar{\varphi}_{PX}}\Big)^k\Big]}{\bar{\varphi}_{PD}^{\sigma-1}\Big[1-\Big(\frac{\bar{\varphi}_{PD}}{\bar{\varphi}_{PX}}\Big)^{k-(\sigma-1)}\Big]}$$

under the Pareto assumption. Similarly, for SOEs, the relative size is

$$\frac{\pi_{SD}(\bar{\varphi}_{SO})\Big[1-\Big(\frac{\bar{\varphi}_{SD}}{\bar{\varphi}_{SX}}\Big)^k\Big]}{\pi_{SD}(\bar{\varphi}_{SD})\Big[1-\Big(\frac{\bar{\varphi}_{SD}}{\bar{\varphi}_{SX}}\Big)^{k-(\sigma-1)}\Big]} = \frac{\bar{\varphi}_{SO}^{\sigma-1}\Big[1-\Big(\frac{\bar{\varphi}_{SD}}{\bar{\varphi}_{SX}}\Big)^k\Big]}{\bar{\varphi}_{SD}^{\sigma-1}\Big[1-\Big(\frac{\bar{\varphi}_{SD}}{\bar{\varphi}_{SX}}\Big)^{k-(\sigma-1)}\Big]}$$

Since

$$\frac{\bar{\varphi}_{PX}}{\bar{\varphi}_{PD}} = \frac{\bar{\varphi}_{SX}}{\bar{\varphi}_{SD}} > 1, \quad \bar{\varphi}_{SO} > \bar{\varphi}_{PO}, \quad \bar{\varphi}_{SD} < \bar{\varphi}_{PD},$$

the relative size of private MNCs (i.e., compared with private non-exporting firms) is smaller than that of state-owned MNCs.

We now prove the second part. Comparing equation (12) with equation (9) and noting that overall sales are proportional to the operating profit, we conclude that the ratio of foreign sales to domestic sales is higher for private MNCs (than for state-owned MNCs), conditioning on φ. This is because domestic sales are smaller for private firms than for SOEs, conditioning on the productivity draw, φ.

For the third part of the proposition, there are three cases to consider. The first case is that both types of firms are non-exporters before the reduction in f_I. Equations (7), (9) (11) and (12) together imply that

$$\frac{\pi_{PO}(\varphi)}{\pi_{PD}(\varphi)} > \frac{\pi_{SO}(\varphi)}{\pi_{SD}(\varphi)},$$

which is what we need to prove (remember that overall sales are proportional to the operating profit).

The second case is that both types of firms are exporters before the reduction in f_I. In this case, equations (8), (10) (11) and (12) together imply that

$$\frac{\pi_{PO}(\varphi)}{\pi_{PX}(\varphi)} > \frac{\pi_{SO}(\varphi)}{\pi_{SX}(\varphi)}.$$

Therefore, after two firms with the same φ undertake FDI, the increase in overall firm size is greater for the new private MNC than for the new state-owned FDI firm.

The final case is that the SOE is an exporter and the private firm is a non-exporter before the reduction of the fixed FDI cost. In this case, we have

$$\frac{\pi_{PO}(\varphi)}{\pi_{PD}(\varphi)} > \frac{\pi_{PO}(\varphi)}{\pi_{PX}(\varphi)} > \frac{\pi_{SO}(\varphi)}{\pi_{SX}(\varphi)},$$

since $\pi_{PX}(\varphi) > \pi_{PD}(\varphi)$. Therefore, after two firms with the same φ undertake FDI, the increase in overall firm size is larger for the new private MNC (than for the new state-owned MNC). In total, the third part of this proposition is true for all possible cases.

7.3 Appendix C: Variants of the Model

7.3.1 Fixed FDI Cost

In this subsection, we assume that the fixed FDI cost is paid using domestic factors. Under current specification, we derive FDI cutoffs as

$$\frac{(f_I - f_X)r_H}{(1+\omega_H^{\mu-1})^{\frac{1}{\mu-1}}} = \frac{D_F}{\sigma}\left(\beta\bar{\varphi}_{SO}\right)^{\sigma-1}\left[\frac{(1+\omega_F^{\mu-1})^{\frac{\sigma-1}{\mu-1}}}{r_F^{\sigma-1}} - \frac{(1+\omega_H^{\mu-1})^{\frac{\sigma-1}{\mu-1}}}{(\tau r_H)^{\sigma-1}}\right] \tag{18}$$

and

$$\frac{(f_I - f_X)cr_H}{(1+(c\omega_H)^{\mu-1})^{\frac{1}{\mu-1}}} = \frac{D_F}{\sigma}\left(\beta\bar{\varphi}_{PO}\right)^{\sigma-1}\left[\frac{(1+\omega_F^{\mu-1})^{\frac{\sigma-1}{\mu-1}}}{r_F^{\sigma-1}} - \frac{(1+(c\omega_H)^{\mu-1})^{\frac{\sigma-1}{\mu-1}}}{(c\tau r_H)^{\sigma-1}}\right]. \tag{19}$$

Denote the inverse of domestic marginal cost (after normalizing φ to one) as

$$x_H(r_H, w_H) = \frac{(1+\omega_H^{\mu-1})^{\frac{1}{\mu-1}}}{r_H} \tag{20}$$

and the inverse of foreign marginal cost as

$$x_F(r_F, w_F) = \frac{(1+\omega_F^{\mu-1})^{\frac{1}{\mu-1}}}{r_F}. \tag{21}$$

Note that the existence of the input price wedge increases the domestic marginal cost, or

$$x_H(r_H, w_H) > x_H(cr_H, w_H).$$

An sufficient and necessary condition for $\bar{\varphi}_{SO} > \bar{\varphi}_{PO}$ (for any $c > 1$) is that

$$\tau^{\sigma-1} x_F(r_F, w_F)^{\sigma-1}(x_H(r_H, w_H) - x_H(cr_H, w_H)) < x_H(r_H, w_H)^{\sigma} - x_H(cr_H, w_H)^{\sigma},$$

which puts an upper bound on the marginal production cost in China (i.e., "H").[39] The above condition is more likely to hold in the case of China (especially before 2008), as China enjoyed relatively low production costs compared with developed economies.

Another variant of the above model is that both types of firms use domestic resources to pay for the fixed FDI cost, and private firms do not face discrimination when they pay for this fixed cost. This assumption receives some empirical support, as the Chinese government is actively seeking to support the "Going-Out" strategy of Chinese firms which include private firms. For this variant of the model, FDI cutoffs can be derived as

$$\frac{(f_I - f_X) r_H}{(1 + \omega_H^{\mu-1})^{\frac{1}{\mu-1}}} = \frac{D_F}{\sigma}\left(\beta \bar{\varphi}_{SO}\right)^{\sigma-1}\left[\frac{(1 + \omega_F^{\mu-1})^{\frac{\sigma-1}{\mu-1}}}{r_F^{\sigma-1}} - \frac{(1 + \omega_H^{\mu-1})^{\frac{\sigma-1}{\mu-1}}}{(\tau r_H)^{\sigma-1}}\right] \tag{22}$$

and

$$\frac{f_I r_H}{(1 + \omega_H^{\mu-1})^{\frac{1}{\mu-1}}} - \frac{f_X c r_H}{(1 + (c\omega_H)^{\mu-1})^{\frac{1}{\mu-1}}} = \frac{D_F}{\sigma}\left(\beta \bar{\varphi}_{PO}\right)^{\sigma-1}\left[\frac{(1 + \omega_F^{\mu-1})^{\frac{\sigma-1}{\mu-1}}}{r_F^{\sigma-1}} - \frac{(1 + (c\omega_H)^{\mu-1})^{\frac{\sigma-1}{\mu-1}}}{(c\tau r_H)^{\sigma-1}}\right]. \tag{23}$$

Obviously, the selection reversal result holds irrespective of parameter values (i.e., $\bar{\varphi}_{SO} > \bar{\varphi}_{PO}$), since there is no difference in the fixed cost of engaging in FDI between SOEs and private firms.

7.3.2 Variable FDI Cost

In this subsection, we modify our basic model to allow SOEs to use domestic factors when producing abroad. SOEs would have incentive to do so, if

$$x_H(r_H, w_H) > x_F(r_F, w_F) > x_H(cr_H, w_H),$$

and firms are allowed to bring domestic factors to the foreign country to produce. Under this specification, FDI cutoffs can be derived as

$$\frac{f_I r_F}{(1 + \omega_F^{\mu-1})^{\frac{1}{\mu-1}}} - \frac{f_X r_H}{(1 + (\omega_H)^{\mu-1})^{\frac{1}{\mu-1}}} = \frac{D_F}{\sigma}\left(\beta \bar{\varphi}_{SO}\right)^{\sigma-1}\left[\frac{(1 + \omega_H^{\mu-1})^{\frac{\sigma-1}{\mu-1}}}{r_H^{\sigma-1}} - \frac{(1 + \omega_H^{\mu-1})^{\frac{\sigma-1}{\mu-1}}}{(\tau r_H)^{\sigma-1}}\right] \tag{24}$$

and

$$\frac{f_I r_F}{(1 + \omega_F^{\mu-1})^{\frac{1}{\mu-1}}} - \frac{f_X c r_H}{(1 + (c\omega_H)^{\mu-1})^{\frac{1}{\mu-1}}} = \frac{D_F}{\sigma}\left(\beta \bar{\varphi}_{PO}\right)^{\sigma-1}\left[\frac{(1 + \omega_F^{\mu-1})^{\frac{\sigma-1}{\mu-1}}}{r_F^{\sigma-1}} - \frac{(1 + (c\omega_H)^{\mu-1})^{\frac{\sigma-1}{\mu-1}}}{(c\tau r_H)^{\sigma-1}}\right]. \tag{25}$$

[39] Note that since $\sigma > 1$, $\frac{x_H(r_H,w_H)^{\sigma} - x_H(cr_H,w_H)^{\sigma}}{x_H(r_H,w_H) - x_H(cr_H,w_H)}$ increases with $x_H(r_H, w_H)$.

The selection reversal result holds (i.e., $\bar{\varphi}_{SO} > \bar{\varphi}_{PO}$), if

$$\tau^{\sigma-1}[x_H(r_H, w_H)^{\sigma-1} - x_F(r_F, w_F)^{\sigma-1}] < x_H(r_H, w_H)^{\sigma-1} - x_H(cr_H, w_H)^{\sigma-1},$$

where $x_H(.,.)$ and $x_F(.,.)$ are defined in equations (20) and (21) respectively. Note that this condition is a sufficient but non-necessary condition for the selection reversal result to hold. Absent general equilibrium feedback, the above inequality holds if the distortion is more severe (i.e., $x_H(cr_H, w_H)$ is small enough) or the difference in the undistorted factor prices is small (i.e., $x_H(r_H, w_H)$ is close enough to $x_F(r_F, w_F)$).

7.4 Appendix Tables

Appendix Table 1: Summary Statistics of Key Variables (2000-08)

Variable	Mean	Std. dev.	Min	Max
Firm TFP (Olley-Pakes)	3.61	1.18	0.61	6.57
Firm FDI indicator	0.003	0.066	0	1
Firm export indicator	0.29	0.451	0	1
SOE indicator	0.04	0.191	0	1
SOE indicator (broader)	0.07	0.252	0	1
Foreign indicator	0.20	0.402	0	1
Firm log labor	4.78	1.115	1.61	13.25

Appendix Table 2: Robustness Checks of Productivity Premium of State-owned MNCs (2000-06)

Category	All Firms		Non-MNC Firms		MNC Firms	
Measures of RTFP	Labor Productivity	$RTFP^{LevPet}$	Labor Productivity	$RTFP^{LevPet}$	Labor Productivity	$RTFP^{LevPet}$
	(1)	(2)	(3)	(4)	(5)	(6)
(i) Private firms	10.69	0.525	10.69	0.525	11.14	0.596
(ii) SOE	10.30	0.518	10.29	0.519	11.72	0.684
Difference=(i)-(ii)	0.39***	0.007***	0.40***	0.006***	-0.588*	-0.088***
	(58.82)	(6.49)	(59.08)	(6.57)	(-4.46)	(-2.80)

Notes: Columns (1)-(2) show that private firms have higher log labor productivity and relative TFP (measured in Levinsohn-Petrin) than SOEs for all firms. Similarly, columns (3) and (4) show that private non-MNC firms have higher log labor productivity and relative TFP than SOE non-MNC firms. Columns (5) and (6) show that private MNC firms are *less* productive than SOE MNC firms. Number in parenthesis are t-value. ***(**,*) denotes the significance at 1(5, 10)%, respectively.

Appendix Table 3: Absolute Size Premium for SOEs

Category	Non-FDI exporting firms		FDI non-exporting firms		MNCs		Domestic sales
Variable	Lnl	Sales	Lnl	Sales	Lnl	Sales	of MNCs
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
(i) Private firms	5.19	60,703	4.73	181,713	5.77	3,110,883	1,874,675
(ii) SOE	6.88	130,238	6.55	549,485	8.29	11,130,681	10,347,231
Difference=(i)-(ii)	-1.69***	-69,535***	-1.82***	-367,772**	-2.52***	-8,019,798***	-8,472,556***
	(-140.8)	(-26.71)	(-7.85)	(-2.26)	(-14.14)	(-5.49)	(-8.48)
			Regressions				
SOE Indicator	1.566***	1.491***	1.795***	1.701***	2.400***	2.841***	3.727***
	(79.35)	(70.83)	(4.78)	(4.07)	(7.68)	(8.14)	(6.84)
Firm TFP	0.068***	0.550***	0.180***	0.683***	0.345***	0.807***	0.938***
	(21.56)	(163.30)	(4.41)	(15.03)	(7.61)	(15.95)	(11.51)
Year-specific Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-specific Fixed Effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of Observations	323,397	323,397	1,375	1,375	2,352	2,352	2,058
R-squared	0.07	0.21	0.15	0.33	0.16	0.31	0.21

Note: Columns (1) to (6) of the upper module show that private firms have lower sales and employment than SOEs for non-FDI exporting firms, FDI non-exporting firms, and MNCs, respectively. Column (7) in the upper module shows that domestic sales of private MNCs are smaller than those of state-owned MNCs. The lower module regresses firm size (in log employment) and firm sales on the SOE indicator while controlling for firm TFP, year-specific fixed effects, and firm-specific fixed effects. All the regressions show that SOEs are larger than private firms among non-FDI exporting firms, non-exporting MNCs, and MNCs. The numbers in parentheses are *t*-values. *** (**, *) denotes significance at the 1 percent (5 percent, 10 percent) level.

Appendix Table 4: Channels of Rare-Events Logit Estimates

SOE Defined	Narrow	Narrow	Broad	Broad
Regressand: FDI Indicator	(1)	(2)	(3)	(4)
SOE Indicator	-1.064***	-1.082***	-1.071***	-1.086***
	(-10.42)	(-10.56)	(-10.75)	(-10.87)
SOE Indicator × Industry Interest Rates		0.204***		0.174***
		(3.04)		(2.86)
Industry Interest Rates	-0.016	-0.014	-0.016	-0.014
	(-0.65)	(-0.56)	(-0.65)	(-0.55)
Firm Relative TFP	3.692***	3.693***	3.693***	3.694***
	(17.93)	(17.94)	(17.94)	(17.94)
Log Firm Labor	0.566***	0.566***	0.568***	0.568***
	(39.13)	(39.13)	(39.21)	(39.22)
Export Indicator	0.849***	0.849***	0.848***	0.848***
	(21.92)	(21.92)	(21.88)	(21.88)
Year Fixed Effects	Yes	Yes	Yes	Yes
Industry Fixed Effects	Yes	Yes	Yes	Yes
Number of Observations	1,136,603	1,136,603	1,136,604	1,136,604

Note: The regressand is the FDI indicator. The numbers in parentheses are *t*-values clustered at the firm level. *** (**) denotes significance at the 1 percent (5 percent) level. The SOE indicator is defined as both narrow way and broad way a là Hsieh and Song (2015). Industrial interest rate is the aggregated average firm-level interest rates at CIC 2-digit industry level.