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Decisions of OFDI Engagement and Location for Heterogeneous Multinational firms: Evidence from Chinese firms

Yanmin Shao^{a,b,*}, Yan Shang^{c,d}

^a Dolinks School of Economics and Management, University of Science and Technology Beijing, Beijing, China

^b Academy of Mathematics and Systems Science, Chinese Academy of Sciences, Beijing, China

^c School of Economics and Management, University of Chinese Academy of Science, Beijing, China

^d Post-Doctoral Research Center, Industrial and Commercial Bank of China Limited, Beijing, China

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ABSTRACT

This paper explores how multinational firm take decisions with regard to outward FDI (OFDI) depending on total factor productivity (TFP). In particular, we examine how the TFP of an individual firm interacts with the host country's factors, and its indirect impact on the location decision. An annual data set from 2008 to 2013 for publicly listed multinational firms in China is examined. The empirical results suggest that, first, the TFP could stimulate the OFDI engagement of a firm. Second, the influence of the firm's TFP is consistent across firms with different institutional advantages. Third, the firm's TFP reduces the importance of the host country's market potential on the likelihood of the firm's entry into a host country.

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1. Introduction

The impact of multinational corporations (MNCs) on world economy has drawn significant attention in academic circles (Wang et al., 2008). According to the 2015 World Investment Report, MNCs' international production expanded generating value added of approximately \$7.9 trillion in 2014, and outward FDI (OFDI) stock as a percentage of GDP in 2014 was 33.7%. The sales assets of MNCs' foreign affiliates grew faster than that of their domestic counterparts and it reached \$36.35 trillion in 2014, which is almost half of the global GDP. This phenomenon has prompted worldwide researchers' attention to investigate OFDI.

Decision making with regard to OFDI and location are both strategic issues for multinational firms. However, literature concerns the firm-level study on an OFDI provider in the developing countries, such as China, is inadequate. Analyzing the case of China is vital for several reasons. First, China is the largest provider of OFDI within the developing countries. According to the 2014 Statistical Bulletin of China's Outward Foreign Direct Investment, China's OFDI reached \$123.12 billion in 2014, the highest level on record and the third highest in the world for three consecutive years following the US and Hong Kong. China's OFDI has increased for 12 consecutive years since 2003, with the flow in 2014 being 45.6 times that of 2002, and an average growth rate as high as 37.5% during the period 2002 to 2014. This

level of OFDI is sufficiently large for researchers to study the case of China as a representative one. Second, China's government constantly promotes expanded production by Chinese enterprises in the global arena. Emerging-market governments have provided valuable resources to support the internationalization of the firms (Wang et al. 2012b). Thus, the impact of institutional factors on MNCs' OFDI entails further consideration. Third, compared with the enterprises in developed countries, which have a particular competitive advantage to set up a foreign affiliate and earn higher returns, the decision concerning OFDI investment and the choice of location for China's MNCs might be different.

Another issue is that the role of MNCs' heterogeneity on Chinese firm's decisions on OFDI has not been addressed sufficiently. To date, Tian and Yu (2012), Wakasugi and Zhang (2012), and Wei et al. (2013) examined how the productivity of Chinese firms affects their choices, that is, exports or OFDI, as well as the location of internationalization, namely, in high-income or low-income countries. Wakasugi and Zhang (2012) and Wei et al. (2013) employed cross-sectional survey data but could not control the endogeneity caused by the data, and thus they failed to verify whether the surveyed companies had high productivity before engaging in OFDI activities. Tian and Yu (2012) investigated the relationships between firm productivity and OFDI based on the panel enterprise data of Zhejiang Province. Their results showed that firm productivity has a positive effect on enterprises' investment and the amount of investment. Furthermore, after dividing the FDI firms into two groups according to the income level of the destination countries, they found that firm productivity

* Corresponding author.

E-mail address: yanminshao@amss.ac.cn (Y. Shao).

has no significant effect on firm's decision to invest in countries with different income levels. One shortcoming of the study is that they do not consider the factors that determine an enterprise's location choice.

Due to the different levels of competitiveness, firms with different TFP levels might also differ in their selection of foreign production locations, and the effect of the host country's wage levels, market size, macroeconomic environment, and other factors might affect firms differently, depending on their TFP. However, only [Chen and Moore \(2010\)](#) explored how the influence of market size, production costs, and trade costs on firms' location decision varies with firm-level TFP. Therefore, it is essential to study how and to what extent firms' productivity moderates the effects of the host country's factors (such as the host country's investment environment, production conditions, and relevant policies and regulations), and influences the entry of Chinese firms into foreign countries after controlling for factors related to the host country, industry, and firm.

This paper offers several contributions to the literature on firm OFDI engagement and location decision in the context of emerging economies. First, previous discussion has shown that the two decisions are determined by the firm's internal factors. Thus, this paper considers the two decisions in a unified framework to capture the possible interaction between them. Second, this paper is perhaps the first attempt to empirically study the firms' productivity effects on OFDI engagement after taking the reverse causality problem into account. Third, we examine whether the state ownership strengthens the effect of firms' productivity on OFDI decisions. Fourth, we analyze the moderating role of the firm's productivity on the effect of the host country's factor in the firm's location decision.

The remainder of the paper is structured as follows. In [Section 2](#), we present the literature review and hypothesis. In [Section 3](#), the data and method are described, followed by the empirical experiment in [Section 4](#). In [Section 5](#), we analyze the empirical results. [Section 6](#) discusses the limitations and directions for future studies.

2. Literature review and hypotheses

Recent international studies have paid close attention to the issue of the firm-level productivity differences and internationalization modes ([Montagna, 2001](#); [Melitz, 2003](#)). A major breakthrough in this regard can be attributed to [Melitz \(2003\)](#) and [Bernard et al. \(2003\)](#), who augmented the Krugman-like monopoly competition model with firm heterogeneity, and demonstrated how its interaction with sunk costs associated with entering foreign markets determines their export behavior. Building on this framework, [Helpman et al. \(2004\)](#) were the first to model firms' decisions between exporting and setting up a foreign subsidiary serving the local market (hereafter referred to as the HMV model). The key prediction emerging from these studies is that firms with different levels of productivity will generally engage in distinct modes of international activities, wherein the most productive firms choose to invest in foreign markets while the less productive ones opt for export. Moreover, some of the less productive firms continue to produce only for the domestic market and simultaneously force the least productive firms to exit, as only sufficiently productive firms can afford the distinct sunk costs related to the FDI.

Although there have been several studies of the firm's productivity and internationalization mode, however, most of the studies have analyzed firms from developed countries, such as Germany ([Wagner, 2006](#); [Buch and Lipponer, 2007](#); [Arnold and Hussinger, 2010](#)), Poland ([Hagemeyer and Kolasa, 2011](#)), Ireland ([Girma et al., 2004](#)), the United Kingdom ([Girma et al., 2005](#)), Turkey ([Yasar and Paul, 2007](#)), France ([Nefussi, 2006](#); [Engel and Procher, 2012](#)), Italy ([Castellani and Zanfei, 2007](#)), the United States ([Helpman et al., 2004](#); [Yeaple, 2009](#)), and Japan ([Head and Ries, 2003](#); [Murasaki, 2005](#); [Kimura and Kiyota, 2006](#)). A few researchers have focused on firms from developing countries, for example, China ([Wakasugi and Zhang, 2012](#)), India

([Bhattacharya et al., 2012](#)), and Slovenia ([Damijan et al., 2007](#)). Some academicians have also used cross-border panel data ([Pietrovitto et al., 2012](#)). The majority of the research findings show that while the HMV model's theoretical expectations can be satisfied, a few researchers conclude otherwise ([Girma et al., 2004](#)).

Traditional FDI theory stresses that having a particular advantage is a prerequisite for an enterprise to conduct FDI. Existing FDI theories, including the monopoly advantage theory ([Hymer, 1960](#)), the product life cycle theory ([Vernon, 1966](#)), the internalization theory ([Coase, 1937](#)), as well as the international eclectic theory ([Dunning, 1976](#)) emphasize the importance of heterogeneity of scarce resources, which can ensure the enterprises' competitive advantage. Such capabilities can assist emerging market enterprises (EMEs) in responding successfully and proactively to institutional pressures, seeking changes in the manner of internationalization ([Castrogiovanni, 1991](#); [Wang et al., 2012b](#)). Therefore, the productivity of enterprises may also play an important role in OFDI activities. To some extent, enterprises conducting OFDI may a face complex business environment abroad, and thus, the comprehensive capability of the firm should be stronger, as only enterprises with high productivity will be able to bear the high costs of OFDI activities. Thus, we hypothesize as follows.

Hypothesis 1. Firms with higher levels of productivity are more likely to conduct OFDI.

Despite the fast growth in OFDI made by Chinese enterprises as a result of the government's "going out" policy, we noticed a feature in the distribution of overseas investment. The OFDI stock of state-owned enterprises (hereafter referred to as SOEs) accounted for 53.6% of the total in 2014, and that of non-state-owned enterprises (hereafter referred to as non-SOEs), less than half the total. Thus, SOEs take the dominant position in OFDI. In addition the OFDI policies of China favor Chinese SOEs, and private firms were legally prohibited from investing abroad prior to 2003 ([Buckley et al., 2007](#); [Kolstad and Wiig, 2012](#)). This point is important as the internationalization by emerging-market SOEs might be driven by political objectives and normative pressures, and not just by commercial interests ([Deng, 2009](#)). For example, some SOEs tend to invest in resource-rich and high-risk countries, and private enterprises tend to invest in markets in developed countries ([Ramasamy et al., 2012](#)). In this case, it is essential to consider the actual situation of Chinese enterprises, and investigate whether productivity has significantly different effects for SOEs and non-SOEs with regard to their OFDI engagement.

The institutional theory is a particularly powerful tool for understanding FDI from EMEs ([Wang et al., 2012a](#)). Many researchers have studied whether and how institutional advantages of firms' state ownership matters in the context of their strategies ([Morck et al., 2008](#); [Wang et al., 2012b](#)). Compared to non-SOEs, Chinese SOEs have strong political capabilities that, in turn, help them get access to a variety of strategically important resources for OFDI engagement, such as the low-interest funding, direct and indirect subsidies, and domestic tax breaks ([Nee, 1992](#); [Yiu et al., 2007](#); [Yiu, 2011](#)). Moreover, the state-owned financial institutions provide direct and indirect financial support to Chinese enterprises engaged in the process of "going out." For example, the Export-Import Bank of China is a professional foreign trade policy bank, which supports OFDI activities in many ways, including the provision of special overseas investment loans, while the China Development Bank has built a worldwide business network structure covering > 190 countries and regions, and supports the participation of a large number of domestic enterprises in all types of OFDI activities. In fact, 80–90% of funding requirement for OFDI by Chinese enterprises is sourced from China's banks. Related government departments, for example, the National Development and Reform Commission (NDRC), Ministry of Foreign Affairs (MFA), Ministry of Commerce (MOC), and local business sectors provide information on the host country's macroeconomic and investment environment, legal systems, administrative

systems, costs, and other information. Simultaneously, China's government-funded advisory agencies provide information and technical support services on OFDI. The financial, human, and technological resources supplied or subsidized by the Chinese government are unique institution-based ownership advantages for Chinese business groups looking to capitalize on asset-exploitation and asset-augmentation internationalization, and these advantages allow Chinese SOEs to compete in the domestic and global markets (Yiu, 2011).

From the perspective of the host country, some acquisitions of foreign companies by Chinese SOEs may be motivated by non-commercial objectives which, in turn, draw the attention of the relevant government departments of the host economies to those acquisitions (Globerman and Shapiro, 2009; Wang et al., 2012b). Thus, SOEs may have less legitimacy and face greater institutional pressures in a host country's society than privately owned firms. These institutional pressures arise from a combination of ideological conflicts, perceived threats to national security, and claimed unfair competitive advantage due to support from the home country's government (Meyer et al., 2014). Moreover, as the SOEs face different institutions, laws, and culture if they invest in foreign countries, such changes in the environment are likely to exert great pressure on Chinese companies "going out." Particularly, SOEs may find it easier to enter countries with chronically weak institutions and having rules similar to those in the home country because the liabilities caused by their foreignness in opaque and less munificent environments are considerably lower, and the firms are more comfortable with how such governments operate (Buckley et al., 2007; Kolstad and Wiig, 2012). Therefore, firms' capabilities and institutional advantages need to be complementary in order for them to increase overseas investment.

Compared to non-SOEs, Chinese SOEs with institutional advantages have strong political capabilities that in turn help them get access to strategically important factor resources controlled by the state (Warner et al., 2004; Wang et al., 2012a). Interaction between state government involvement and firm capabilities also influences EMEs' ability to internationalize (Wang et al., 2012b). However, some studies find that China's SOEs acted as a drag on China's productivity growth by absorbing resources and providing little economic value in return (Elliott and Zhou, 2013). Thus, EMEs with weak capabilities cannot take full advantage of the reciprocal relationship with the government to identify global opportunities, and reduce the transaction cost in the international investment. The state ownership indicates the resource dependence on the home-country government, and therefore increases a firm's tendency to conform stay in domestic to, rather than resist, home regulatory restrictions on outward FDI (Cui and Jiang, 2012). The capability of the firm also can enable it to take advantage of the government support by actively promoting the introduction of new policies for their internationalization (Luo et al., 2010). Thus, the institutional

advantages (through state ownership) interact with the firm's productivity to affect its overseas investment positively (Wang et al., 2012b). Thus, we propose the following hypothesis.

Hypothesis 2. The institutional advantages interact with the firm's TFP to affect the firm's overseas investment intention positively.

Location decision is one of the most important decisions faced by MNCs. A vast expanse of the economics literature has examined the determinants of FDI. The typical approach of estimating the effect of potential determinants of FDI is to regress the chosen dependent variable, such as the probability of making an FDI at a particular location or the amount of investment located therein, on a set of independent variables, which, on theoretical grounds, would likely affect the investment, such as the local market potential, cost of production, cost of transport, taxes, and the general business environment faced by foreign firms in the host country (Cheng and Kwan, 2000; Head and Mayer, 2004; Bognanno and Yang, 2005; Grossman et al., 2006; Blonigen et al., 2007; Faria, 2015). A firm's location decision depends not only on the host country's factors, but also on firm's productivity (Aw and Lee, 2008).

Previous theoretical and empirical studies also discuss how the heterogeneity in firm productivity interacts with heterogeneity in the market size and other factors of potential host countries. These studies provide some important insights into firm location decision. Head and Ries (2003) found that less productive Japanese MNCs seem to be attracted to the option of relocating to a low-cost foreign country, and the low-productivity firms have greater incentive to invest in low-income countries. Baldwin and Okubo (2006) found that most productive firms tend to relocate to bigger markets first, and the least efficient ones will locate in the periphery. Thus, a subsidy tends to sort firms according to their efficiency levels after integrating a Melitz-style model (Melitz, 2003) of monopolistic competition with heterogeneous firms. Melitz and Ottaviano (2008) also modeled how market size and trade affect firms' competitiveness, which then feeds back into the selection of heterogeneous producers and exporters in that market. They showed that larger markets exhibit tougher competition resulting in lower average mark-ups and higher aggregate productivity. Some studies have also concentrated on firms from developing countries. Damijan et al. (2007) focused on Slovenian manufacturing, and they found that firms with affiliates in low-income countries only have lower average productivity. However, the marginal effect of increased productivity on the probability of investing in poor and rich countries was not statistically significant, thus supporting the hypothesis of Head and Ries (2003). The influence of the host country's production cost on the location decision of the multinational firms with heterogeneous TFP has also been discussed in some studies. Aw and Lee (2008)

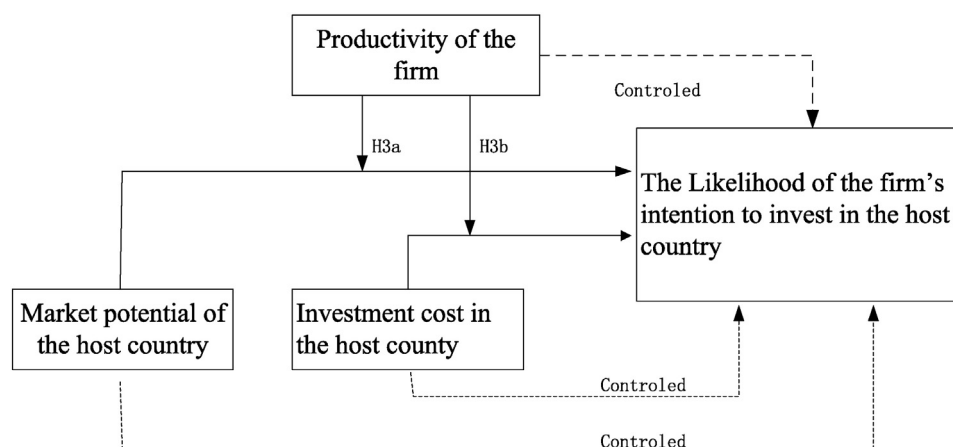


Fig. 1. The moderation effect of productivity on the firm's OFDI location decisions.

Table 1
Summary and correlations of the variables used in the study of firm's OFDI intention.

| | Mean | S.D. | Max | Min | OFDI | TFP | Ownership | Size | Age |
|-----------|-------|------|-------|-------|----------|----------|-----------|----------|-----|
| OFDI | 0.06 | 0.24 | 0.00 | 1.00 | 1 | | | | |
| TFP | 4.37 | 1.02 | -0.29 | 8.91 | 0.1018* | 1 | | | |
| Ownership | 0.67 | 0.47 | 0.00 | 1.00 | -0.0212 | 0.0494* | 1 | | |
| Size | 21.78 | 1.31 | 16.46 | 28.27 | 0.2079* | 0.2015* | 0.2793* | 1 | |
| Age | 16.39 | 4.13 | 4.00 | 34.00 | -0.0443* | -0.1457* | -0.1558* | -0.0838* | 1 |

Note: * means $p < 0.01$.

observed that Taiwanese multinational firms investing in the North are predicted to have higher productivity than firms investing in the South, as the fixed investment costs in the South are less than those in the North. Yeaple (2009) found that an increase in the mark-up adjusted demand level or a reduction in the local cost of production will lower the cutoff productivity index, inducing relatively less productive firms to invest. Further, the most productive US firms invest in a larger number of foreign countries and sell more in each country they operate in.

In fact, the location decision of multinational firms is affected by both firm-level and country-level factors (Martí et al., 2015). Furthermore, the interactions between firms' capability, related cost, and market characteristics of the host might affect the location decision of MNCs. To date, only Chen and Moore (2010) have modeled how multinational firms with heterogeneous TFP self-select different host countries. They found that countries with less attractive attributes, including smaller market potential, greater production costs, and lower import tariff, have greater requirement with regard to TFP. Notably, firms operating in foreign countries may encounter unfamiliarity and discrimination costs associated with their foreign operations. The effects of such costs are expected to be low if foreign firms can easily follow "the rules of the game" and obtain information necessary for their operations (Schwens and Kabst, 2011; Lu et al., 2014b). Thus, based on the above analysis, we expect that marginal effects of host countries on the firms OFDI location decision depend upon the EME's own capabilities (see Fig. 1). Accordingly, we propose the following two hypotheses.

Hypothesis 3a. Firm's productivity moderates the effect of host country's market potential on location choices; the higher the firm's productivity, the stronger the negative effect of the host country's market potential on the likelihood of investing in the host country.

Hypothesis 3b. Firm's productivity moderates the effect of host country's production cost on location choices; the higher the firm's productivity, the stronger the positive effect of the host country's production cost on the likelihood of investing in the host country.

3. Data and methods

3.1. Data on OFDI events

In order to conduct the empirical study, we construct a novel panel data set of OFDI events for public firms listed on the main board of

Table 2
Summary and correlations of the variables used in the study of firm's location decision.

| | Mean | S.D. | Max | Min | OFDI | TFP | Market potential | Entry cost | Institution | Distance | Ownership | Size | Age |
|------------------|-------|--------|--------|---------|----------|----------|------------------|------------|-------------|----------|-----------|----------|-----|
| OFDI | 0.002 | 0.050 | 0.00 | 1.00 | 1 | | | | | | | | |
| TFP | 4.656 | 0.997 | -0.286 | 8.840 | 0.0106* | 1 | | | | | | | |
| Market potential | 0.004 | 0.002 | 0.00 | 0.02 | 0.0315* | 0.0003 | 1 | | | | | | |
| Entry cost | 47.88 | 105.91 | 0.00 | 1165.33 | -0.0123* | 0.0006 | -0.3138* | 1 | | | | | |
| Institution | 0.08 | 1.01 | -2.24 | 1.90 | 0.0405* | -0.0001 | 0.5265* | -0.4058* | 1 | | | | |
| Distance | 8.95 | 0.55 | 6.86 | 9.87 | -0.0154* | -0.0001 | -0.2731* | 0.1690* | -0.0400* | 1 | | | |
| Ownership | 0.67 | 0.47 | 0.00 | 1.00 | -0.0025 | 0.0734* | -0.0001 | -0.0006 | 0.0001 | -0.0001 | 1 | | |
| Size | 22.42 | 1.43 | 17.12 | 28.27 | 0.0251* | 0.1635* | -0.0075* | -0.0188* | 0.0019 | 0.001 | 0.2953* | 1 | |
| Age | 16.05 | 4.43 | 4.00 | 34.00 | -0.0103* | -0.2176* | -0.0095* | -0.0237* | 0.0024 | 0.0014 | -0.0910* | -0.1201* | 1 |

Note: * means $p < 0.01$.

China's Shanghai and Shenzhen Stock Markets from the year 2008 to 2013. We choose this sample span because China's OFDI surged after the world financial crisis occurred in 2008. Firms' OFDI events include greenfield investment, merger and acquisition activities, and other types of investment. We define a subsidiary as any entity where the listed firm holds at least 20% of the equity (Lu et al., 2014b). In addition, we manually collect each listed firm's overseas OFDI events from its annual reports from the year 2008 to 2013. If we find an overseas event in firm i's annual report for year t, but it is not included in the annual report of the year t-1, we check the firm's website and the related news report to confirm the event. Thus, each OFDI event is double-checked by comparing the firm's OFDI event information for consecutive years. Variables concerning the firms' OFDI events information include the founding time, country (region), business scope, equity ratio, and etc. This study eliminates three types of OFDI from the above data: (1) overseas investment in three major tax havens: Cayman Islands, British Virgin Islands and Bermuda (Hampton and Christensen, 2002); and (2) overseas investment in Hong Kong and Macau. In the case of Chinese firms' OFDI, Hong Kong and Macau are special destinations for Chinese firms because they are regarded as the intermediary of their overseas reinvestment in other countries. (3) Enterprises that have undergone great changes with the stock code.

3.2. Measurement of firm's TFP

As mentioned above, the calculation of a firm's TFP is important. There are many ways to estimate a firm's TFP (Fujii et al., 2010; Wang et al., 2016). Many studies use the Solow residual to measure the TFP of an economy which is estimated using an ordinary least squares (OLS) regression. However, OLS estimation cannot consider the problem of reverse causality. To achieve a certain output, enterprises may employ more staff; the decision to increase staff is affected by the output rather than the influence of other exogenous factors. Allowing for the presence of reverse causality between outputs and inputs, we use an estimation procedure suggested by Olley and Pakes (1996) that provides two-stage semi-parametric estimation approach of the production function and TFP. This method assumes that an enterprise makes its investment decision based on its current productivity, thus solving the above bias problems by replacing unobservable productivity by a function of the enterprise's current investment and other variable. Given the financial variables of listed companies, this study employs the business incomes, number of employees, net fixed assets, and fixed investment

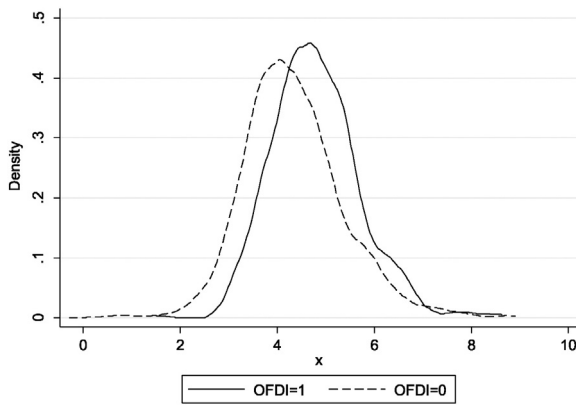


Fig. 2. Probability density functions of OFDI firms versus non-OFDI firms.

to represent total output, labor force, capital and investment, respectively, and to estimate each enterprise's TFP.

3.3. The variables

3.3.1. The dependent variable

With regard to research on the firm's OFDI decision, the dependent variable is the OFDI engagement, which refers to whether an enterprise has been engaged in OFDI for a year. If the *i*-th firm has established one or more subsidiaries overseas in one year, the entry dummy variable equals 1, and 0 otherwise. The firm-level sample includes 7262 firm-year observations, among which 533 observations of the dependent variable takes the value 1.

To study the location decision for the enterprise of China, the dependent variable is the location dummy, which equals to 1 if the enterprise conducted an entry event in a given host country in a given year, and 0 otherwise. And the location dummy variable equals 1 no matter how many subsidiaries they have built in the given country in a given year. After combining the firm-level data with host country-level data, there are 197,971 firm-year-country observations, and the dependent variable of 887 firm-year-country observations equals to 1.

3.3.2. The independent variables

TFP: Refer to Section 3.2 for details.

Although the TFP estimation takes the reverse causality problem into account, it still cannot exclude the possibility of the enterprise improving its TFP by learning from overseas. In addition, we still cannot regulate all endogenous factors, such as the spillover effect from developed countries caused by advanced technologies of host countries, which can improve the enterprise's TFP. To solve this problem, we use

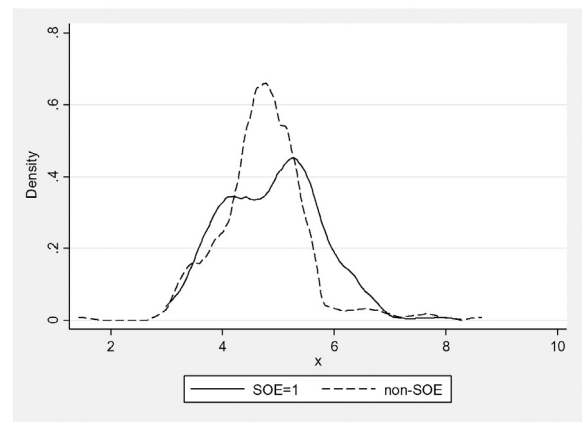


Fig. 4. Probability density functions of SOEs and non-SOEs engaging in OFDI.

a three-year moving average of TFP to reflect a firms' TFP in the given year (Holburn and Zelner, 2010). For example, the average of the enterprise's TFP values in 2007, 2008, and 2009 is used as the TFP index in 2010.

3.3.3. The enterprise-level control variables

Specifically, SOEs differ from non-SOEs with respect to various features, for example, objectives, resource access, and corporate strategies. SOEs might adapt mode and control decisions differently from private firms when they invest in oversea (Meyer et al., 2014). To test the possible heterogeneous response of MNCs owing to their institutional advantage, for firms with the state (central) government or local government as the controlling stakeholder, we assign the value 1 to variable ownership, while for the other firms, the ownership variable equals 0 (Duanmu, 2012).

Following the existing literature, we include two firm-level control variables that are important for a firm's OFDI engagement. Firm size is controlled as larger firms typically have more slack resources associated with OFDI, and firm age reflects a firm's accumulation of knowledge and experience (Cui et al., 2011; Wei et al., 2013). Firm size is measured by the logarithm transformation of a firm's total assets. Firm age is measured as the number of years since establishment and is a proxy of experience and resources as older and well-established firms usually have more experience and resources than younger firms (Yiu et al., 2007; Lu et al., 2014a). All the data are sourced from firms' annual reports.

For the set of explanatory variables regarding the host country, we include the four variables, including one market potential variable and three related production cost variables.

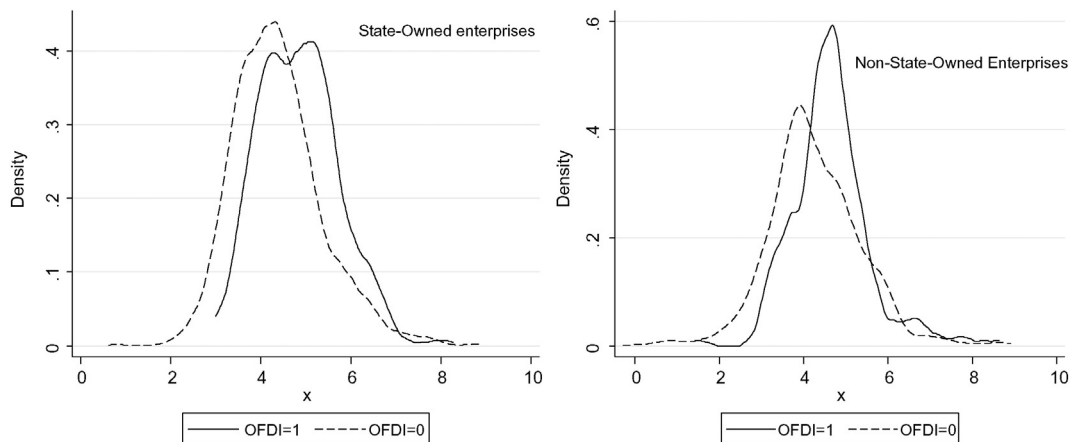


Fig. 3. Probability density functions of OFDI firms versus non-OFDI firms for SOEs (left-hand image) and non-SOEs (right-hand image).

Table 3
Differences between OFDI firm and non-OFDI firm.

| | TFP | Labor | Capital | Business income | Obs. |
|---------------|-----------------------|------------------------|------------------------|------------------------|------|
| OFDI firm | 4.790 | 8.895 | 21.589 | 22.931 | 442 |
| Non-OFDI firm | 4.335 | 7.573 | 20.146 | 21.263 | 6722 |
| Difference | -0.455*** (-9.073) | -1.321*** (-18.074) | -1.442*** (-16.153) | -1.667*** (-21.025) | |

Note: numbers in parentheses are t-values.
*** Denotes significance level at 1%.

Market size and proximity to larger markets have been proven as important determinants of FDI location. Thus, in this paper, we include the market potential variable to take into account the locations of competitors (Krugman, 1992; Head and Mayer, 2004). The market potential of country *i* is defined as the sum of inverse-distance-weighted GDPs of all other $k \neq i$ countries in the world for which we can obtain yearly GDP data. We obtain the data on the GDP and geographical distance from the World Development Indicators and the CEPII distance database, respectively.

$$\text{Thus, Market } P_{it} = \sum_{k=1}^n (\text{GDP}_k \times W_{i,k,t}) \text{ for all } k \neq i \quad (1)$$

Investments in the host country need to be licensed and authorized by local authorities, and these costs will affect firms' location decisions. The World Bank's publication named Doing Business describes the number of steps necessary and time needed to complete the host country's program requirements with regard to investments. The total cost of starting a business is the most widely used measure of entry costs. Thus, we use the Costs of Starting a Business from the World Development Indicators as a proxy for entry cost. Chinese firms' OFDI location decision is associated negatively with the entry cost variable.

The quality of governance is likely an important determinant of FDI activity, particularly for less developed countries, for a variety of reasons. The quality of governance is a necessary determinant for well-functioning markets; poor governance and corruption increase the cost of doing business; thus, they are likely to diminish FDI activity (Blonigen, 2005; Daude and Stein, 2007). Many researchers have sourced data from the Worldwide Governance Indicators (WGIs) (Kaufmann et al., 2009; Buchanan et al., 2012). The index of Regulatory Quality employed as the proxy of the main governance quality are obtained from the Polity IV database. This variable reflects perceptions about the ability of the host country's government to formulate and implement sound policies and regulations that permit and promote private sector development. The estimate of the governance performance

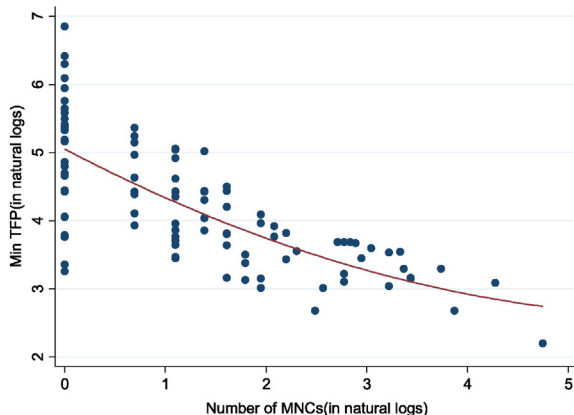


Fig. 5. The relationship between host-country popularity and minimum TFP.

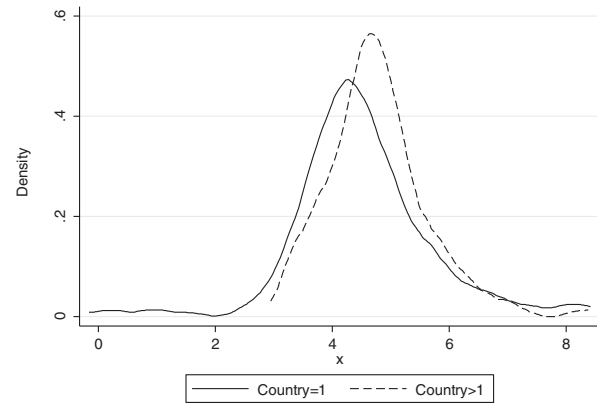


Fig. 6. The probability density function of firms with OFDI in different host countries.

index ranges from approximately -2.5 (weak) to 2.5 (strong). Because the measure of quality of governance that we use assigns higher values to good governance, so we expect a positive relationship between the OFDI location decision of Chinese firms and the quality of governance.

Following Feenstra (2002) and Chen and Moore (2010), we include the distance between Beijing and the geographic centers of host countries with the expectation that subsidiaries located in distant markets are likely to require a larger monitoring cost. Thus, we expect a negative relationship between the OFDI location decision of Chinese firms and geographic distance from China. These data are sourced from the CEPII distance database.

3.4. The model and data description

Hypotheses 1 and 2 were tested by estimating the Eq. (2) below. The dependent variable in the equation is the firm's OFDI intention in a given year. For the independent variable and control variables, the enterprise's TFP and firm size are calculated using the average of the past three years. Company age is expressed as the firm's age in the corresponding year. The data of the independent variable are transformed into natural logarithms.

$$\Pr(D_{ofdi_{ijt}} = 1 | X_{ijt}) = \beta_0 + \beta_1 \text{LnTfp}_{ijt} + \beta_2 \text{LnOwnership}_{ijt} + \beta_3 \text{LnSize}_{ijt} + \beta_4 \text{LnAge}_{ijt} + \varepsilon_{ijt} \quad (2)$$

Hypotheses 3a and 3b were tested by estimating Eq. (3). The dependent variable of the equation is the firm's OFDI decision in a given country in a given year. Three kinds of explanatory variables are included in the enterprise location decision. First, we include the firm-level control variable and the firm's TFP, which measure the effect of the firm's self-selection. Second, factors relevant to the host country, such as market potential, cost of entry, quality of governance, and geographic distance from China are included, and these factors may have the same effect for firms investing in those countries. All the data are calculated using the past three years' average except the market potential. Third, we include the cross-term of the firm TFP and country-level factors to examine the link between location decision, host country factors, and the firm's capability. We use the following model:

$$\Pr(D_{ofdi_{ijt}} = 1 | X_{ijt}) = \beta_0 + \beta_1 \text{LnTfp}_{ijt} + \beta_2 \text{LnOwnership}_{ijt} + \beta_3 \text{LnSize}_{ijt} + \beta_4 \text{LnAge}_{ijt} + \gamma_1 \text{LnMarketp}_{ijt} + \gamma_2 \text{LnEntrycost}_{ijt} + \gamma_3 \text{LnGovernance}_{ijt} + \gamma_4 \text{LnDistance}_{ijt} + \lambda_1 \text{LnTfp}_{ijt} \times \text{LnMarketp}_{ijt} + \lambda_2 \text{LnTfp}_{ijt} \times \text{LnEntrycost}_{ijt} + \lambda_3 \text{LnTfp}_{ijt} \times \text{LnGovernance}_{ijt} + \lambda_4 \text{LnTfp}_{ijt} \times \text{LnDistance}_{ijt} + \varepsilon_{ijt} \quad (3)$$

Table 4
Estimation results of TFP's effect on firms' OFDI decisions.

| | (1) | (2) | (3) | (4) | (5) |
|---------------------------------|--------------------|--------------------|---------------------|---------------------|--------------------|
| TFP | | 0.133*** (5.27) | 0.224*** (6.92) | 0.223*** (6.85) | 0.192*** (4.12) |
| Ownership | −0.343*** (−6.07) | −0.390*** (−6.91) | −0.385*** (−6.60) | −0.384*** (−6.57) | −0.629** (−2.34) |
| Size | 0.336*** (16.27) | 0.309*** (15.23) | 0.348*** (16.27) | 0.343*** (15.56) | 0.343*** (15.55) |
| Age | −0.018*** (−2.65) | −0.018*** (−2.80) | 0.003 (0.45) | 0.0002 (−0.02) | 0.0002 (−0.03) |
| TFP * ownership | | | | | 0.053 (0.94) |
| Constant | −8.623*** (−17.33) | −8.462*** (−18.21) | −10.214*** (−19.04) | −10.019*** (−18.21) | −9.872*** (−17.28) |
| Year-specific fixed effects | Yes | Yes | No | Yes | Yes |
| Industry-specific fixed effects | Yes | No | Yes | Yes | Yes |
| Obs. | 7262 | 7106 | 7026 | 7026 | 7026 |
| Log likelihood | −1456.30 | −1438.39 | −1371.90 | −1368.86 | −1368.43 |
| Pseudo R ² | 0.134 | 0.115 | 0.153 | 0.155 | 0.156 |

Note: z statistics in parentheses.

*** significant at 1%.

The descriptive statistics and correlations for the variables used in the Models 2 and 3 are displayed in Tables 1 and 2, respectively. Table 1 shows that firm TFP and firm size are significantly positively correlated with its OFDI intention, while firm age is significantly negatively correlated with its OFDI intention.

Table 2 shows that firm TFP, host country market potential, host country governance, and firm size are significantly positively correlated with the dependent variable, while host country entry cost, host country distance, and firm age are significantly negatively correlated with the dependent variable.

4. Results and discussion

4.1. Firm TFP

Fig. 2 shows the probability density functions (PDFs) of TFP for enterprises engaging (solid line) and not engaging (dotted line) in OFDI.¹ Fig. 2 indicates that the PDF of the TFP for different firms show varying behaviors, and in particular, the TFP of enterprises engaging in OFDI (solid line) is higher than that of the enterprises that do not engage in OFDI (dotted line).

The left- and the right-hand image in Fig. 3 show the PDFs of the TFP for SOEs and non-SOEs, respectively. According to the figure, for both SOEs and non-SOEs, the enterprises engaging in OFDI are likely to have higher TFP than the enterprise that do not engage in OFDI. Furthermore, Fig. 4 shows the PDFs of TFP for SOEs engaging in OFDI and non-SOEs engaging in OFDI. This figure reveals that for the firms engaging OFDI, the PDF of TFP for SOEs (solid line) is not significantly different from the PDF of non-SOEs (dotted line).

Table 3 examines whether there is any significant difference in the average TFP and other factors for enterprises engaging in OFDI and those that do not. The results in Table 3 show that the TFP, labor, capital and business income for the enterprises engaging in OFDI are significantly higher in the enterprise than that do not engage in OFDI, which is consistent with the result shown in Fig. 2.

4.2. TFP distribution of firms under different situations

To investigate the moderation effect of TFP, we plot the minimum TFP of China's MNCs in each host country against the number of Chinese MNC investments in the country. Fig. 5 shows that the minimum TFP for each country is negatively associated with popularity in the market. This implies that host counties with more attractive attributes (such as large market, etc.) might have lower TFP requirements. Thus, the TFP of the firm might moderate the effect of the host country's factors on the location decision of the firm.

¹ In order to avoid the problem of reverse causality between the enterprise productivity and OFDI decision, this article took the average value for the first three years before the current year as enterprise productivity as illustrated in Section 3.2.

In Fig. 6, we depict the PDFs of firm's TFP for two groups: firms with OFDI in one host country, and firms with OFDI in more than one host country. The PDFs appear to shift to the right according to the increase in OFDI events. This means that the TFP premium of firms with OFDI investments in more than one host country is larger.

4.3. Effect of TFP on MNCs' OFDI engagement

Regression analyses are performed in a step-wise manner, and the results are presented in Table 4. Model 1 in the second column of Table 4 is the baseline model, which includes all three control variable: firm ownership, firm size, and firm age. The results show that firm size has a significant positive relationship with the firm's OFDI decision. Unlike the results of Tian and Yu (2012), our findings show that both firm ownership and firm age have a significant negative effect. The result is consistent with the correlation coefficient in Table 1. The result might be due to the institutional advantages and incentive mechanisms enjoyed by the SOEs and companies that have existed for a long time. On the one hand, because China's regional development is highly uneven, the rising production costs in eastern coastal areas have pushed some firms with institutional advantages to maximize their institutional strengths in the home country, and transfer part of their production capacity to its central and western regions. Thus, these firms do not necessarily need to migrate overseas. On the other hand, exposed to unfamiliar foreign markets after "going out", the OFDI activities of the firm might experience significant uncertainty, and the managers of the firm must bear more responsibility. Once the SOEs experience a negative event, the managers might be investigated by the relevant departments. Thus, SOEs' administrative departments are not willing to "go out".

To test Hypotheses 1, we introduce the hypothesized terms in Columns 3 to 5 and the hypothesized terms for both Hypotheses 1 and 2 in Column 6. As shown in Models 2 to 4, the TFP is significantly positive. Hence, Hypothesis 1 cannot be rejected. Consistent with Hypothesis 1, the TFP in Models 2–4 is significantly positive, which implies that firms' TFP has a profound impact on their OFDI decisions. However, Hypothesis 2 is not supported. Model 5 in Table 4 demonstrates that the interaction of TFP with ownership is insignificant though positive, indicating that the effect of SOEs' TFP is not significantly different from the corresponding values for non-SOEs. All the results are robust given that the estimated coefficients and significance of the control variables in Model 5 are similar to the corresponding results of Model 4.

4.4. Effect of TFP on MNCs' location decisions

Table 5 shows the estimation result of the location decisions of China's multinational firms. Model 6 in the second column of Table 5 is the baseline model, which presents the result of the Eq. (3) with the year- and industry-specific fixed effects, including both the firm-level

Table 5
Estimation results of the effect of TFP on MNCs' location decisions.

| | (6) | (7) | (8) | (9) |
|---------------------------------|-------------------|--------------------|--------------------|-------------------|
| TFP | | 0.059*** (2.86) | 0.147*** (3.62) | 0.526** (2.13) |
| Market potential | 14.236** (2.01) | 13.285* (1.83) | 92.351*** (2.89) | 92.120** (2.48) |
| Entry cost | 0.001*** (2.69) | 0.001*** (2.86) | 0.001*** (2.80) | 0.0004 (0.40) |
| Governance | 0.285*** (13.83) | 0.286*** (13.59) | 0.288*** (13.64) | 0.321*** (3.06) |
| Distance | -0.172*** (-6.55) | -0.176*** (-6.55) | -0.178*** (-6.64) | 0.028 (0.21) |
| Ownership | -0.165*** (-4.63) | -0.166*** (-4.60) | -0.167*** (-4.61) | -0.167*** (-4.62) |
| TFP × market potential | | | -16.816** (-2.50) | -16.916** (-2.15) |
| TFP × entry cost | | | | 0.00003 (0.17) |
| TFP × governance | | | | -0.0069 (-0.33) |
| TFP × distance | | | | -0.043 (-1.57) |
| Size | 0.112*** (9.69) | 0.115*** (9.44) | 0.116*** (9.47) | 0.116*** (9.49) |
| Age | -0.014*** (-3.69) | -0.010** (-2.42) | -0.010** (-2.44) | -0.010** (-2.45) |
| Constant | -3.857*** (-9.98) | -4.285*** (-10.15) | -4.685*** (-10.44) | -6.521*** (-5.14) |
| Year-specific fixed effects | Yes | Yes | Yes | Yes |
| Industry-specific fixed effects | Yes | Yes | Yes | Yes |
| Obs. | 197,971 | 190,759 | 190,759 | 190,759 |
| Log likelihood | -3171.71 | -3037.80 | -3034.41 | -3033.19 |
| Pseudo R ² | 0.085 | 0.086 | 0.087 | 0.087 |

Note: z statistics in parentheses.

* significant at 10%, ** significant at 5%, and *** significant at 1%.

and the country-level control variables. Consistent with the existing studies, the coefficient of the host market potential is positive and significant, showing that the host country with a large market increases the probability of the firm entry. There is a positive correlation between entry cost for the host country and the MNC's incentive to invest in that country, which is not consistent with the theoretical findings. The reason for this might be that the variable entry cost cannot fully reflect the cost actually applied to foreign firms. Unfortunately, other data for entry cost are not available for most host countries; therefore, employing the other entry cost variables might reduce the sample size. In addition, Chinese firms tend to choose host countries with good governance and geographic proximity, because this may reduce the fixed cost of investment. After introducing the variable of the firm's TFP in Model 7, the signs and significance of the firm-and country-level control variables are similar to the effects recorded in Model 6, which further demonstrates that our results are robust.

We introduce the variable related to *Hypotheses 3a* in Model 8 and those related to both *Hypotheses 3a* and *3b* in Model 9. The results in *Table 5* show that the cross-term of market potential and TFP has a significant and negative moderating effect on the location decision of Chinese firms, which supports *Hypothesis 3a*. This implies that the positive relationship between market potential and OFDI decision weakens as TFP increases. The coefficients of three interaction terms of the TFP, with the host country's entry cost, the governance, and distance, are not statistically significant in Model 9. It indicates that the empirical finding does not support *Hypotheses 3b*. The results suggest that TFP does not significantly moderate the effect of the host country's production cost and the TFP of the firm can not reduce important of the host country's production cost on the firm's location decisions.

4.5. Robust test

To examine the sensitivity of our results, we conducted several robustness tests. First, to consider the causal effect of TFP, we test the hypotheses using the sample of new multinational firm entries to avoid the reverse causality problem, and the results are consistent with the findings mentioned above. Second, we use the share of the top 10 SOE shareholders as the proxy variable of institutional advantage for a robustness test. The results of models are similar to the findings reported thus far.

We also consider whether there is a significant change after introducing Asian factors. This is because that >67% of China's OFDI overall stocks were distributed throughout Asia between the year

2008 and 2014, excluding the Cayman Islands, the British Virgin Islands, and Bermuda. At the same time, with the rising political and economic cooperation between China and Asian countries, the promotion of the "One Belt, One Road" initiative, and the establishment of Asian investment banking, an increasing number of Chinese enterprises might be encouraged to invest more in Asia regions. The empirical result shows that China's MNCs are inclined to invest more in Asia regions, and the main results of *Hypotheses 3a* and *3b* are consistent with the results in *Table 5*. Detailed results for the above robustness tests are not reported here due to space constraints, but are available upon request.

5. Discussion and implications

Micro-level analyses of Chinese enterprises' OFDI have been largely ignored because of a lack of data on China's OFDI. Thus, using firm-level data, we explored the internal determinants that might affect firms' OFDI and location decisions. The empirical evidences suggests that (1) the more productive the Chinese firms, the higher their motivation to participation in OFDI; and (2) the influence of the firm's TFP is consistent across firms with different institutional advantages, in this case, we find that the SOEs with institutional advantages do not have an upper hand over non-SOEs in terms of OFDI engagement. These findings extend the empirical literature on EMEs as they explain the effects of TFP on firms' OFDI decisions.

In addition, the findings in this paper suggest that the TFP distribution of China's MNCs varies significantly across host countries. The empirical results show that the effect of the host country's market potential on the location decision reduces with an increase in the firm's TFP. This also means that countries with larger market potential are more attractive for most firms, particularly firms that are less productive. The reason might be that enterprises with high TFP invest in several countries, and therefore, the impact of exogenous factors on the location decisions would be decreased. The result is in line with the finding of *Yeaple (2009)* that more-productive U.S. multinational firms own affiliates in more foreign countries; thus, the effect of host countries might be not as high as those of the other countries. However, the empirical results show that the effect of the host country's production cost will not significantly change with the increase in firms' TFP, which means that the effects of the host country's production cost are the same across enterprises with different TFP.

These empirical results shed lights on firm's internationalization and location decision in the emerging market. First, Chinese enterprises should strengthen their own sustainable core competitiveness in

order to promote the long-term and sustainable development of Chinese OFDI. Second, Chinese firms investing abroad choose a specific location depending on both individual characteristics (productivity level, size, and age) and the host country's characteristics (market potential, distance, and governance), as well as their interaction. Third, enterprises with higher TFP can focus on opening up new markets in the less attractive host countries, so as to reduce the reliance on the developed host markets.

6. Limitations and future directions

This paper suffers from some limitations. First, owing to the inadequacy of the micro-data on Chinese firms engaging in OFDI, the sample used here does not cover non-listed companies. Second, while the Probit model can investigate whether the firm invests in a given host country in a given year, it cannot investigate the location choice of the firm among several host countries. Therefore, there are several interesting directions for future research. It would be informative to consider factors at the home country level, host country level, industry level, and firm level. There is a need to investigate how macro-level factors interact with industry- and firm-level factors by adopting more comprehensive techniques. It would also be interesting to study the different impacts of TFP under the controlled investment motivations of different enterprises.

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Yanmin Shao is an associate professor of Dolinks School of Economics and Management, University of Science and Technology Beijing and Academy of Mathematics and Systems Science, Chinese Academy of Sciences. She conducts interdisciplinary research to study the production efficiency of the economy, with a particular emphasis on industry production and outward foreign direct investment. Her work has appeared in flagship journals, including *Journal of Cleaner Production*, *Resources, Conservation & Recycling*, *Expert Systems with Applications*, etc. She has worked as the senior research assistant in Hong Kong City University for several times. She got her doctor degree from Academy of Mathematics and Systems Science, Chinese Academy of Science in 2010.

Yan Shang is a post-doctoral of Industrial & Commercial Bank of China and University of Chinese Academy of Sciences. She got her doctor degree from Academy of Mathematics and Systems Science, Chinese Academy of Science in 2015. She has worked as senior research assistant in Hong Kong Polytechnic University for a year. Her research interest focuses on efficiency analysis, and China's outward foreign direct investment.